Kansas 4-H Beef Leader Notebook

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KANSAS 4-H LEADERS NOTEBOOK

Introduction

This notebook is designed to help you as a 4-H beef leader do the best job that you can to make the beef project a fun, interesting, and valuable experience for the 4-H youth that you teach. The beef project is one of several projects within the Animal Sciences 4-H Curriculum Division. It is important to Kansas, because the beef and meat packing industry is one of the largest generators of dollars to the Kansas economy. It is important to 4-H, because several thousand members annually are attracted to the beef project. The beef project, then, becomes the vehicle through which we can teach profitable beef production practices and necessary life skills to the youth who enroll. Other 4-H project areas such as meats, veterinary science, marketing, computer, and health and safety are incorporated where appropriate.

OBJECTIVES

The objectives of the beef project are as follows:

1. Learn and apply recommended principles of beef animal science.
2. Learn to use accepted practices for mental, physical and emotional health, and to respect yourself and others.
3. Demonstrate a knowledge of sound breeding, feeding, and management practices.
4. Develop skills, knowledge and attitudes for lifelong use.
5. Identify types and grades of animals and employ efficient marketing methods.
6. Practice leadership skills and roles, take part in community affairs, and demonstrate citizenship responsibility.
7. Identify quality in wholesale and retail cuts of animals and animal products and understand their relationship to management practices.
8. Develop integrity, sportsmanship, decision-making capability, and public speaking skills through participation in demonstrations, tours, judging, and/or exhibits.
9. Learn the value of scientific research and its influence upon animals and the meat industry.
10. Explore career, job and productive leisure opportunities.

MAJOR CONCEPTS

To help meet the above objectives, 13 general 4-H beef project concepts or topics were identified by the Beef Design Team. Each of the specific lesson plans falls under one of these major 13 concepts—Economics, Facilities, Range and Pasture Forage, Health, Management, Meats, Nutrition, Parasites, Records, Reproduction, Selection, Showing and Miscellaneous.

LIFE SKILLS

Kansas 4-H life skills have been articulated to help define the youth development outcomes of our 4-H program. It is the goal of 4-H to develop youth who are contributing, productive members of society.

Youth may achieve this goal when these five life skills are developed and applied.

1. Positive self-concept
2. Sound decision-making
3. Positive interpersonal relationships
4. Desire for lifelong learning
5. Concern for community

These five life skills are incorporated throughout the lesson plans and in the educational design of the project meetings. The "Dialogue for Critical Thinking" Section leads the group through the experiential learning process.

AGES AND STAGES

Leaders can best achieve these desired outcomes with their members when they have well-prepared leader material and understand how to structure a stimulating learning environment for the age of youth they are leading. We know and believe that each child is unique, yet we also know that there are generalities about certain age groups that help us program more effectively.

These lesson plans have been developed to target four general age groups:

- Level I—ages 7 and 8
- Level II—ages 9, 10, 11
- Level III—ages 12, 13, 14
- Level IV—ages 15 and older

A review about the physical, mental, social and emotional characteristics of these age groups will prepare the leader for a successful project experience. It should be understood by the leader that the levels are also based on corresponding skill levels of youth. Thus, a 12-year-old youth enrolling in beef for the first time should probably begin with lessons in Level I, and not take Level III until the member has mastered some basic knowledge and skills.

Ages 7 and 8

Physical growth can be described as slow and steady. Mastering physical skills is important to self-concept. This includes everything from printing with a pencil to large muscle skills like catching a ball. Activities need to be just that—active! Provide opportunities to practice skills, but use projects that can be completed successfully and quickly by beginners.

Typical second or third graders think in concrete terms. If they have never seen it, heard it, felt it, tasted it, or smelled it, they have a hard time thinking of it. Leaders should show and tell, rather than giving instructions verbally. Early elementary children are learning to sort things into categories. This makes collecting things important and fun at this age. Most are more interested in the "process"—what? why? how?—than in the resulting product.

As children move away from dependence on parents at this age, they need

to transfer that dependence to another adult, so the leader may become very important in their eyes. Building friendships occurs easily and generally by the end of this period, boys prefer playing with boys and girls with girls. Peer opinion now becomes very important. Small group activities are effective, but children still need an adult to share approval.

Seven and 8-year-olds need and seek the approval of adults, because they are not yet confident enough to set their own standards. Play or making believe is one way they increase their ability to imagine what other people think and feel. Rules and rituals are important, but it is very hard for children this age to lose. This is why success needs to be emphasized, even if it is small. Failures should be minimized. Cooperative games and activities are especially enjoyable. When an activity fails, the leader should help children interpret the reasons behind the failures, which teaches that failing is not always bad. Learning to cope with problems is a skill the 4-H leader can encourage for all members. **The usual practice of awarding competitive ribbons should be minimized or avoided for this age.** For this reason, the bucket calf exhibit should not become a "mini-steer show."

Ages 9, 10, 11
Physically, most children at this age are in a holding pattern, although puberty may be starting for some very early-maturing girls. Activities should encourage physical involvement, because 9- to 11-year-olds are anything but still and quiet.

Hands-on involvement with objects is helpful. Children this age like field trips, but only if they are not expected to stay confined or to do one thing for a long period of time. Upper elementary children need opportunities to share their thoughts and reactions with others. They are still fairly concrete thinkers and will give more attention if they are seeing and doing things.

Children at this stage are beginning to think logically and symbolically and are beginning to understand abstract ideas. As they consider ideas, they think it is either right or wrong, great or disgusting, fun or boring. There is very little middle ground.

The role of the leader is most crucial at this stage, as these children look to the adult for approval and follow rules primarily out of respect for the adult. Individual evaluation by adults is preferable to group competition where only one can be the best. They want to know how much they have improved and what they should do to be better next time. Encouragement from an adult can have remarkable accomplishments.

This is the age of the "joiners." They like to be in organized groups of others similar to themselves. If you have both boys and girls of this age in your project groups, you will do best if small group work is done in same-sex groups. They generally are concerned with immediate self-reward; however, the satisfaction of completing a project comes from pleasing the leader or parent rather than from the value of the activity itself.

Toward the end of this age range, children are ready to take responsibility for their own actions. Giving these youth opportunities to make decisions should be encouraged. Leaders should move from dictating directions to giving reassurance and support for members' decisions.

Nine, 10- and 11-year-olds have a strong need to feel accepted and worthwhile. School and other pressures become demanding. Successes should continue to be emphasized. Comparison with the success of others is difficult for these children. It erodes self-confidence. Instead of comparing children with each other, build positive self-concepts by comparing present to past performance for the individual.

Ages 12, 13 and 14
This is a time of developmental variety among peers. Growth spurts beginning with adolescence occur at a wide range of ages, with girls maturing before boys. These rapid changes in physical appearance may make teens uncomfortable. Slower developing teens may also be uneasy about the lack of changes.

Young teens move from concrete to more abstract thinking. Playing with ideas is as much fun as playing sports. Ready-made solutions from adults often are rejected in favor of finding their own solutions. Leaders who provide supervision without interference will have a great influence on these youth.

Small groups provide the best opportunity for young teens to test ideas. Justice and equality become important issues. Judging of projects is now viewed in terms of what is fair, as well as a reflection of the self-worth of the individual.

These youth enjoy participating in activities away from home as they begin to develop independence. Opinions of peers become more important than opinions of parents or other adults. Close friendships begin to develop, and group experiences provide opportunity for social acceptance.

As puberty approaches, emotions begin a roller coaster ride. Young teens begin to test values and seek adults who are accepting and willing to talk about values and morals. This period seems to present the biggest challenge to a young person's self-concept. These youngsters face so many changes that they hardly know who they are. Adults can help by providing self-knowledge and self-discovery activities such as the "dialogue for critical thinking" portion of these lesson plans.

Continue to avoid comparing young people with each other, being careful not to embarrass them. They want to be a part of something important that provides opportunity to develop responsibility.

Ages 15, 16 and 17
Most teens of this age know their own abilities and talents. In most cases, they have adjusted to the many body changes by now. Many develop athletic talent and devote hours to training and competition. Learning to

drive a car further moves the teen from family into the community as independent people.

Mid-teens begin to think about their future and make realistic plans. Their vocational goals influence the activities they select. Teens set goals based on feelings of personal need and priorities. **Any goals set by others are generally rejected**. As they master abstract thinking, they can imagine new things in ways that sometimes challenge adults.

These teens can initiate and carry out their own tasks without supervision. A leader can be helpful by arranging new experiences in areas of interest to teens, but must be sure to allow for plenty of input from them. Leader-member relations should change from director/follower to that of advisor/independent worker.

Mid-teens tend to be wrapped up in themselves. Relationship skills are usually well-developed. Dating increases and acceptance by members of the opposite sex is now of high importance. Sports and clubs are important, but these teens now want to be recognized as unique individuals within that group.

Two important emotional goals of the middle-teen years are independence and identity. Time is precious. If activities are perceived as busywork, teens soon will lose patience and interest. Middle teens are learning to cooperate with others on an adult level. They will pride themselves on increased ability to be responsible in the eyes of themselves, peers, and adults.

Ages 18 and 19
These young adults are completing their 4-H careers and moving on to college, jobs, marriage, and other adult responsibilities. If continuing involvement at the local level, they will be self-directed learners or assume adult leadership roles.

This information on child development has been taken from the North Central Regional Extension Publication No. 292, *Ages and Stages of Child and Youth Development: A Guide for 4-H Leaders,* written by Jeanne Karns, graduate assistant and Judith Myers-Walls, Extension Specialist, Human Development, Purdue University.

YOUTH AT RISK

Some child development specialists and educators have noted every child of the ‘90s is at “some risk” because of the complex social forces affecting our country since the early 1950s. In 1991, The National Commission on Children estimated that fully one-quarter of all children are “at severe risk” in relation to substance abuse, school failure, delinquency, etc., and another quarter are “moderately at risk.” H. Stephen Glenn and Jane Nelsen document these changes in their book, *Raising Self-Reliant Children in a Self-Indulgent World.* Four major factors necessary for the development of capable young people have been identified that are generally missing from our culture—networks, meaningful roles, on-the-job training, and parenting resources. 4-H project meetings can

help restore these vital missing pieces.

Glenn's definition of a network, in the simplest sense, defines the 4-H project meeting: "two or more individuals who engage in dialogue about the world and the life they are living and who occasionally collaborate to achieve some mutually desirable end." The dialog for critical thinking portion of these lesson plans directly address this definition.

Many youth today are growing up in families and communities without any significant role to play. They just don't seem needed until they become an adult. Research indicates that a primary cause of decline in motivation, discipline, and achievement is this perceived lack of need or value. Glenn and Nelsen challenge us to deal with youth actively in ways that affirm their contributions. **We must treat youth as contributors and assets rather than passive objects to be done for or to.** As 4-H project leaders, when we listen to members, we must take them seriously and treat them as significant, we will begin to restore the dialogue and collaboration necessary to link youth with the larger society.

On-the-job training with "hands-on" involvement has been the cornerstone of 4-H project work. It is important for youth to have this opportunity because that is where they learn patience, personal initiative, hard work, and deferred gratification. If they don't learn about real life in this way, they receive its impressions passively from the media, generally through five hours of television each day.

"Learning by doing" is one of the primary reasons why 4-H has been recognized in the field of informal education. If we, as parents or leaders, think we are helping when we do their work for them, we need to stop and consider that, "The best way to destroy self-esteem and a sense of worth in young people is to do too much for them. This robs them of a sense of personal capability. The greatest gift of all is to help them validate themselves as agents in their own lives." (Glenn and Nelsen, pg. 47)

Today's parents need all the help they can get. According to the Ewing Marion Kauffman Foundation report, *Reweaving the Tattered Web—Socializing and Enculturating our Children*, by Basil J. Whiting in June 1993, "Three generations and extended families in the same house are not so common. Grandparents and aunts and uncles live longer distances away, and often alone (only five percent of American children now see a grandparent regularly).… Divorce is common. Half of those who remarry will experience a second divorce. Half of all children will spend some of their childhood with a divorced parent." As a 4-H project leader, you become a parent resource, both to the child and the child's parent.

Today's parents are concerned and fearful for their children. Why? Dr. Bruce Baldwin, nationally known psychologist and author says, "They wonder if their kids have what it takes to succeed as they have. Parents know that in the future, even menial positions will require well-developed cognitive skills: reading, writing, math, computer literacy, and the ability

to process information quickly and efficiently." (*TEAM, The Early Adolescence Magazine,* Vol. IV, No. 5, May-June 1990)

The same magazine noted that a large metropolitan education trust reported the types of requirements for employees comparing the past with the future:

PAST	**FUTURE**
Doers	Thinkers
Single repetitive functions	Quality circle approach
Individual piecework	Team centered
Autocratic	Participatory
Single job in lifetime	Flexible learners
Familiar with simple machines	Technology knowledgeable
Single task orientation	Information processors

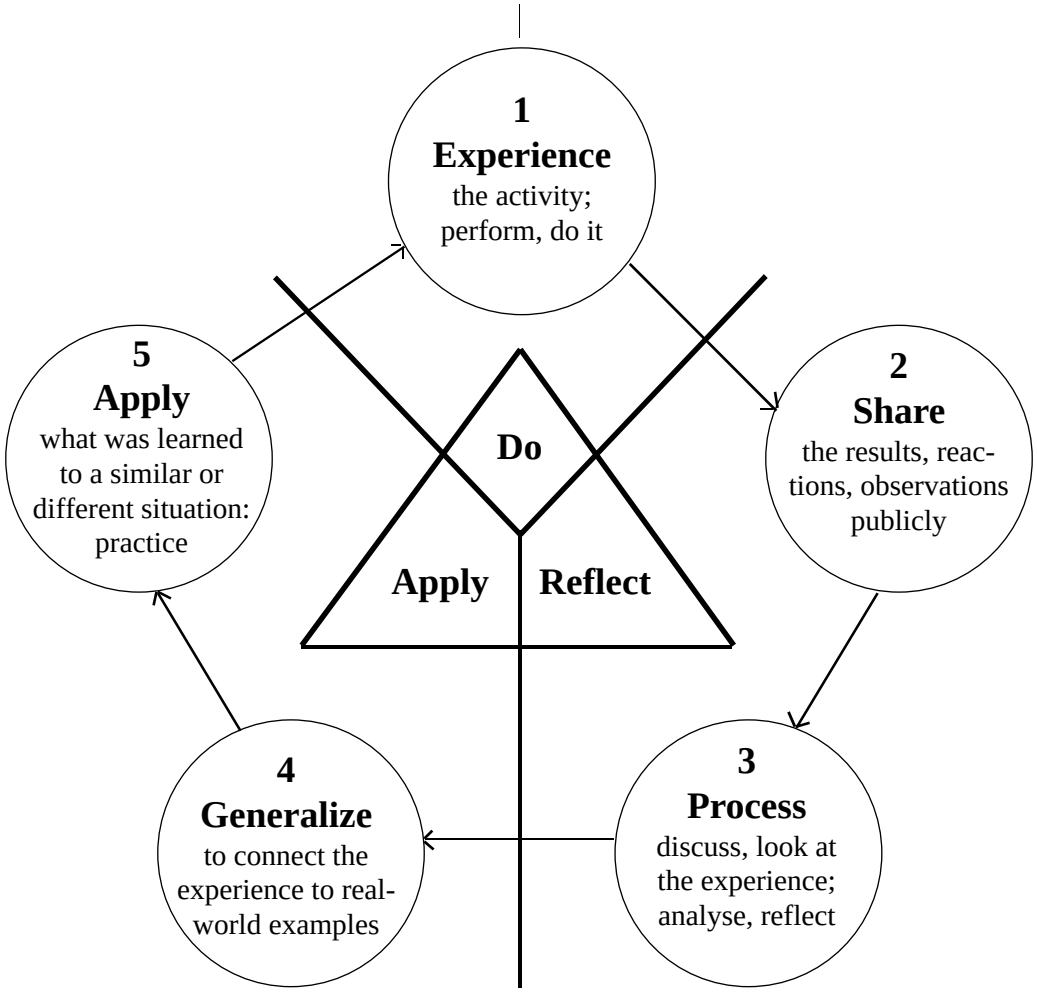
The January 1990, issue of *Prevention Forum* magazine offers hope for today's youth when it reports that research on youth who have become healthy adults in spite of adversity have had the opportunity, somewhere in their lives, to experience a caring, nurturing environment that encourages their active participation in problem-solving, decision-making, planning, goal-setting, and helping others in meaningful activities.

According to the Kauffman Foundation report, "child and youth development by natural osmosis is no longer an effective strategy. We can rely no longer on child development to occur as a natural by-product of family and community functioning because too many families and communitites no longer function the way they used to.

This means reweaving the web to do what the family and community no longer do, and perhaps no longer can do adequately. It means constructing new institutions and new ways for children and youth to sustain relationships with a variety of caring adults.… Yet this must be supplementation, not replacement. We dare not leave out strands of parent-strengthening services in the many ways and places where traditional parenting is, at bottom, the still-to-be-preferred approach."

The project lesson plans contained in this leader's notebook have been designed to incorporate the components critical to the development of capable, contributing young people. By following these plans, leaders will help prepare their members to function and live productively in the world which they will soon inherit and direct. They are also designed to help you, as the leader, quickly and easily prepare for the lesson, conduct the activity, and facilitate the discussion and dialogue.

EXPERIENTIAL LEARNING MODEL



Example questions used to complete the Eperimential Learning Model

A. Share

1. What did you do?
2. What happened? What did you see? Hear? Touch? Taste?
3. How did you feel?
4. How did it feel to . . . ?
5. What was most difficult? Easiest?

B. Process

1. What problems or issues seemed to occur over and over?
2. What similar experiences have you had?
3. What was most important?
4. Why was that significant?
5. Why do you think it happened?
6. What caused you to feel that way?

C. Generalize

1. What did you learn about yourself through this activity?
2. What did you learn about a life skill?
3. How do the major themes or ideas relate to real life and not just the activity?
4. How did you go about making your decision?

D. Apply

1. How can you apply what you learned (life skill) to a new situation?
2. How will the issues raised by this activity be useful in the future?
3. How will you act differently in the future as a result of this activity?
4. How can you do it differently for different results?

APPLYING THE EXPERIENTIAL LEARNING PROCESS

Hands-on involvement (learning by doing) is the most effective method for learning this material. It helps youth learn personal initiative, hard work, patience and deferred gratification. By doing the work for the youth, parents, teachers and leaders may destroy the young person's self-esteem and sense of worth. They may rob youth of learning by trial and error, practicing skills and becoming competent and capable. The greatest gift leaders can give is to help youth validate themselves as capable people. These lessons were designed using a model known as the *experiential learning process* which was adopted as the national curriculum development model for Extension Youth Development in 1992.

Experiential learning takes place when a person is involved in an activity, looks back and evaluates it, determines what was useful or important to remember, and uses this information to perform another activity.

The Experiential Learning process encourages youth involvement through dialogue and strengthens adult-child relationships. To enhance the goal of learning an atmosphere of friendliness, trust, and unconditional acceptance is required.

In each lesson, the "Dialogue for Critical Thinking" questions help complete the experiential learning steps. Except for the content review questions, most of these leading questions do not have a "right" or "wrong" answer. In addition to providing feedback to the leader, their purpose is to affirm and validate the perceptions of the members.

Take time to begin to feel comfortable with this process. It may seem awkward at first, but remember, Latin for "to teach" means to draw forth through dialogue and understanding. When the Experiential Learning process is used to help youth share the process of discovery, leaders will be developing them as critical thinkers, concerned for others, with the wisdom to function successfully in their future world.

FORMAT OF KANSAS 4-H BEEF PROJECT

Each lesson plan in this notebook follows the same general outline which includes:

TITLE generally descriptive of the beef skill to be learned.

LEVEL describes which age level it is written for.

What Members Will Learn . . .

ABOUT THE PROJECT indicates what beef subject matter will be learned.

ABOUT THEMSELVES indicates what personal or life skills will be learned. These specific objectives can be used to evaluate if the lesson was successful and learning goals accomplished by the members.

MATERIALS NEEDED tells the leader what equipment, supplies, visuals or handouts will be needed in preparation for the lesson.

ACTIVITY TIME NEEDED gives the approximate time needed to complete the activity. Most lessons can be completed in 30 to 60 minutes.

ACTIVITY information is what the leader needs to know to teach the activity. This portion can be used as a leader's script for the leader if necessary.

LEADER NOTES give directions or instructions for the leader which go with the "Activity" information. Space is available for leaders to write their own notes also. Member activity sheets or handouts are provided for the leader to copy and give to members to work on at the meeting or take home so parents can reinforce the learning.

DIALOGUE FOR CRITICAL THINKING questions are provided for the leader to help enhance life skill development and generalize the subject information to the real world of the youth participant.

GOING FURTHER ideas such as tours, demonstrations, handouts, and things to do at home, are for the leader and members to consider if they want to learn more about this particular lesson content.

REFERENCES credit the source used to develop this lesson activity in addition to the author.

AUTHOR is the source of information plus names of Kansas State University faculty who reviewed and adapted this lesson including specific ideas from volunteers.

The beef project is one of several Kansas 4-H projects to undergo a major change in the way the project materials have been designed and used. Leaders need to realize that members will no longer receive member resource books or materials through the County Extension Office. Members will receive a "Beef Member Guide and Annual Report" which outlines the skills to be learned, describes learning opportunities, lists awards and careers, suggests where they can find more information, provides space for beginning goals and ending evaluations, and a year-end beef summary record. All other printed materials for members will be given to them by their beef project leader.

In order for members to have a successful project experience, it is **imperative** that a leader meet with members. These lessons work best with an adult and/or teen leader working with a small group of members. Several youth in the group will stimulate the discussion and dialogue, which is so important to the success of this process. If members are unable to meet in a group, the parent may serve as a leader to his/her child by requesting copies of the appropriate lesson plans from the Extension office and completing them at home.

The beef project has been restructured to feature a series of sequential learning experiences based on members' age and skill level, which will challenge them with new skills each year they remain in the project. Our goal is to make them knowledgeable of the entire beef industry rather than specialize in one type of project exhibit. In fact, owning an animal and exhibiting at a show need not be required. It is possible for a member to participate in the group lessons without owning an animal. Owning, caring for, and exhibiting an animal should be considered a special bonus to the total project experience.

The project exhibit should be decided by the member, parent and leader, based on member's age, skill level, facility and financial needs, and what local exhibit opportunities have been identified. Most counties provide county fair classes for bucket calf, market steer, and breeding heifers. Others also add feedlot futurities. This approach to the beef materials provides maximum flexibility for counties to establish exhibits that meet the needs of their beef members. Statewide opportunities offer market steer and breeding heifer classes plus show and share opportunities.

Ideally, members should progress through all levels in order, but it is not necessary. If project members vary in age and skill levels and the group is large enough, splitting into like age groups with additional leaders is recommended. Older members might be used as assistant leaders with beginning levels which then allows teens to be self-directed learners for advanced skills, or teens might meet together as a multi-club or county-wide group.

ROLE OF THE 4-H PROJECT LEADER

Your major roles are that of teacher, facilitator and encourager.

Your Role as Teacher:

- Help members set goals.
- Share your knowledge of the project through meetings, tours and home visits. Having five to 10 meetings works well. Set meeting dates and times with the participants. Remind participants of upcoming meetings.
- Invite and involve parents and other leaders when appropriate.
- Keep your skills current through trainings, consultations, and reading. Ask for help or advice as needed.

Your Role as Facilitator:

- Use techniques to facilitate (assist) learning. See "Teaching with Discussion."
- Be sensitive and respond to individuals' needs, beliefs and family circumstances. Do not judge.
- Help members find additional learning opportunities and resources. (Using "Going Further" in the lessons.)
- Relate project to everyday life and career possibilities.

Your Role as Encourager:

- Recognize the personal growth of members and help them celebrate their successes.
- Lead (not push) participants into new skills and new ways of thinking. Encourage and challenge them to become better persons, yet always accept them and love them as they are now.

Your classroom is wherever the member must be in order to learn—in the home, meeting room, or on a field trip. Your subject matter, what you teach, is beef and youth development.

TEACHING WITH DISCUSSION

Why Use Discussion?

Discussion is part of every lesson. Discussion questions appear in the "Dialogue for Critical Thinking" section. Discussion is most effective when you want to:

1. Give participants practice thinking in terms of the subject matter.
2. Help participants evaluate their beliefs.
3. Stimulate participants to apply principles.
4. Help participants learn to anticipate or solve problems.
5. Use the resources of the group members.
6. Gain acceptance of new information.
7. Develop motivation for further learning.
8. Get feedback on how well participants learned the material.

How Can I Get People to Talk?

Discussion can be difficult at first simply because few participate. Sometimes, all that is necessary to improve the situation is time, your smiles and encouragement, and practice. Many participants are used to being talked **at**, not **with** in educational situations. The fear of being embarrassed is another major factor. Not knowing the other participants, being unsure of one's idea, being afraid of sounding silly—these make participants feel that the safest thing to do is remain silent.

How Can I Help Them Overcome Their Fear?

The first step is making sure participants become acquainted with each other and with you. Begin by having get-acquainted activities at the organizational meeting. Continue by providing games, refreshments, time to talk, and other opportunities for friendship building throughout the project meeting period. Get to know each participant personally. Take a special interest in them; they will come to trust you.

When asking a question, call on participants by name. This seems to promote freer communication.

Sitting in a circle also encourages exchange.

Eliminate the fear of being wrong. (This is a tremendous barrier to discussion.) Avoid questions where there is only one right answer. Do not judge participants' answers about beliefs and preferences. Do not allow any

participant to make unkind comments about another's answer.

At times, give participants opportunities to talk in small groups to work out answers together. If your group seems to have difficulty responding to questions, allow them to write out their answers first. This seems to give them added confidence to share their thoughts with others. As much as possible, ask questions that can have no wrong answers: How do you feel about this? What do you think?

What if Someone Talks Too Much?
There are several effective ways to work with a person who monopolizes the discussion. You might ask this person and at least one other to observe the discussion and report their observations to the group; for example: Did we solve the problem? Did everyone get a chance to participate? Another option is to divide into smaller discussion groups. Ask one person from each group to report the results of the discussion. Do not choose the monopolizer to report. You also could talk to this person privately. Explain that you appreciate the participation and insights, but you believe other people also should be given the opportunity to learn how to talk in a group. Ask this participant to help the group by allowing others more time for discussion and perhaps saving personal insights for more difficult questions.

Reference: *Teaching Tips* by Wilbert J. McKeachie (1986)

THE FIRST MEETING

The first meeting is usually an organizational one to plan for the project year. It is a good idea to have parents attend this first meeting with the members. Parents should be encouraged to take part in any or all activities.

As members arrive, plan something for them to do. Perhaps a teen leader can be prepared with a get-acquainted game or activity. Make sure every member knows everyone else. Do not assume this is the case. Taking time now to build group trust will have payoffs later in commitment, discipline and encouraging discussion. Share some of the broad objectives you have for the beef project. Set dates with members and parents for future meetings. Schedule any demonstrations with members and discuss other special activities for the entire year. Discuss your expectations for recovering costs of materials, copying, etc.

Young people deserve to be treated as contributors and assets instead of passive objects to be done for or to. Your job is to involve your participants and challenge them toward learning and personal growth. They should be involved in the planning and preparation of meetings. A map helps to give us direction, keep us on track and know when we've reached our destination. We've designed a MAP—Member Achievement Plan—to help you and your 4-H members plan, as a group and as individuals, what they want to learn, make and do in this project. This is called goal-setting. It also teaches decision making.

Ask members to bring their Beef Member Guide and Annual Report to the first meeting along with pocket folder or binder to put it in. They will use it to begin to develop their "MAP" by completing Step 1. The leader and project group decide on four to six lessons they would like to learn about. Provide members a list of lesson titles from the appropriate level and let them choose. There should be plenty of choices to choose from different topics within the same Level if the same members enroll next year. As members get older, it is appropriate for them to choose less from a given list and become skilled at identifying and writing their own learning goals.

Goals may be divided into two groups: short-term and long-term. Short-term goals can be accomplished during the project year, while long-term goals take one or more years. Members will need to work with both types; however, a base for success and confidence will be established quickly with short-term goals.

Short-term goals:
- Must be specific and attainable
- Have a measurable outcome
- Specify time of completion
- Often related to long-term goals

Examples:
A. By the end of the summer, I will know how to lead a calf in the showring.
B. By August 1, my steer will have gained 450 pounds, because I learned proper nutrition and health care.

Long-term goals:
- Must be believable
- Give direction and motivation
- Describe conditions one hopes to achieve

Examples:
A. To be the champion beef show-person at the county fair.
B. I will become a better feed purchaser, by learning how to read feed labels.

It is easy for a member to list long-term goals. If your members tend to think of only long-term goals, simply ask them, "What will you need to learn or do in order to accomplish this goal? How will you make this happen?" Answering these questions will provide many short-term goals. As a leader, you are aware of many of your member's capabilities. You can help identify which goals are realistic for this year and which might have to become long-term goals.

After setting goals, review them periodically with members to see what progress is being made or what needs to be altered to reflect current situations. Hearing genuine praise or concern from interested adults is essential in helping members obtain their goals.

Explain other parts of the Member Guide and Annual Report as necessary. Discuss expectation of members and parents. Complete a short lesson activity from the appropriate level.

STEPS 2 AND 3 of the MAP—Do, Measure
At the project meeting, or at home with their family, members add their own personal goals to their MAP and add the date planned in the column on the right. As members complete their goals, they write the date completed in Step 3.

STEPS 4 AND 5 of the MAP—Evaluate, Share and Celebrate
At the end of the annual project experience, goals should be evaluated. How did the goals work? What was learned? What needs to be accomplished next? Members may not have accomplished what they set out to do, but they may have learned many things in the process. Setting a goal to reach a partial number of total goals isn't a bad idea, since it enables the younger member to feel successful.

The member and the leader, or in the case of the parent leader, the member and the parent, should complete Step 5 of the MAP as soon as the member has completed his/her short-term plans. All members who complete this step should be given immediate recognition for their project goal-planning accomplishments. Kansas 4-H has created a new recognition system for recognizing 4-H members for reaching annual project goals. Check with your County Extension Agent to see if this special recognition is offered in your county.

When properly used, incentives can be an effective way to encourage good project work and enhance personal development of the members. One of the strongest human incentives is that inner feeling of accomplishment and achievement.

Public recognition in news articles or at meetings, a word of praise or pat on the back from leaders are also effective in encouraging desirable performance.

Group recognition should be used at the end of the project to recognize the accomplishments of each member who completed the project, attended a certain number of meetings, demonstrated certain acquired skills, etc. Recognize not only the member who might have won the championship, but use your imagination to recognize the most improved showperson, best caretaker, best records, most improved beef judge.

REFERENCES

Portions of this introduction section have been adapted from the *Beef Cattle Leader Guide* published by the Texas Agricultural Extension Service, and from *Celebration!,* Nebraska Cooperative Extension Service, 4-H publication 262.

Reweaving the Tattered Web—Socializing and Enculturating our Children, by Basil J. Whiting, is published by Ewing Marion Kauffman Foundation, 4900 Oak, Kansas City, MO 64112-2776.

Raising Self-Reliant Children in a Self-Indulgent World, by H. Stephen Glenn and Jane Nelsen, Ed. D., is published by Prima Publishing and Communications, P.O. Box 1260SR, Rocklin, CA 95677, (916) 624-5718, and can be ordered from St. Martin's Press, 175 Fifth Avenue, New York, NY 10010 (212) 674-5151.

A video presentation by Stephen Glenn, which summarizes much of *Raising Self-Reliant Children in a Self-Indulgent World,* can be requested through your county Extension office. Ask for the video, Developing Capable Young People, available from Kansas State University, Department of Communications, Production Services/Instructional Media.

Some members may wish to secure additonal reading materials. The following references are suggested. Members may write to listed organizations or groups for ordering information, or check with their public library or local bookstore.

Livestock Judging Guide, 4-H 112, avialable for sale from your county Extension office.

Kansas Beef Cattle Handbook, one reference copy is located in each Kansas county Extension office, or for sale from Kansas State University, Department of Animal Sciences and Industry, (913) 532-6131, $35.

Animal Science and Industry, by Duane Acker, published by Prentice-Hall (basic textbook).

Kansas Beef Council, P.O. Box 4567, Topeka, Kansas 66604.

National Live Stock and Meat Board, 444 North Michigan Avenue, Chicago, Illinois 60611.

Write to the respective beef cattle breed associations.

Handbook of Livestock Management Techniques, Battaglia and Mayrose, 1981, Burgess Publishing Co.

PLANNING HELPS

The following forms may be used by the leader to help in planning for their beef project experience.

- Project Member Enrollment Record
- Project Leader Meeting Record
- List of Members and Their Goals
- Volunteer Support Form
- Project Meeting Checklist

The General Section in this notebook also contains useful information for the leader.

- 4-H Steer Project Calendar of Events
- Beef Cow Management Calendar (Includes good tips for heifers)
- Conducting a Beef Skillathon
- How to Give a 4-H Beef Presentation
- Conducting a 4-H Livestock Judging Contest
- Lesson Plans by Beef Project Concepts
- Beef Member Guide and Annual Report

Cooperative Extension Service
Kansas State University
Manhattan, Kansas

PROJECT MEMBER ENROLLMENT RECORD

Name	Age Jan. 1	Yrs. in Project	Parents' Name(s)	Address	Phone No.

PROJECT LEADER MEETING RECORD

name of project _____ **phase(s)** _____ **project leader** _____

PROJECT MEMBERS		ATTENDANCE AT PROJECT MEETINGS									PRESENTATIONS MADE BY MEMBERS	
Name	**Phone**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**		**Demonstrations**	**Talks**
1.												
2.												
3.												
4.												
5.												
6.												
7.												
8.												
9.												
10.												
11.												
12.												
13.												
14.												
15.												
16.												
17.												
18.												
19.												
20.												

LIST OF MEMBERS AND THEIR GOALS

1. **NAME:** _____

   Plans or wants to do: _____

   _____

   Assistance, resources, or materials needed: _____

   _____

2. **NAME:** _____

   Plans or wants to do: _____

   _____

   Assistance, resources, or materials needed: _____

   _____

3. **NAME:** _____

   Plans or wants to do: _____

   _____

   Assistance, resources, or materials needed: _____

   _____

4. **NAME:** _____

   Plans or wants to do: _____

   _____

   Assistance, resources, or materials needed: _____

   _____

5. **NAME:** _____

   Plans or wants to do: _____

   _____

   Assistance, resources, or materials needed: _____

   _____

6. **NAME:** _____

   Plans or wants to do: _____

   _____

   Assistance, resources, or materials needed: _____

   _____

7. **NAME:** _____

   Plans or wants to do: _____

   _____

   Assistance, resources, or materials needed: _____

   _____

8. NAME: _____

Plans or wants to do: _____

Assistance, resources, or materials needed: _____

9. NAME: _____

Plans or wants to do: _____

Assistance, resources, or materials needed: _____

10. NAME: _____

Plans or wants to do: _____

Assistance, resources, or materials needed: _____

11. NAME: _____

Plans or wants to do: _____

Assistance, resources, or materials needed: _____

12. NAME: _____

Plans or wants to do: _____

Assistance, resources, or materials needed: _____

13. NAME: _____

Plans or wants to do: _____

Assistance, resources, or materials needed: _____

14. NAME: _____

Plans or wants to do: _____

Assistance, resources, or materials needed: _____

VOLUNTEER SUPPORT FORM

Volunteer I name _____

Volunteer II name _____

Address _____

City _____ Home phone _____

Volunteer I occupation _____ Business phone _____

Volunteer II occupation _____ Business phone _____

Other volunteer obligations _____

_____

_____

_____

I would be willing to assist the 4-H program by:

Volunteer I	Volunteer II	
☐	☐	Helping members with demonstrations.
☐	☐	Helping members with project talks or public speaking.
☐	☐	Helping provide transportation to project meetings.
☐	☐	Assisting members with project records.
☐	☐	Helping provide transportation for project tours or field trips.
☐	☐	Assisting with project meetings when needed. Special skills I have: _____
☐	☐	Help bring refreshments.
☐	☐	Developing a “calling tree” for meeting reminders.
☐	☐	Making my home available for a project meeting if needed.
☐	☐	Helping provide special supplies if needed.
☐	☐	Others, please explain: _____

_____

PROJECT MEETING CHECKLIST

A MEETING EVALUATION INSTRUMENT

After your project meeting, take a few minutes to consider each of the following questions. This checklist should also serve as a reminder of ideas to incorporate in future project meetings.

	MEETINGS HELD					
	1st	2nd	3rd	4th	5th	6th
1. Were the objectives of the meeting clear to members?						
2 Did I give each member a chance to actively participate? (sharing ideas, assisting, presentations)						
3. Did I commend or encourage each youth in some way?						
4. Did I plan for differences in ages, abilities, and interests of members?						
5. Did I observe progress of individual members?						
6. Did I involve other volunteers in some way? (planning, leadership assistance, transportation, refreshments)						
7. Did I give members a chance to assume responsibility when it was appropriate?						
8. Did I incorporate some fun activity or game into the project meeting?						
9. Did I summarize the new information shared and skills learned at the close of the meeting?						
10. Most of all, did I enjoy working with the young people involved?						

**Seven or more positive responses denotes an excellent meeting rating!*

NOTES:

4-H STEER PROJECT CALENDAR OF EVENTS

Before going to look for a potential project animal, determine what goals you want to accomplish. Are you planning on showing only at a county show, or do you plan on going to a regional or state show? Just because you choose a county fair steer rather than a national quality steer, the important thing to keep in mind is what you learn, and will your steer project be profitable. Once your goals are clear in your mind, it is time to begin the search! It is **never too early** to start looking for a calf. Below are some general guidelines to follow for a 4-H steer to be exhibited in late summer.

July through December, Purchase Steer

- Look around before buying a steer, if possible, and purchase the best steer you can within your budget. **Remember**, just because you buy a steer for a county fair and pay market price doesn't mean that he won't be good enough to go to a state or national show.
- Make sure your pen is ready before you buy the steer. Have your feed purchased and the water source cleaned.

October (or whenever steer is purchased)

- After purchasing, weigh your steer and determine the "ideal" end weight.
- Start on growing ration. Hay works very well as a starting ration with a few pounds of grain and protein supplement.
- Start keeping your project record information and take a picture of your steer.
- Make sure calf is identified.
- Watch closely to make sure calf is eating.
- Check with seller to determine which vaccinations the steer has received. If the seller hasn't provided the proper vaccinations, make sure your steer is properly vaccinated.
- Deworm and implant.
- Start halter breaking.
- Watch for health problems as they often occur the first two to four weeks you own the calf.

November and December

- Continue halter breaking and leading the steer (it may help to brush and comb the steer to get him used to being worked with).
- Gradually increase the level of grain being fed.
- Pour for grub and lice control.
- Watch for ringworm.
- Check at the Extension Office to find out when the calf needs to be weighed for the county or state shows.
- Check to make sure your feed doesn't spoil and your water source is clean.

January, February and March

- Continue halter breaking and leading.
- Weigh calf and calculate finished weight and gain needed for desired show.
- Continue increasing the level of grain fed.
- Check to make sure water source isn't freezing.
- Check dates of spring shows and decide if you plan to attend.
- Consider giving a beef project talk or demonstration at the 4-H club meeting.

April and May

- With wet weather, start watching for foot rot and treat immediately.
- Daily leading of calf.
- Start working with a show stick.
- Possibly reimplant your calf.

- Plan your fly control program.
- Check weight of calf and calculate how much the calf must gain by show time.
- Recheck record keeping system to make sure you're keeping track of all the information you need.

June, July and August

- Daily rinsing.
- Increased fly control.
- Trim feet in early June.
- Work with show stick. If possible, get a group of people around you so your steer gets used to strange surroundings and lots of people so he won't become "spooked" at the fair.
- Start clipping.
  –rough clip 2 weeks prior to show (head, sheath, brisket, anywhere that will be shaved).
  –around 1 week prior to show, clip the body and blend in the shaved parts.
  –around 2 days prior to show, put finishing touches on clipping the steer.
- Get your show book and check the county fair show schedule.
- At the show, take a final picture of your steer.

September and October

- Complete records and turn them in.

BEEF COW MANAGEMENT CALENDAR

These guidelines are for a herd but can also apply to one animal.

December

- Watch for evidence of abortions. Get specimen to a laboratory for diagnosis.
- Spray for lice. Louse populations increase with the arrival of cooler fall weather, and they peak in March. Spray twice, 14 days apart.
- Provide at least 5 gallons of water per cow per day.
- In extremely cold weather, increase the energy level of the ration.
- Watch for foot rot. Trim feet. If necessary, treat with an antibiotic. Inorganic iodine added to the mineral mix has been shown to be effective.
- Check records of pregnancy to determine expected calving dates.
- Purchase and number ear tags.
- Vaccinate cows with a vaccine to prevent scours in calves.

February 15 to April 15

- The ideal calving season in Kansas is February 15 to April 15. If calves are born at this time, they will be old enough to handle the extra milk flow when the herd goes to pasture in May.
- First-calf heifers should be located so they may be observed very closely for signs of calving. It is probably wise to assume that two-year-old heifers are not capable of calving without assistance. If you work under this assumption, you will very likely save most, if not all, of the calves.
- Prepare a clean, dry stall for the calving.
- Watch for scours.
- Have a heat lamp for weak calves.
- Have frozen colostrum available in a bovine esophageal feeder for emergencies.
- In a normal presentation, the two front feet and the head of the calf appear first. Be prepared for calving difficulties if you see the following signs:
  - –Only the calf's tail is visible
  - –Only the calf's head is visible
  - –The front feet protrude past the knees, but the calf's nose cannot be located
  - –The head and one foot are visible
  - –More than two feet are visible
  - –After two hours of labor, there is no progress in delivery. At this point, get help!
- During calving, if you are pulling the calf, use a sack cord and pull down, not straight out. If you are using a calf puller, be sure that the presentation of the calf is normal.
- As soon as the calf is born, do the following:
  - – Dip its navel in iodine.
  - – Place an ear tag in one ear. It should have the same number as the tatoo.
  - – Weigh the calf.
  - – Inject the calf with ADE vitamin supplement.
  - – Record the tag number of the sire, dam, and calf, along with the calf's birth date. Note any important information about calving.
- Ear tag calves and assign numbers consecutively in order of birth.
- Check each calf within a few hours after birth. If it has not nursed, it should be helped to do so. The calf must receive colostrum within the first 24 hours.
- Separate pregnant cows from cows with calves, and feed accordingly.
- Purchase herd sires, either from test station sales, or from breeders and commercial firms specializing in performance-tested seedstock.
- Check bulls for fertility. They should have a physical examination and semen evaluation 30 to 60 days before the start of the breeding season.

- Vaccinate all open cows and heifers for vibriosis, IBR, and leptospirosis not less than 30 days prior to breeding.
- Watch for grass tetany. To be on the safe side, supplement feed with magnesium.
- When calves are 1 month old, put creep calf feeders in pastures.
- Ideally, it would be advisable to separate cows with heifer calves from those with bull calves and to creep feed the bull calves only if necessary.
- Castrate and dehorn calves when they are 45 days old.
- Start breeding yearling heifers by March 25, one cycle earlier than mature cows.
- The breeding season begins on April 15. Turn in bulls or begin artificial insemination (AI).

ARTIFICIAL INSEMINATION

- Check for estrus (heat) twice a day—once in the early morning and once in the late evening. Confining cows to a limited grazing area will ease this chore.
- For best results, inseminate about 12 hours after heat is first observed.
- Have good handling facilities and work gently with the cows.
- Use AI for 45 days (2 heat periods) and then turn in a cleanup bull. Remember, each time a cow fails to conceive after coming in heat, you lose 35 pounds of calf at weaning. Make positive identification of cows so that you will have accurate records on the date the cow was bred, the date she returned to heat, and the expected calving date.

PASTURE BREEDING

- Yearling bulls: use 1 bull for every 20 cows.
- Mature bulls: use 1 bull for every 25 cows.
- Rotate bulls every 15 days if possible to allow bulls to rest 15 days.
- Vaccinate all calves for blackleg and malignant edema at 3 to 4 weeks of age.

May

- Provide plenty of good water. Each cow needs 8 gallons per day.
- Provide fly control. Spray every two weeks. Use dust bags and/or backrubbers.
- If your bull is getting too thin, carry some grain to him once a day. Four to 5 pounds of grain will make a big difference.

June to August

- Remove bulls on June 15.
- Plan for a winter feed supply.
- Continue your fly control program.
- Watch for and treat pink-eye.
- Vaccinate heifer calves for brucellosis between 2 to 4 months of age.
- Test all cows for pregnancy between August 1 and August 15.
- Tattoo all calves in both ears when they are 3 to 7 months old.

September

- Consider (1) harvesting corn refuse, (2) storing some corn silage or milo stover for emergency winter feed supply, or (3) purchasing the neighbor’s corncobs for potential winter feed.
- Use diverted acres.
- Don’t allow cattle to graze most sorghum crops between the first frost and the definite killing frost because there will be prussic acid in the regrowth shoots.
- Vaccinate all calves again for blackleg and malignant edema.
- Vaccinate all calves for IBR, BVD, and PI3.
- Worm all calves.

- Spray all calves for lice.
- Plan your calf marketing program. Here are some options:
  - –Wean calves and get them on feed before selling them.
  - –Sell small lots through special feeder calf sales.
  - –Winter calves and sell them in the spring.
  - –Feed out calves for slaughter.
  - –Get carcass and feedlot data.

October and November

- Wean calves in October
- Make initial selection of replacement heifers (approximately 40 percent of the heifer crop). Look for good 205-day weaning weights, good frames, soundness, femininity, and muscle.
- Test for grubs after August 1 and absolutely no later than November 1. Use the pour-on technique.
- Permanently identify calves by branding (freeze or hot) and by tattooing.
- Start replacement heifers on feed for gains of 1.25 pounds a day.
- Cull cows. Identify all cows that are going to slaughter. Cull all cows that are open, old, unsound, or that have a bad udder or a poor record.
- Group cows for winter management of the cow herd. Pasture (1) Put in mature, average-flesh cows. Pasture (2) Put in first-calf heifers with old thin cows. They should be fed to gain ½ pound per day through the winter.
- Test the entire herd for brucellosis in order to maintain an accredited herd.
- Trim feet on cows when needed.

CONDUCTING A BEEF SKILLATHON

A skillathon is an excellent method of involving your members and their parents in challenging, non-competitive, learn-by-doing activities. This method of helping members develop both their life skills and project skills is designated as a series of mini-learning stations with a facilitator at each one. The participants rotate from station to station, attempting to perform the specific tasks given at each station. The station facilitator allows all team members to test their own knowledge and abilities before giving them any hints. This technique is referred to as experiential learning or learning by doing before being told or shown how.

A skillathon works well not only during project meetings, but also at the 4-H club. It is an excellent way to involve several project groups in the program at once. By asking various project groups to set up one or two learn-by-doing stations, the entire club can be actively involved at once. In addition, you can use a skillathon to give recognition to the project groups and their leaders.

The skillathon approach has also been successfully used to strengthen the educational value of county and state fairs. Both adults and youth enjoy the challenge posed by each situation and task.

This project meeting guide briefly outlines how to set up and conduct a beef skillathon. Included are a checklist for the planning committee, advice for the facilitator, and suggested supplies, situations, and tasks for each station.

WHAT YOUR MEMBERS WILL ACCOMPLISH

By participating in a skillathon, your members will accomplish the following:

(1) Given a situation and a task they will be able to evaluate their abilities to solve the challenge presented and discover for themselves what they need to know to do the activity.
(2) They will learn to work as members of a team.
(3) They will practice making decisions and speaking before others.
(4) They will receive recognition and praise for their efforts.

CHECKLIST FOR A SKILLATHON COMMITTEE

- Decide on the stations wanted, considering time and resources available.
- Make up a realistic situation and task for each station.
- Decide who will be in charge of each station.
- Decide on the equipment or supplies needed at each station.
- Delegate responsibility for gathering supplies.
- Depending on the size of the group and the number of stations, group the members into teams of two to four, assigning each team to a station and moving them to the next station every 10 minutes or so.
- After all teams have rotated through the stations, have each team select a station and give a short presentation to the entire group on how the team solved the task at that particular station.
- Praise everyone’s efforts.

RESPONSIBILITIES OF THE STATION FACILITATOR

You will find it challenging and rewarding to be a helper at one of the stations. The extent to which the participants develop project skills and life skills depends largely on how successfully you relate to them. Here are suggested steps:

- Familiarize yourself with the topic and any available project meeting guides, supplies, and training aids.
- Compile a list of questions to ask each team.
- Set up your station to include a standup situation and task sign, and necessary supplies.
- Allow the team members to discover for themselves how to accomplish the task, instead of telling or showing them how first.

- Facilitate the learning situation for each team in the following suggested manner:
  1. Divide the members into teams of two to five members.
  2. Make supplies available.
  3. Provide the members with a realistic situation and task to respond to.
  4. Step back and allow the members time to discover their own solution.
  5. Respond to member questions with questions so the answers are their own.
  6. Listen to the members' presentation.
  7. Accept their solutions.
  8. Ask questions to help them build on what they presented.
  9. Reinforce their efforts with praise.
- Ask members to show how they would set up and conduct this same activity at a 4-H project meeting.
- Mark the team's participation card if one is used.
- Prepare your station for the next team.
- Following the skillathon, inventory and pack up all equipment, materials, and signs.

STATION INFORMATION

Some possible topics and suggestions for presenting each topic at individual stations are included here. Station topics are limited only by your imagination and interest. The model calf made from the Minnesota 4-H calf pattern can be a useful training aid for several of the suggested topics. At all stations, try displaying the situation and task on an 8- x 11-inch stand-up so that the teams can start solving the task immediately. Each of the following stations could be used as an activity associated with that particular lesson plan. You are encouraged to develop and use skillathon type situations in any lesson in addition to, or as a substitute to, a suggested activity.

Identifying Beef Breeds

Supplies. Pictures of beef breeds, index cards with names of beef breeds on each, and cards with breed characteristics.
Directions. Let the team match the breed and characteristics with each of the pictures and check their answers. Follow-up with questions.
Situation. A new member asks your help identifying breeds.
Task. Identify and give one characteristic of each breed.

Identifying Parts of Beef

Supplies. Minnesota 4-H Beef Parts Chart, parts, T-pins, sponge for pins, and cardboard for chart.
Directions. Let the team members make their decisions and check their answers. Follow-up with questions.
Situation. You are preparing for the judging contest.
Task. Match the names with the parts.

Judging Hay

Supplies. Four flakes of different quality hay, notecards numbered 1 to 4, and oral reasons notecards for each member.
Directions. Let the teams complete the task. Work with them as needed, particularly to determine the cuts (degree of differences) between the pairs.
Situation. Your hay supplier has just brought over four samples of hay for you to evaluate.
Task. Discuss what makes good hay. Judge the samples as a class and determine the cuts (degree of differences) between the pairs.

Presenting Oral Reasons

Supplies. Oral reason notecards or pad for each member
Directions. Refer to information in the oral reasons lesson. Let each member give a complete set of oral reasons.
Situation. The parents and members of the 4-H beef project group are interested in why you placed the hay as you did.
Task. Present your reasons.

Scoring a Judging Class
Supplies. Hormel computing slide, paper, and pencils.
Directions. Give the team a scorecard with different placings, have them study the project meeting guide to figure the class score. If they are still completely confused after a few minutes, walk them through an example using the six steps. Let them check the score using the Hormel computing slide.
Situation. The official cuts and placing for the class have just been given.
Task. Work together to figure your score for the class.

Dehorning a Calf
Supplies. Dehorning equipment, model horns, caustic potash, and scissors.
Directions. Provide the supplies and let the team solve the task. Follow-up with questions
Situation. You have been asked by your neighbor to dehorn his calf. You agree.
Task. Demonstrate how to dehorn the calf.

Castrating a Calf
Supplies. A model calf made from the Minnesota 4-H calf pattern, elastrator with rings, burdizzo, emasculator, knife, or all-in-one castrator.
Directions. Listen while the members demonstrate how to castrate a calf. Follow-up with questions.
Situation. Your neighbor has asked for your help to castrate his calf.
Task. Demonstrate your castrating technique.

Identifying a Calf
Supplies. Ear tags, ear tagger, and tattoo set.
Directions. Let the team demonstrate how to solve the task. Follow-up with questions.
Situation. You want to be able to identify your new calf.
Task. Present your reasons.

Implanting Growth Hormones in Beef Cattle
Supplies. Model ear, implanting gun, implanting pellets, and calf puppet head.
Directions. Let the team complete the task. Follow-up with questions.
Situation. You are determined to make your market animal grow as fast as possible.
Task. Demonstrate how to implant the pellets in the animal.

Identify Feed Ingredients
Supplies. Pack of 9 to 12 feed ingredients, chips with ingredient names and human food names, paper plates with the words PROTEIN, ENERGY, WATER, VITAMINS, and MINERALS written on them.
DIRCTIONS: Let members match the chips to the ingredients. Then have them put all chips on the plate specifying its nutrient category. Ask questions and discuss.
Situation. Your local feed store manager has dropped off some feed ingredients for your project group's use.
Task. Identify the ingredients and divide them into nutrient categories of energy, protein, vitamins, minerals, and water.

Understanding a Feed Tag
Supplies. Feed tags
Directions. Provide the teams with feed tags. Let members explain what they read. Ask questions and discuss. Refer to the project lesson plan.
Situation. You're in a feed store and a customer sees your 4-H T-shirt. The customer asks your help in understanding a feed tag.
Task. Explain to the customer what information the tag contains and how it helps in choosing a feed for a flock or herd.

Delivering a Calf
Supplies. Minnesota 4-H model calf, calf delivery box, petroleum jelly, Ivory flakes and obstetrical equipment.
Directions. Let the team demonstrate how to deliver the calf. Follow-up with questions.
Situation. Your cow has been in labor for a long time.
Task. Demonstrate how to deliver the calf.

Caring for the Newborn Calf
Supplies. Minnesota 4-H model calf, towel, 7 percent iodine bottle, sentence fragments as listed in the project meeting guide, and colostrum bottle.
Directions. Let the team demonstrate, and then follow-up with questions.
Situation. A new calf has just come into the world.
Task. Demonstrate what you would do during the calf's first 24 hours.

Taking an Animal's Temperature
Supplies. Model or real calf, thermometer, string to attach to thermometer, and notecards to record information.
Directions. Provide the supplies and let the team demonstrate how to solve the task. Follow-up with questions.
Situation. The veterinarian has asked you to take your sick animal's temperature, pulse, and breathing rate.
Task. Demonstrate how to take each of these.

Administering Medication to Animals
Supplies. Needle and syringe, IV needle and tubing, feed packet, drench gun, bolus gun, and model calf made from Minnesota 4-H calf pattern.
Directions. Provide the supplies and let the 4-H'ers demonstrate how to solve the task. Follow-up with questions.
Situation. At various times your animal has been given medication orally, subcutaneously, intravenously, and/or intramuscularly.
Task. Demonstrate how to use these methods to administer medication.

Identifying Retail Meat Cuts
Supplies. Picture of meat cuts, chips with names of meat cuts, 4-H Beef Parts Chart, and Meat Board for reference.
Directions. Let the members match the chips with the cuts, and then check their scores. Follow-up with questions about where various cuts are located.
Situation. You are practicing for the Meats Judging contest.
Task. Match the names with the meat cuts.

Taking Carcass Measurement
Supplies. Ruler, acetate tracing paper, pencils, grid paper, planimeter, and rib eye steak.
Directions. Provide the materials and allow the teams to demonstrate how to determine the loin eye area and any other carcass measurements.
Situation. You have been asked to help take carcass measurements.
Task. Demonstrate how you would take the measurements required.

Making a Rope Halter
Supplies. Nylon or manila three-strand rope, hog rings, pliers, and animal puppet head.
Directions. Provide copies of "Making a Rope Halter" to the team if they need them, and let them make a halter. Have them put a complete halter on an animal puppet head before leaving the station.
Situation. You are unable to find you favorite halter.
Task. Demonstrate how to make a rope halter.

Tying Farm Knots
Supplies. Five 5-foot lengths of rope and available board or other object to which to tie knots.
Directions. Let the members attempt to tie the knot before asking any questions.
Situation. You want to brush up on your knot-tying skills before you begin training your project animal.
Task. Demonstrate how to tie five different knots and tell when you would use each.

For copies of the Minnesota beef calf model pattern, send $3 for each to:
University of Minnesota
Communication Resources Distribution
3 Coffey Hall, 1420 Eckles Avenue
St. Paul, MN 55108

HOW TO GIVE A 4-H BEEF PRESENTATION

What is a demonstration or illustrated talk? It is simply showing and telling someone how to do something. A demonstration or talk is referred to as a presentation.

A demonstration uses equipment, animals, and actual projects to show how to do something.

An illustrated talk is giving information through posters or other illustration.

Demonstrations and illustrated talks are two of the most effective methods of teaching information. They are used by 4-H'ers, 4-H leaders, Sunday school teachers, school teachers, vacuum cleaner sales personnel, college professors, and car sales personnel. Research shows that people remember 11 percent of what they hear, 20 percent of what they see and hear, and 90 percent of what they see, hear, and do.

The audience that views a demonstration will see and hear, so they'll remember approximately 20 percent of the information.

A member who prepares and presents a demonstration will remember approximately 90 percent of the information.

Members are encouraged to give demonstrations and illustrated talks to

- learn more about something that interests them.
- learn subject matter.
- learn to express themselves.
- share information with others.
- teach other members in project groups, clubs and county workshops.
- develop poise and confidence.
- represent 4-H at civic clubs, county, district and state contests.
- achieve. Awards can be won with these presentations.
- have fun. It is fun to give a presentation. Ask other members who have given them. They've been to a lot of places and met a lot of people because they've participated.

STEPS IN PREPARING A PRESENTATION

1. **Select a topic**

Some things that will influence the choice of topic are the audience who will view the presentation, experience and interest of member, availability of information and equipment.

Possible beef topics are:

- Parts of a Beef Animal
- Equipment for a Show Box
- How to Treat for Bloat
- Making a Rope Halter
- How to Control Grubs
- How to Control Flies
- Selection of Beef Cattle
- Nutrients of Feed
- Good Feeding Practices
- Facilities for Feeding Steers
- Value of Production Records in Beef Cattle Production

2. **Gather information—**books, magazines, beef industry resource people or materials, Extension publications.

3. **Develop an outline**

   A. **Introduction.** Tell audience what you are going to do, i.e., "I am going to (show, teach, tell) you."

   B. **Body.** Describe the presentation. Show and tell what you said you were going to do (use illustrations to

help teach, show, and/or present the subject).

C. **Summary.** Review what was said and done.

Be sure your outline

(1) Contains all the important steps to make or do something.
(2) Has information or steps presented in logical order so that it is clear to the audience.
(3) Explains why and how things are done.
(4) Lists supplies and equipment needed.
(5) Includes visuals that will be needed to teach the subject.

4. **Make visuals and/or gather materials.** Keep visuals simple, neat and easy to read. Use correct equipment.

In choosing equipment, be sure the equipment is designed to do what you are teaching, that it is accepted by authorities, and that it is clean and in good condition.

In using visuals to reinforce points and help teach, first be sure that the visual is needed. Use only words, pictures or diagrams that are needed to help people understand or remember. Use simple words and short phrases.

Be sure the visual is large enough for the audience to see. Two-inch letters can be seen for 50 feet, ½-inch letters for 10 feet.

The visual should not be crowded, but space should be left between letters, words and drawings, so that it is easy to read. Keep posters neat and clean so that they are attractive. Use heavy cardboard for posters so they will stay in place as well as be durable. Lightweight poster board tends to bend and fall over.

Practice demonstration or illustrated talk and present to your club or other group.

Remember the steps in preparing a Beef Presentation are: choose a topic or subject; gather information from books, magazines, specialists; make an outline that includes an Introduction, Body and Conclusion; select the right equipment; prepare visuals; and practice.

Have members present a short demonstration or talk by

1. **Preparing paper sack demonstration or talk**

A. Place various items in sack that members could describe or demonstrate how to use
–scotch comb
–rice root brush
–can of adhesive
–show exhibit card
–show entry card
–diagram of beef facility

B. Pass paper sack around room having each member reach into sack, select an item and describe, demonstrate or give information about the item.

2. **Preparing simple one- to three-minute illustrated talk or method demonstration kits**

A. Prepare kits, sacks, or packets of materials.
Examples:

- leather cleaner, leather halter, instructions for cleaning leather
- poster board, markers, information on facilities for beef animals
- picture of beef animal, list of beef animal parts, poster and marker
- beef registration form, information on how to complete a registration form, poster and marker
- pictures of retail cuts of beef, information on how to cook different beef cuts
- package of “beef strips,” electric skillet, information on how to cook beef strips

- picture of beef animal, information on what to look for in a beef steer, beef heifer, poster and marker
- information on screwworm program or other health-related information, poster and marker
- list of what is needed in a show box, poster and marker
- blowdryer, comb and brush, live beef animal

B. Divide group into teams of two and give each group a presentation kit.
C. Give groups 10 to 15 minutes to prepare a presentation to give to the group.
D. Have each group give their presentation.

CONDUCTING A 4-H LIVESTOCK JUDGING CONTEST

SELECT THE CLASSES

A class is made up of four animals, of the same sex and relatively the same age. The idea behind a 4-H livestock judging contest is not to "trick" the members, but instead to provide a learning experience. Therefore, in selecting the classes, strive not to find the most difficult class to place, but instead choose a "placeable" class that requires the members to think through their decisions.

For example, a typical class could contain an easy top place, and easy bottom place and a middle pair that could arguably be placed either way. Variations of this basic theory are an easy top or bottom and the other three placings would be close or a good class can consist of two close pairs. Avoid making a class of four animals that are very similar and, therefore, difficult to place.

SETTING UP THE CLASS

Once the classes are selected, you need to set them up so that they are easily evaluated. This includes deciding whether they will be tied to a fence or post, held on a halter by a helper or simply let loose in a pen. This depends on the facilities available, whether you are at a member's farm or the county fairgrounds. The easiest way is to tie the animals to a fence on level ground where the members can get behind and beside them.

The other consideration in setting up the classes, is which class is first, second and third. Usually, beef cattle classes are a segment of the whole livestock judging contest. But sometimes, a contest is comprised only of beef cattle classes. When deciding the order of the classes, it is important to consider which classes are reasons classes and which are not. Usually, reasons classes are interspersed within the contest and oral reasons are given last, after judging all the classes. But, for first-time judgers or inexperienced reasons-givers, it might be a good idea to have them give reasons immediately after judging the class.

ORGANIZE THE PARTICIPANTS

When the members arrive they should register at a specific place. Write their name and the name of their team on a score sheet. Teams are usually made up of four individuals from the same club or county. A county or club can usually enter as many teams as they want, with only four people per team. If there are one or two extra people from a county, they cannot form a team (with more than four, or less than three members) but can compete individually. Assign numbers to each participant at this time and hand out the judging cards they will need. Be sure each participant has paper and pencils to fill out the cards and take notes for reasons.

Depending on how many members are participating, you may need to split up the whole into manageable groups. The groups should include as many members as possible, but they must be able to easily see the class. There should be no more groups than there are classes, so that each group is judging a different class at the same time. Each class period should last between 12 to 15 minutes. At the end of each period, the groups rotate to the next class in line.

Before you split up the groups, it might be a good idea to show the participants how to fill out a judging card.

DETERMINE OFFICIAL PLACINGS AND CUTS

A good time to determine the official placings is the same time that the participants are judging the animals. If you make the official placing earlier, be sure to look over the classes during the contest to be sure the animals look the same. The amount of fill and the health of the animal may change.

In order to place the classes, it is important to know how the classes are numbered. Always number the class as you are standing behind the animals, from left to right. Therefore, number one is on your far left and number four

is on your far right. It might be a good idea to tape a number either to the wall where the cattle are tied or on the back of the person that is leading the animal.

After you determine the official placing, you must assign cuts to the class. Cuts are used to figure scores for the participants' placings and they indicate how difficult or easy the class was to place. Cuts are a series of three numbers that correspond to the three pairs within a class. For example, if a class is placed 1-2-3-4 and cuts of 4-2-6, the top pair was 1-2 and the cut for the pair was 4. The middle pair of 2-3 had a cut of 2 and the bottom pair of 3-4 was cut 6. A large numerical cut meant the pair was easily placed and, if the participant placed it wrong, they could lose a lot of points. When a pair is close or more difficult to place, the cut is small and, therefore, the participant loses less points if the pair is placed differently from the official placing.

Cuts also tell how difficult the class was as a whole to place. In the same example, placing 1-2-3-4 with cuts of 4-2-6, we can tell the class was made up of a fairly easy top placing (cut of 4 points), a close middle pair (cut of 2 points) and an easy bottom placing (cut of 6 points).

There are some additional rules for determining cuts:

1. Cuts may range from 1 to 8 for each pair.
2. The total for the three cuts may range from 3 to 15.
3. If the total is 15, the middle number cannot be larger than 5.
4. If they total 14, the middle number cannot be larger than 8.

LISTENING TO ORAL REASONS

If there are very many participants in the contest, it may be wise to have more than just one person listen to oral reasons. A different person could listen to each class of reasons. Before the contest, meet with all the reasons-takers and try to standardize everyone's standards for reasons. It is a good idea to have everyone listen to the first three or four sets of reasons together so that they are listening for the same thing.

It would also be a good idea to read through the lesson, Introduction to Giving Oral Reasons, before the contest. Scores for reasons are based on the same scale as the judging class. The most important thing in reasons for younger, inexperienced members is to tell the truth in a set of reasons. Style and terminology are second to telling the truth. In other words, if one person tells you exactly what they saw and can remember what the class looked like without using notes, they would have a higher score than a person who uses great terms and has a good, flowing style, but can't remember the class and, therefore, gives a "canned set" of reasons.

The best reasons score is 50 points, but that is very rarely given except in experienced college contests. Sometimes, a reasons-taker will award a member 25 points just for standing up and trying to give a set of reasons, even if it is all wrong. A typical set of reasons will range in score from 30 to 45 points.

Use oral reasons as an opportunity to talk with each member individually. Ask questions about the classes if there is something you think a member missed. It is important to stay positive about reasons; therefore, try to give each person encouragement and suggestions rather than criticism.

GIVE OFFICIAL PLACINGS AND REASONS

After the participants have given reasons, it is time to tell them the official placings. At this time, you can also show them how to give a set of reasons. Use this as a learning experience to teach about cattle selection, by pointing out specific traits and characteristics of the cattle in the class.

Be sure to give the cuts of the classes, so that participants can figure their scores for their own information. After giving the reasons for a class, tell the official placing (e.g. 1-2-3-4) and the cuts (e.g., 4-2-6).

DETERMINE SCORES OF CLASSES AND REASONS

Many times in a contest, an unbiased group of people will keep scores as the contest progresses. They will collect judging cards after each class, determine the score and record it on the registration paper before the next class is finished. If this is not possible, the official or organizer of the contest can figure scores after the contest.

If you are lucky enough to have a computing slide to figure the scores, the process will be fairly fast. It will take more time to score the classes by hand, but with some experience, it can be accomplished without much more time.

In order to determine scores, you must know the official placing, the cuts and the participant's placing

Official placing: 2-4-1-3
Cuts: 2 - 5 - 3
Participant's placing: 1-4-2-3

Now, ask yourself six questions while you compare your placing with the official placing. Every time the answer is "no" to one of the following questions, the participant loses points in relation to the amount of cuts.

1. Did you place 2 over 4 (like the official judge did)? No, so 2 points are lost
2. Did you place 2 over 1? No, so 2 + 5 points are lost.
3. Did you place 2 over 3 Yes, so no points are lost.
4. Did you place 4 over 1? No, so 5 points are lost.
5. Did you place 4 over 3? Yes, so no points are lost.
6. Did you place 1 over 3? Yes, so no points are lost.

Now, add up the number of points lost (2 + 2 + 5 + 5 = 14), then subtract that number from 50 points, because that's the number that is possible if the class is placed exactly right (50 – 14 = 36 points). So 36 points is the score for that class.

That score should be recorded on the sheet on which the member registered. When all the classes are recorded and the reasons recorded(50 points possible per set of reasons), add up all the scores for an individual to determine their total score. Then add up all participants' scores from one county or team to determine the team score. Teams for a contest are usually made up of the top three individuals' scores in that team. The fourth score is dropped and doesn't count toward team competition. All four of the contestants on a team are eligible for individual competition.

GIVE AWARDS OR RECOGNITION

Awards are determined by the total score for individuals and teams. Usually awards (either ribbons, plaques or medals) are given for the top 10 individuals (senior and junior divisions) and the top five teams (senior and junior divisions). The first place is awarded to the individual or team with the **most** points.

When announcing the award winners, start at the lowest placing (10th) and work toward first place. This is the practice for both individuals and teams.

If ribbons, plaques or medals are not available, other awards may be given. For example: a scotch comb, T-bone steaks, dinner coupon at a local restaurant, halter, or with the breeder's consent, credit at a local production sale.

SUMMARY

The award is not the important part of the judging contest. The purpose of the contest is to provide a learning experience for the member and a place to test their knowledge of selection standards for beef cattle.

A well-run contest is fun for the participant and organizer alike, but it doesn't have to be a professional production to be fun and provide a good learning experience. Each contest is a little different in the way it is organized and run. Brainstorm on ideas for your contest, keeping in mind the basic rules of the Kansas State Fair 4-H Livestock Judging Contest. Those rules are available from your local County Extension Office or the State Extension Office.

LESSONS PLANS BY BEEF PROJECT CONCEPTS

CONCEPT	LESSON TITLE	UNIT LEVEL
Economics	Budgeting and Financing a Calf	IV
	Basic Economics of the Beef Project	II
	Beef Cattle Project Financing	III
Facilities	Facilities for a Beef Project	I
	Cattle Handling Facilities	IV
Range and Pasture Forage	Taking a Hay Sample	III
	Range Forage for Beef Cattle Production	IV
	Knowing Your Range Plants	IV
	Selection of Quality Hay	IV
	Production of Quality Hay	III
	The Animal Unit Concept	IV
	Securing Uniform Grazing	IV
Health	The Comfort Zone: Knowing Your Animal's Normal Temperature	III
	Common Cattle Diseases: Foot Rot	III
	Common Cattle Diseases: Ringworm and Warts	II
	Common Cattle Diseases: Bloat and Acidosis/Founder	III
	How to Give A Shot	II
	Where Does It Hurt? Introduction to Common Cattle Diseases	III
	Is Your Calf Sick or Well	I
	Recognizing a Healthy Beef Animal	II
Management	Flanking Your Calf	II
	Implanting Beef Cattle	III
	Safety with Beef Cattle	II
	Cattle Identification	I
	Dehorning Cattle	III
	Restraining Beef Cattle	III
	Practical Farm Knots	I
Meats	Identifying Low- versus High-Fat Meat	I
	Beef Carcass Anatomy	III
	Meat Inspection	IV
	Making Your Own Beef Jerky	II
	Your Beef Animal is More than Just Steak	II
	Beef as a Food	III
	Shopping for Beef	IV
	Beef Consumer Consideration	IV
Nutrition	How Much Water?	I
	How Much Water?	III
	Heifer Nutrition	II
	Identifying Types of Feeds and Understanding Feed Tags	I
	Feed Identification and Classification	III
	Feed Nutrients and Their Uses	III

LESSONS PLANS BY BEEF PROJECT CONCEPTS, *continued*

	Ruminant Digestive System	III
	Feeding 4-H Show Steers	II
	Introduction to Balancing a Feed Ration	IV
	Understanding Feed Labels	IV
Parasite	Common Cattle Parasites: Lice, worms, grubs	II
Records	Recording Your Beef Project	II
	Determining Frame Score and Weight Requirements of Steer for County Fair	II
	Registration of Purebred Cattle	II
	Understanding Frame Scores	III
	Types and Purebreeds of Cattle	II
	Projecting, Computing Average Daily Gain	II
Reproduction	Anatomy of a Male Reproductive Tract	II
	Anatomy of a Female Reproductive Tract	II
	The Cow's Estrous Cycle and Fertilization	IV
	Pregnancy Detection	IV
	Assisting in Difficult Births	IV
	Embryo Transfer in Cattle	IV
Selection	Introduction to Giving Oral Reasons	III
	Introduction to Judging Beef Cattle	II
	Selecting the Breeding Beef Heifer	III
	Heifer Selection and Management for Good Reproductive Performance	IV
Showing	Being Prepared: How to Pack a Tackbox for a Show	I
	Care of a Calf at a Cattle Show	II
	The Proper Way to Wash Your Calf	I
	Making a Tail for a Show Calf	II
	Training Beef Animals for Show	I
	Fitting and Grooming Beef Show Heifers	III
	Basic Beef Showmanship	II
	Making Your Own Adjustable Rope Halter	II
Miscellaneous	Recognizing Sex Differences in Cattle	I
	Color a Rainbow Calf: Identifying the Parts of a Calf	I
	Identifying the Parts of a Beef Animal	II
	Determining Shrink and Dressing Percent for Market Steers	III
	Cattle to Carcass, the Slaughter Process	IV
	Determining Live and Carcass Prices for Market Steers	IV
	Animal Welfare/Rights	IV

Beef Member Guide and Annual Report

Welcome to the Beef project! Beef is one of several projects in the Animal Sciences Division of Kansas 4-H projects. It is an important project because beef production and meat packing is the largest industry in Kansas, bringing more dollars to our economy than any other.

Your Beef Project Leader will be the key to helping you learn about raising and caring for beef cattle. Nearly 100 different topics have been prepared to give you and your leader new ideas to try each year you enroll. You'll have fun with other beef members as you meet to study about these 12 major concepts:

Economics	Facilities	Records
Range and Pasture Forage	Health	Selection
Management	Meats	Reproduction
Nutrition	Parasites	Showing

ADDITIONAL LEARNING OPPORTUNITIES

Besides attending project meetings with your friends, you can learn more about beef and share what you've learned by giving beef presentations at your club, county 4-H Day, State Fair, school or civic clubs in your community. Judging clinics and contests help you learn to observe, evaluate, and make decisions. You will see good beef animals and meet other 4-H'ers. Showmanship teaches how to prepare and show your animal, as well as yourself. Your beef leader has many ideas for trips and tours to add fun to the project.

You may exhibit at spring beef shows, the county fair, state fair and Kansas Junior Livestock Show, as well as beef association field days for those with purebred cattle. The beef quiz bowl and Beef Ambassador competition are additional state fair contests you might consider. The Kansas Beef Council provides a medal to the top beef member in each county based on year-end records and reports. The state winner of the Kansas Award Application will be invited to attend the Emerald Circle Award Banquet.

CAREERS

Opportunities to work in the beef industry are plentiful. Kansas State University Department of Animal Sciences and Industry offers these suggestions.

Production—cow herds, commercial and registered; feeding, sales, showing, breeding, embryo transfer, artifical insemination

Backgrounding—buying and feeding stocker calves

Feedlot—manager, mill operator, cowboy, cowgirl

Business—loan officer, banking, Farmers Home Administration; consultant

Industry—feed companies; packing plants; meat providers, commodity brokers, futures, farm media, public relations; broadcasting

International—teaching, consulting in developing countries; Peace Corp

Government—extension; inspection; graders; marketing systems

Science—nutrition research, private and public animal breeding; genetics; bull studs

Where to go for information—If you do not have a beef project leader for your club, there are several options. Check with your Extension Office to see if you can be a part of a beef project group in a neighboring club, or check to see if you have a county-wide group. If not, your parent is encouraged to act as your leader. You may visit the Extension Office and review the Beef Leader Notebook and copy the material you wish to use. It also contains a list of additional resource information if you want to write for it.

MEMBER "MAP" ACHIEVEMENT PLAN

Step 1— Plan

A. Decide at the beginning with your group and list 4-H project lessons you would like to learn about:

	Date to do	Date completed

B. Decide for yourself and list things you want to learn, make, or do.

Step 2 — Do

As you are doing what you planned, make notes about your progress on your "journal" page.

Step 3 — Measure

Write the date you've completed each part of your plan in the space provided.

Step 4 — Evaluate

Tell about what you planned that worked. If some of your plans didn't work, what would you do differently next time?

Step 5 — Share

As soon as you have completed your short-term plans, discuss them with your leader using this guide.

We agree that _____ *has completed these goal planning steps and should be recognized for project achievement.*

Date _____

4-H'ers Signature _____

Leader's Signature _____

MY JOURNAL

Member Name _____

See instructions for step 2, page 2, of this guide. For the purpose of helping you remember your experiences, you may want to include the date, what you did, what you learned, and how you felt.

KANSAS 4-H LIVESTOCK SUMMARY 19____

(If you have more than one animal, change answers to totals or averages)

Name of project _____ Type of animal to exhibit _____

Name _____ Age _____ Years in 4-H _____

Club _____ County _____

Breed of animal _____ Sex of animal: male ☐ female ☐

Describe your animal: color _____ name _____ Other? _____

What is your animal's eartag number? _____

How much did your animal weigh when you bought it? _____

How much did it cost? _____ When did you get it? _____

How much did it weigh when you sold it? _____

How much did it sell for? _____ When did you sell it? _____

How many pounds did it gain? (subtract purchase weight from sold weight) _____

What did you feed your animal each day when it was young? _____

What did you feed your animal each day as it grew bigger? _____

What equipment did you need to care for your animal? _____

Not required for 7- to 9-year-olds, due to math skills needed

1. How many dollars did you get when your animal was sold?		$_____
2. How many dollars did you pay for it?		$_____
3. Total income (subtract line 2 from line 1)		$_____
4. Total feed cost	$_____	
5. Other expenses (veterinarian, rent, equipment)	$_____	
6. Total expenses (add line 4 and line 5)		$_____
7. Profit or loss on project (subtract line 6 from line 3)		$_____

KSU KANSAS STATE UNIVERSITY

Cooperative Extension Service Manhattan

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File Code: 4-H Youth—2

10-90—4M; 7-94—750; 3-95—750

Kansas 4-H Beef Leader Notebook

Level I

Color a Rainbow Calf: Identifying the Parts of a Calf

Beef, Level I

What Members Will Learn . . .

ABOUT THE PROJECT:

- Recognize the body parts of a calf
- Identify at least seven parts of a calf
- Name at least five parts of a calf from memory

ABOUT THEMSELVES:

- Appreciate differences and similarities

Materials Needed:

- Activity Sheet 1, Rainbow Calf
- Leader's Key, Activity Sheet 1, Rainbow Calf
- Activity Sheet 2, Calf Part Match
- Crayons or coloring pencils (most members could bring their own)
- Flat surface such as table or counter
- Flip chart or chalkboard

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

Knowing the parts of a calf is important when learning about the beef project. Knowing parts and correct beef terminology will help you increase your knowledge of beef. Knowing the parts of an animal is important when participating in a judging contest, answering questions, judging your own cattle, talking to a veterinarian about an animal's sickness, injury, or simply visiting with others in the business.

Here's a picture to color. Since everyone has colors, we'll work on this together. Color each part as I give you the color and name of the part.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What parts of the calf are biggest? Smallest?
2. What parts of the calf are hard/easy to remember?

Leader Notes

Hand out Activity Sheet 1, Rainbow Calf. Use the Leader's Key to give part and color. After 15 to 30 minutes, review some of the main parts.

Hand out Activity Sheet 2, Calf Part Match, to see how well they have learned some of the main parts.

Process:

3. How many calf parts can you name?
4. Why do you think you need to know the parts of a calf?

Generalize:

5. Have you or someone you know ever judged cattle? How important was it to know the parts of the cattle and the general shape of each part?
6. What shapes do some parts have?

Apply:

7. As the calf grows, do these parts or shapes change? Why or why not?
8. What parts of the calf are similar to parts of other animals? Discuss.

GOING FURTHER:

1. Design your own calf drawing and label each part.
2. Visit a veterinarian's office.
3. Visit a meat locker—identify parts.

REFERENCES:

Author:

This lesson was modified from original material authored by Brian A. Swisher, County Extension Agent, 4-H and Youth Programs, Kansas, with adaptation by:
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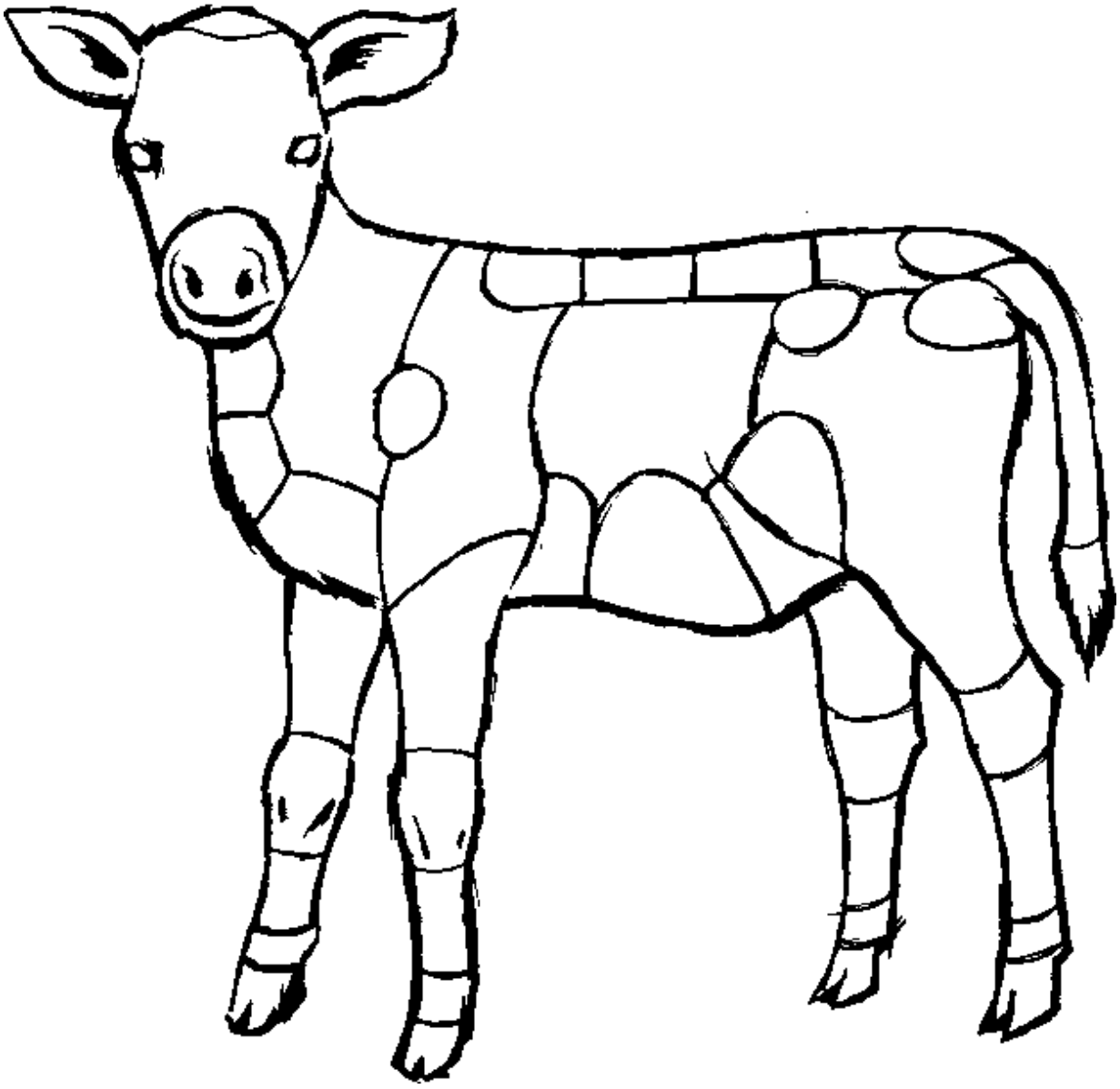
Kansas State University

Cooperative Extension Service
Kansas State University
Manhattan

COLOR A RAINBOW CALF

BEEF, LEVEL I

Activity Sheet 1, Rainbow Calf



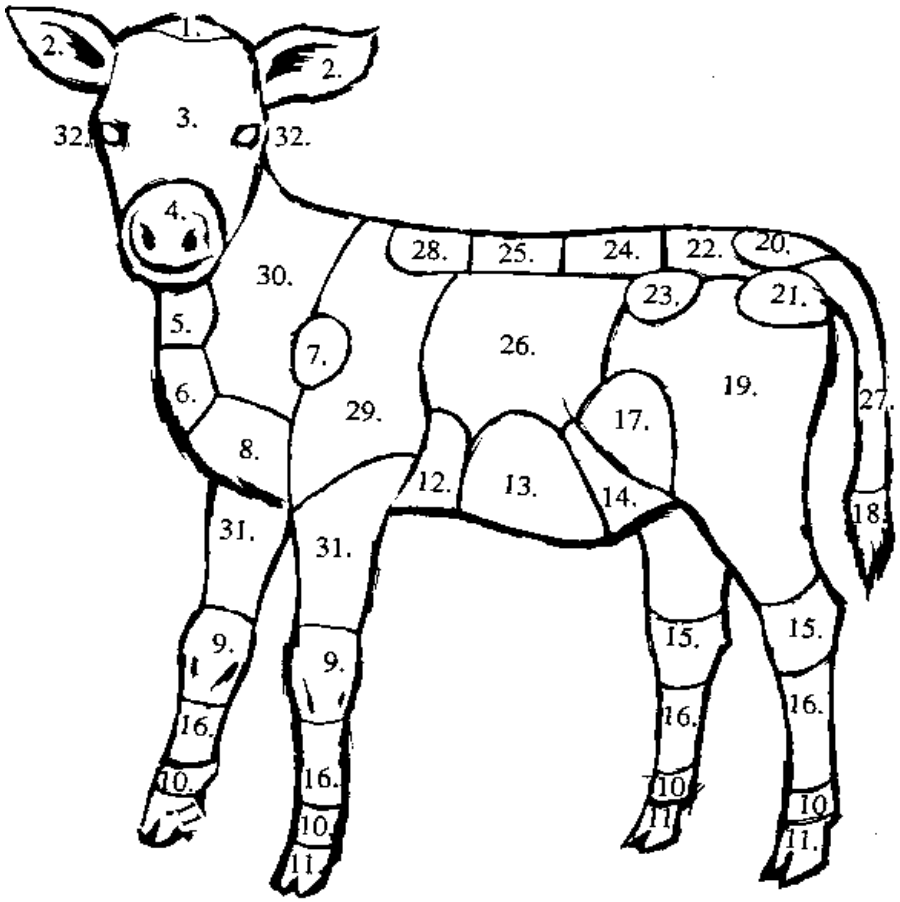
COLOR A RAINBOW CALF

BEEF, LEVEL I

LEADER'S KEY, ACTIVITY SHEET 1, RAINBOW CALF

Color the following parts of a calf the corresponding color.

1. Poll – Orange
2. Ear – Pink
3. Face – Purple
4. Muzzle – Green
5. Throat – Yellow
6. Dewlap – Red
7. Point of shoulder – Orange
8. Brisket – Blue
9. Knee – Purple
10. Pastern – Yellow
11. Hoof – Gold
12. Heart Girth – Red
13. Belly or Middle – Pink
14. Rear Flank – Green
15. Hock – Purple
16. Cannon Bone – Blue
17. Stifle – Blue
18. Switch – Pink
19. Quarter or Round – Red
20. Tail Head – Yellow
21. Pins – Green
22. Rump – Brown
23. Hooks – Blue
24. Loin – Red
25. Back – Orange
26. Ribs – Purple
27. Tail – Blue
28. Crops – Purple
29. Shoulder – Pink
30. Neck – Brown
31. Forearm – Orange
32. Eye – Brown



3-Beef, Level I, Color Rainbow Calf

COLOR A RAINBOW CALF
BEEF, LEVEL I
Activity Sheet 2, Calf Part Match

Draw a line from the word to the part on the calf.

Eye

Ear

Face

Muzzle

Knee

Back

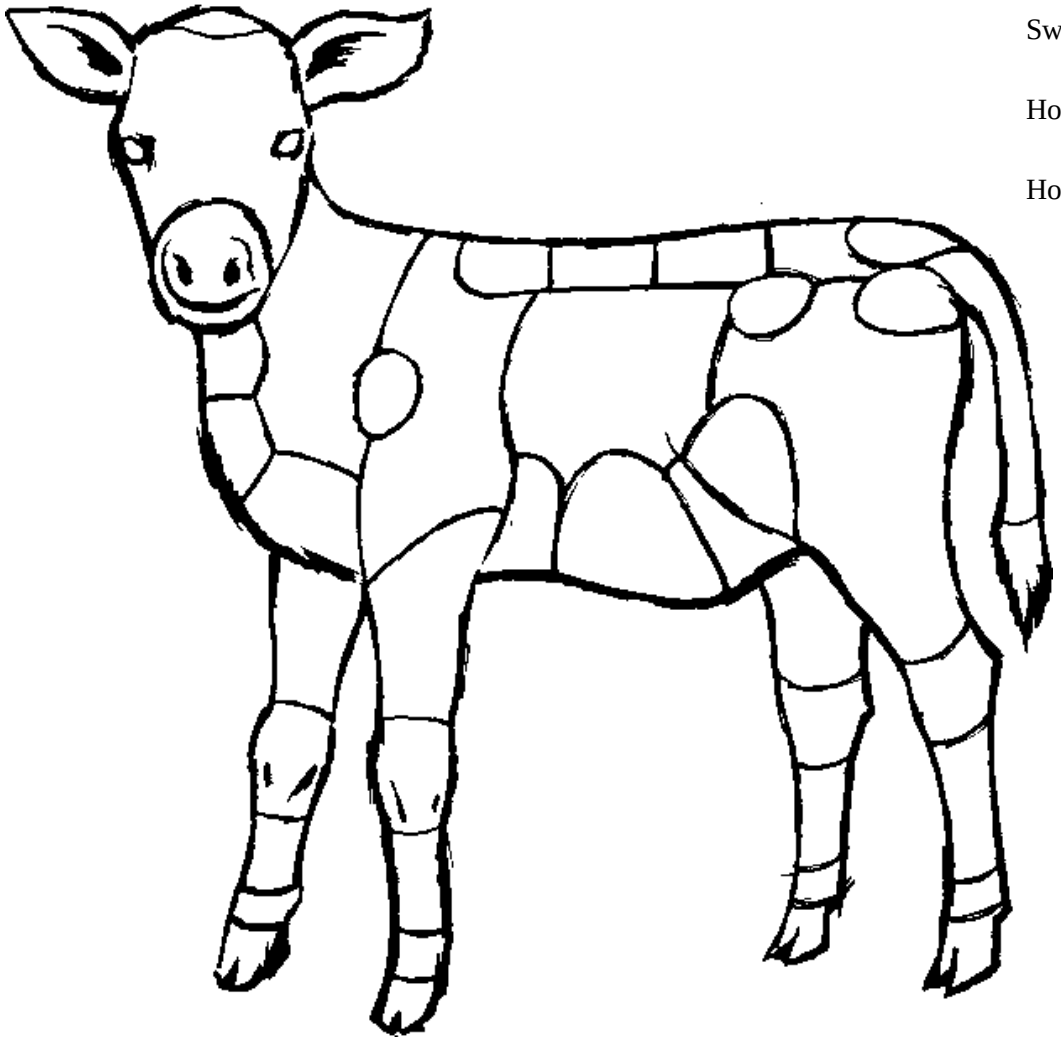
Loin

Tail

Switch

Hock

Hoof



Recognizing Sex Differences in Cattle

Beef, Level I

What Members Will Learn . . .

ABOUT THE PROJECT:

- Recognize the different sex characteristics of cattle
- Name the four basic sex types of cattle

ABOUT THEMSELVES:

- Improve observation skills

Materials Needed:

- Cattle pictures (or live animals)
- Calf model (or live calf)
- Handout 1, Bull
- Handout 2, Steer
- Handout 3, Heifer
- Handout 4, Beef Cow

ACTIVITY TIME NEEDED: 20–30 MINUTES

ACTIVITY

Leader Notes

We all recognize there is a difference between males and females in animals. In humans boys and men are males and girls and women are females. But sometimes it's difficult to tell what sex an animal is unless you know what you're looking for. We can use the reproductive organs of the animal to identify the sex. These are the parts of the body used in mating and having babies. One of the first things a member who wants to raise cattle should learn is how to tell a heifer from a steer or a steer from a bull.

Let's first talk about bulls and steers. These are the males in cattle. When a male calf is born, it is a bull. The main male organs are the testes that are located in the scrotum (a sack-like structure that hangs between his back legs), and the sheath located on the underside of his belly. The sheath contains the penis and this is what the bull uses to breed a cow and to urinate.

Use Handout 1, Bull. Show a picture of a bull or use a live bull. Point out the structures.

But, members don't show bulls in a market show. So, how does a bull become a steer? Let's look at the difference between a bull and a steer. The steer has a scrotum, but it is smaller than the bull's scrotum. This is because the testes have been removed. This process is called castration and can be done a number of ways, but when the bull is castrated, he is then considered a steer.

Leader Notes

Use Handout 2, Steer. Show a picture of a steer or a live steer. Point out the scrotum.

Use Handout 3, Heifer. Show the picture of the heifer or live heifer. Compare that to the steer.

Now, let's talk about the differences between a steer and a heifer. This has nothing to do with which one has horns. Either sex may have horns. Heifers are young female cattle. Most of a heifer's reproductive organs are on the inside of her body, so you can't see them. That is an easy way to tell the difference between the male and female. Also, remember, the steer has a sheath on the underside of his belly where urine leaves the body. But the heifer has no sheath. She urinates from her vulva which is located under her tail. This is also the opening to the reproductive organs located inside the heifer.

Use Handout 4, Beef Cow. Show the picture of a cow or a live cow. Encourage members to color their handouts.

Another type of sex classification is the cow. Technically, it is wrong to call a bull a cow, although many people do. A cow is a female that is older than 2 years and has had a calf. Until you've had some practice it is hard to tell the difference between a heifer and a cow, but it can be done.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What is a male calf called when it is born?
2. What are the two most visible sexual parts of a bull?
3. What is a female calf called when it is born?

Process:

4. How does a bull become a steer?
5. Why is it important to make a bull a steer when it is young?
6. When does a heifer become a cow?

Generalize:

7. Why is it important to know the difference between a bull and a steer? Heifer and cow? Or heifer and steer?
8. What is the main use of steers?
9. What is the main use of heifers?

Apply:

10. Why is the sex of the calf important when choosing your project animal?

GOING FURTHER:

1. Visit a local cow herd to see the differences between heifers and cows.
2. Study the reproductive organs of both sexes.
3. Observe beef calves being castrated.

REFERENCES

Author:
This lesson was modified from original material authored by Brian A. Swisher, County Extension Agent, 4-H, Kansas, and Deborah K. Lyons-Blythe, County Extension Agent, Agriculture, Kansas, with adaptation by:
Kirk A. Astroth, Extension Specialist, 4-H Youth Programs,
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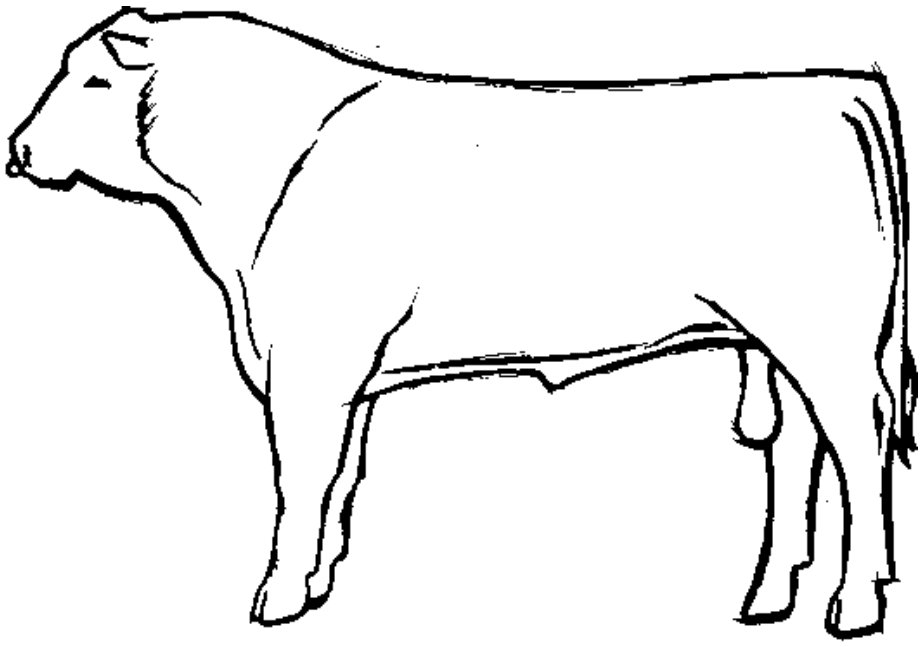
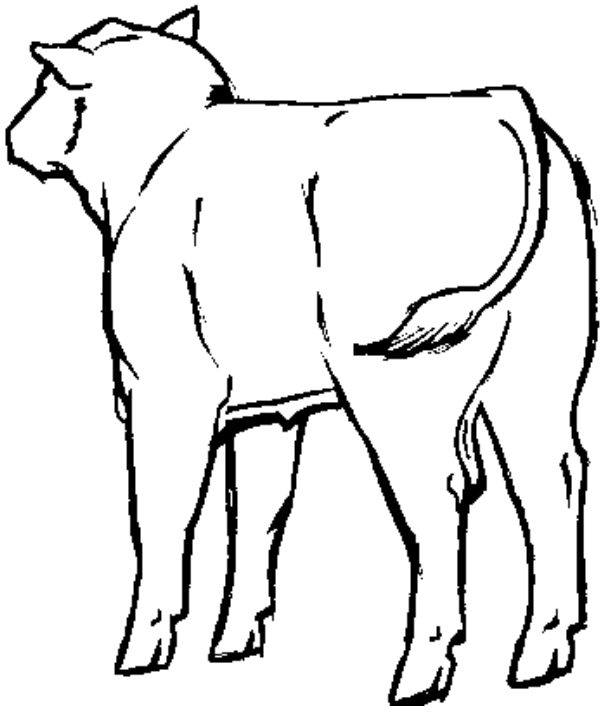
RECOGNIZING SEX DIFFERENCES IN CATTLE

BEEF, LEVEL I

Handout 1, Bull

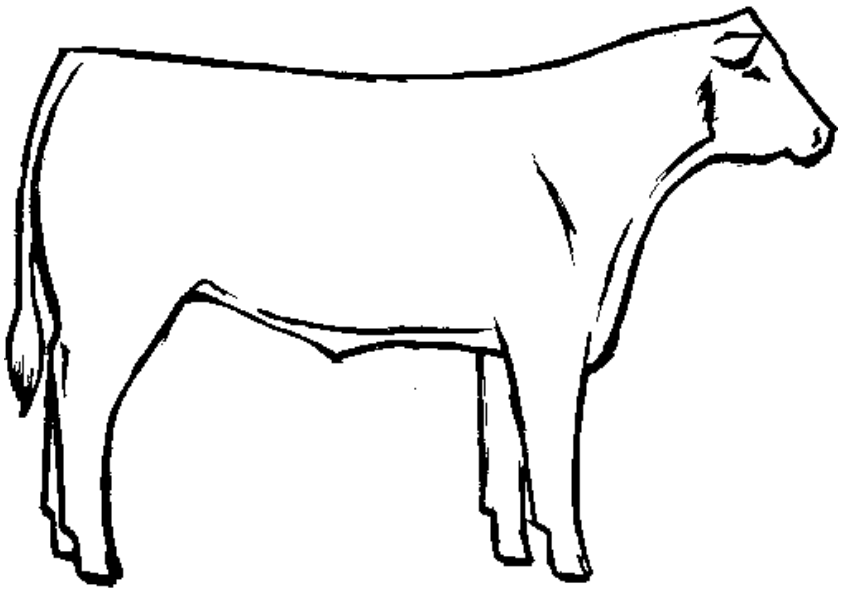


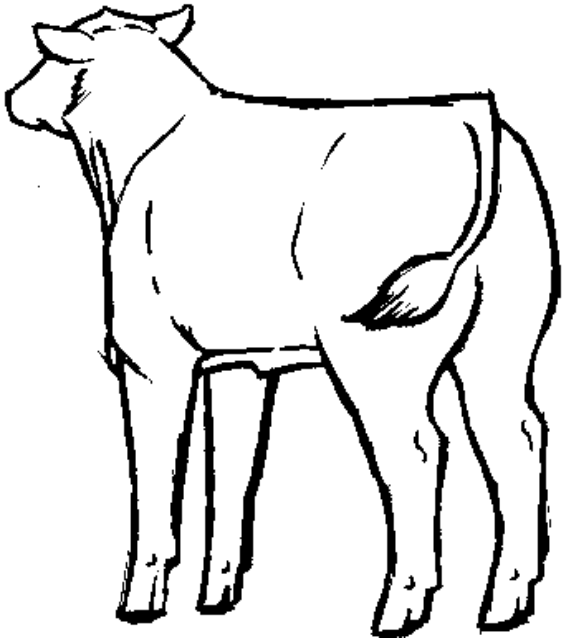


RECOGNIZING SEX DIFFERENCES IN CATTLE

BEEF, LEVEL I

Handout 2, Steer

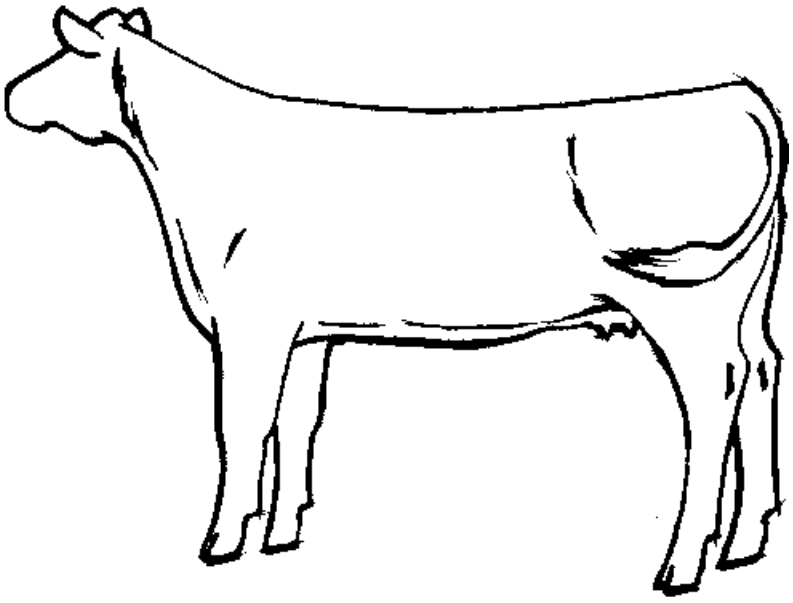


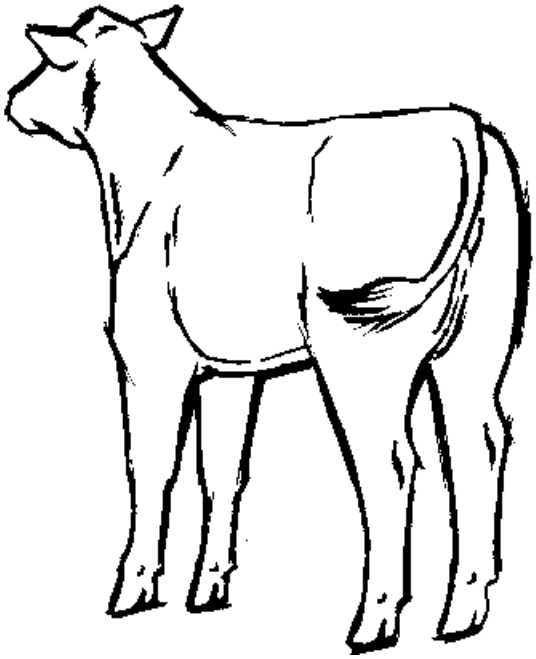


RECOGNIZING SEX DIFFERENCES IN CATTLE

BEEF, LEVEL I

Handout 3, Heifer

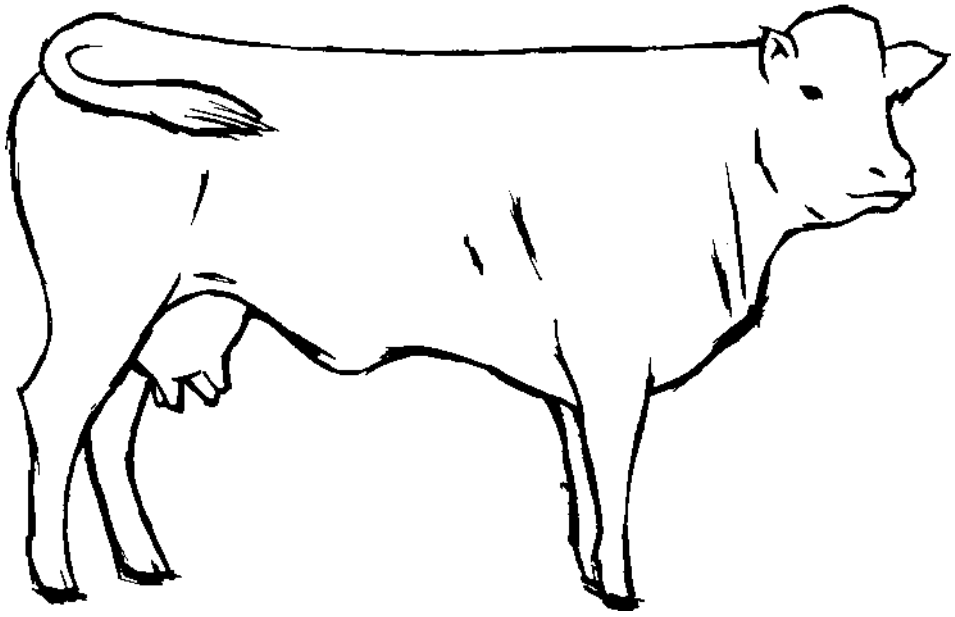




RECOGNIZING SEX DIFFERENCES IN CATTLE

BEEF, LEVEL I

Handout 4, Beef Cow



How Much Water?

Beef, Level I

What Members Will Learn . . .

ABOUT THE PROJECT:

- How much water beef animals drink per day on the average

ABOUT THEMSELVES:

- How much water they use each day

Materials Needed:

- 8-ounce drinking glass
- 1-gallon container
- 5-gallon bucket
- Water
- Activity Sheet 3, Home Water Use Tally Sheet

ACTIVITY TIME NEEDED: 15 MINUTES

ACTIVITY

Leader Notes

All animals require water for healthy lives. Knowing how much clean drinking water an animal requires each day will help members determine if they are able to provide for their animal's needs.

Often, we overlook the importance that water plays in livestock production. A little effort on the part of beef producers in making water freely available will increase production, and therefore, income.

Water is the basis of all life and is the most important part of an animal's diet. A beef animal can go without feed a lot longer than it can go without water.

The average child drinks about six glasses of water per day. How much water do you think the average beef animal drinks each day? Is it more than what humans require? Or less?

The answer depends on the size of the animal, but as you can imagine, livestock require much more water than people primarily because they are so much bigger. For example:

- A 350-pound calf needs between 1 and 5 gallons of drinking water a day. In this case, hauling a 5-gallon bucket of water out to your young animal twice a day might be okay, depending of course, on the weather. A calf needs more water in the summer when it is very hot outside. In the winter, water must be kept fresh so that it does not freeze.

Fill an 8-ounce drinking glass with water. Have members count how many glasses it takes to fill a gallon container. Use the gallon container to measure the capacity of a 5-gallon bucket or another container.

Leader Notes

- A 500-pound calf needs between 2 and 6 gallons of drinking water a day.

- A 750-pound steer needs 10 to 15 gallons per day of clean drinking water. At this level, you can easily see that hauling one bucket of water twice a day won't quite give the animal what it needs to be healthy.

- A steer weighing 1,000 pounds or more needs 20 gallons or more a day of cool, clean drinking water.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialsists.

Give members copies of Activity Sheet 3, Home Water Use Tally Sheet to take home and complete.

Share:

1. How much water does your calf drink each day?
2. How often do you give your calf fresh water?
3. What is the hardest/easiest thing to do to make sure your calf has plenty of fresh, clean water?

Process:

4. How will you know when your calf is thirsty?
5. Why is water important for your calf?
6. In what ways does your calf use water other than drinking?

Generalize:

7. What effect does weather and temperature have on the water needs of animals?
8. After using the Home Water Use Tally Sheet, what did you learn about your water needs?

Apply:

9. Who uses the most water? You or your calf? Why? (Leaders - be sure to consider total water use, not just drinking.)

REFERENCES:

Water Education for Teachers, Cooperative Extension Service, Kansas State University, Morgan Powell and Emily Kling

Author:

This lesson was modified from original material authored by Kirk A. Astroth, Extension Specialist, 4-H Youth Programs, Kansas State University, with adaptation by:
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HOW MUCH WATER?

BEEF, LEVEL I

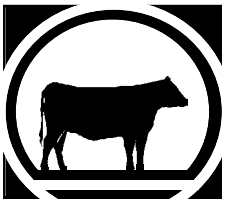
Activity Sheet 3, Home Water Use Tally Sheet

Count or list the number of times you use water on a given day. Record the number of times used or number of minutes used and multiply by gallons per use or per minute. Add items in last column to determine total usage. Ask someone to help figure math totals.

Water Use	How Many Times Daily	Number of Gallons Per Use	Total Gallons Used
Toilet Flushing	_____	5 gallons per flush	_____
Dishwasher	_____	18 gallons per load	_____
Washing Machine	_____	18 gallons per load	_____

Water Use	How Many Minutes Water Is Run	Number of Gallons Per Minute	Total Gallons Used
Shower	_____	6 gallons per minute	_____
Bath	_____	6 gallons per minute	_____
Open Faucet including hose, sink	_____	6 gallons per minute	_____

GRAND TOTAL _____



Identifying Types of Feeds and Understanding Feed Tags

Beef, Level I

What Members Will Learn . . .

ABOUT THE PROJECT:

- Identify the five major types of feed nutrients
- Categorize feeds into roughages or concentrates
- Identify feed nutrient sources
- Identify types of feed tag information

ABOUT THEMSELVES:

- Identify five to eight human foods and whether they are a primary source for protein, energy, mineral, vitamin or water
- The importance of a balanced diet

Materials Needed:

- Five paper plates
- Various index cards with feed ingredients written on them
- Samples of feed ingredients in small jars or plastic bags
- Chalkboard, flip chart or overhead projector
- Examples of various feed tags
- Activity Sheet 4, Cereal Box/Feed Tag Quiz
- Pencils and paper

ACTIVITY TIME REQUIRED: 60 MINUTES

ACTIVITY

Proper animal nutrition is the key to a successful livestock business and a livestock project. Animals also require proper nutrition for growth and development. In the same way, if we don't get the proper nutrition by eating right, we can have health problems and our growth and development may be affected in a negative way.

Members in the beef project should know the types of feed ingredients and how to identify various samples. Learning about the basic feed nutrients is an excellent way to prepare members to learn more about animal feed requirements and understand feed tags.

Generally, feeds are classified into two broad categories: roughages and concentrates. Roughages are typically the leafy green plants such as alfalfa and grasses, crop residues like straw from the production of grains, and silages which are green leafy plant materials that have been chopped and stored wet. Roughages are higher in fiber and less digestible than concentrates—meaning it takes longer for the material to pass through the animal's stomach. But young and rapidly growing animals do not have the

Leader Notes

As members arrive for the project meeting, have four different samples of feed set out on a table. Ask them to work together to decide what the feeds consist of and to what animal(s) they might be fed. Encourage them to discuss their opinions together and come to some consensus as a group.

Show samples youth looked at previously and discuss which are concentrates and which are roughages.

capacity to consume enough low-quality roughage to achieve normal growth and, thus, need other nutrient sources.

Concentrates include grains (corn, wheat, barley, oats and milo), oilseed meals, (like soybean meal, linseed meal, and cottonseed meal), fish meal, packing house byproducts, molasses, and dried milk products. Concentrates are high in energy, low in fiber, and highly digestible—usually about 80 to 90 percent digestible.

Regardless of feed type, all feeds are sources for some of the six basic types of nutrients: protein, energy sources (carbohydrates and fats), minerals, vitamins, and water. Knowing what combination of these nutrients your feed supplies is critical to a good feeding program.

Show an example of a protein source.

Proteins supply the materials necessary to make body tissues. They are the building blocks of which calf bodies are made. Proteins make up muscle, internal organs, bones and the blood. They also make up the skin, hair, hooves, and horns of a beef animal's body. If you feed more protein to your calf than it needs, the extra protein is used as energy—for body heat, cooling, movement, producing milk in females or for other functions. Grains such as corn, oats, and milo supply part of the protein your calf needs to grow. **Protein supplements** such as soybean, cottonseed, or linseed meal are used to balance your calf's ration. (what they eat each day).

Show an example of an energy source.

Energy is supplied to your beef animal from two types of feed nutrients—**carbohydrates** and **fats**. These nutrients are to a calf what gasoline is to a car. They provide energy for growth and maintenance. These nutrients also help the animal produce heat to keep the body warm. Energy fed in excess of what the animal needs for maintenance is stored as fat until the body needs it.

Show an example of a mineral source.

Minerals build bones and teeth and support other life functions in the calf. Livestock need a total of 16 different minerals in their diet. Calcium, phosphorus and salt make up the largest percentage of the minerals needed by the calf. Calcium and phosphorus are usually added to the calf ration for growth of bones and teeth. Many producers use bone meal or dicalcium phosphate as feed ingredients to supply these necessary minerals. Sodium, chlorine, and iodine are also critical minerals for your calf and are usually added in the form of iodized salt. Minerals that are needed only in very small amounts are called **trace minerals** and sometimes added to salt.

Show a good vitamin source.

Vitamins are just as important as other feed nutrients, but they are needed in smaller amounts. Vitamin A is required for the health of skin, eyes, nose, and lungs. For strong bones and healthy blood, vitamin D is needed. Other vitamins are required for numerous body functions. The calf's body produces some vitamins while others must be added to the ration.

Water is usually not considered to be a nutrient, but without it, life would not be possible. Many people consider water to be the most important part

of the calf's diet. Moreover, it is the cheapest part of an animal's diet, but it is often the most neglected part, too. A calf's body is over two-thirds water and blood is over 90 percent water. Water is also necessary in digestion and for carrying food nutrients to the rest of the body. Water carries away waste products through the urine, functions as the body's built-in cooling system, and helps joints move. Your calf can live longer without feed than without water.

Now that we have learned something about the two feed categories (concentrates and roughages) and nutrients, let's see how well you can classify some of the major feed ingredients according to their type.

Optional: You may want to get some actual feed samples from either your own supply or ask your feed dealer for some samples and have the members classify these rather than the index cards.

On this table are five paper plates, each one labeled as either PROTEIN, ENERGY, MINERALS, VITAMINS, or WATER.

Alongside these paper plates are index cards with the names of various feed ingredients written on them. As a group, I would like you to work together to sort through these various feed ingredient cards and decide which plate they should be placed on. When you have finished, let me know and we will discuss your classification.

Following their efforts, review their classifications with them. Remember to ask questions about the reasons for their choices rather than being critical of their decisions. Try to discover why they placed the feed ingredients the way they did. At the same time, you can also ask them which are concentrates and which are roughages.

Primary Protein Sources: Cottonseed meal, soybean meal, linseed meal, corn gluten meal.

Primary Energy Sources: barley, oats, wheat, corn, milo.

Primary Mineral Sources: bone meal, dicalcium phosphate, salt, trace mineralized salt.

Primary Vitamin Sources: vitamin supplements, green pasture, alfalfa hay.

Primary Water Sources: cool, clean water. (Snow does not provide enough water to meet an animal's daily needs for water.)

Have you ever thought about what goes into prepared animal feeds? Let's look at these samples of feed and the tag from each feed. The tag is an important tool for us—it tells us what is in the feed.

Arrange the feed samples on a table so that all members can gather around it. Or divide the group into pairs and give each pair a feed sample and a feed tag.

When you study the samples, answer these questions:

- What kind of animal is this feed meant for?
- What are some of the major ingredients in the feed?
- What are the sources of protein, energy, vitamins, and minerals in this feed?
- Why do some feeds include medicine?

This approach of providing a situation and asking your members to come up with answers or a solution is an effective way to teach this kind of material. Use a teen leader or group facilitator to ask questions as the members study the samples and tags. Let members do the talking and ask questions but don't give the answers.

Leader Notes

Once all groups have had an opportunity to give their explanations, use a different feed tag to help them understand how to read the information that is included. Be sure to refer back to some of the good points each group made and also be sure to correct some inaccuracies that they might have made.

Provide cereal boxes, Activity Sheet 4, Cereal Box/Feed Tag Quiz, and pencils. Then briefly examine the cereal box labels together. Look for the requested information and, when everyone is done, compare the cereals represented for nutritional value.

Repeat this activity with a feed tag from animal feed and compare with the cereal box exercise.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What are two feed types?
2. What are the feed nutrients?
3. What is the protein content on the feed tag for the feed you give your calf?

Process:

4. What is the main purpose for each of the nutrients? Discuss one at a time.
5. What nutrient is needed most often by a calf?

Generalize:

6. What nutrients might you find in other animal feeds?
7. Why do nutrient requirements vary for different ages of animals?

Apply:

8. Where else do you find nutrient information?
9. What nutrient will you look for on the label of the next bag of feed you buy for your calf?

GOING FURTHER:

1. Arrange a trip to a local feed mill to see how the feed ingredients are weighed and mixed together to make a complete ration.
2. Have members make lists of essential nutrients found on the feed tag. Does each feed provide all nutrients?

REFERENCES:

Author:

This lesson was modified from original material adapted from *Identifying and Classifying Feed Ingredients*, Thomas D. Zurcher, University of Minnesota, by Kirk A. Astroth, Extension Specialist, 4-H Youth Programs, Kansas State University, with further adaptation by :

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IDENTIFYING TYPES OF FEEDS AND UNDERSTANDING FEED TAGS

BEEF, LEVEL I

Activity Sheet 4, Cereal Box/Feed Tag Quiz

Cereal manufacturers are required to include “Nutrition Facts” on the box. The label includes a list of ingredients which are listed in order from most to least. It also lists percentage of daily value, amounts of some nutrients per serving, serving size, and servings per container.

1. Name of cereal

2. Main ingredient

3. Serving size Servings per package

4. Which vitamins are listed?

5. Does this cereal provide all of your daily value (100 percent) for any of the nutrients?

6. Which nutrients increase when milk is added?

7. Which nutrients are minerals?

8. Repeat this exercise using an animal feed tag. Compare and discuss the answers.

Is Your Calf Sick or Well?

Beef, Level I

What Members Will Learn . . .

ABOUT THE PROJECT:

- Recognize early signs of a sick calf
- Develop good diagnostic skills
- Recognize a normal animal
- Observe closely and make comparisons

ABOUT THEMSELVES:

- Their normal body temperature
- Improve observation skills

Materials Needed:

- Animal thermometer
- Slips of paper with characteristics of sick animals
- Newsprint
- Markers
- Model of calf or stuffed animal

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

Today we are going to talk about how to recognize a sick calf and how to tell if a calf looks healthy. To be able to care for your calf, or any other animal, you must know its behavior so well, that you can tell when it isn't acting the way it normally acts. This means you must become very good at watching your animal and understanding what you see. We call this **observing** your animal.

Healthy animals act differently than sick animals. Have you ever seen a sick animal? How does a sick animal look?

It is important that you learn to recognize the different ways a healthy and a sick animal act. And since animals are unable to talk, we, their keepers, must be very good observers.

If your calf has any of these signs (point to sick list), you can check to be sure it is really sick by taking its temperature.

Have you ever had a fever? How did you know for sure what your temperature was? The normal body temperature of humans is 98.6°F. How is your temperature taken?

Leader Notes

Record group responses on a large sheet of newsprint. Add these characteristics if children don't identify them:

- droopy ears and head
- nose, dry, crusty, or snotty
- gaunt–gone off feed or water
- diarrhea, color and smell
- rapid or noisy breathing
- bloated–stomach protruding left side

Leader Notes

Note–using a model of a calf or stuffed animal that will accommodate a rectal thermometer, demonstrate while explaining the method.

Let me show you the way we take the temperature of a calf. I will use a glass animal thermometer and then you can practice doing this on the model. First, you need to restrain the calf. If your animal is used to your being around, tying it up may be all you need to do. If not, or if it is really big, you may need to use a squeeze chute to keep it from moving around. Gently lift the tail and insert the thermometer into the rectum about 2 inches (show 2 inches on thermometer). You need to hold it there about one minute or until you count to 60 (1001,1002, 1003, etc.).

Stay calm and don't move around while you are holding the thermometer in the calf or your animal will become nervous. After a minute, remove the thermometer and wipe it off quickly with a paper towel or clean rag. Then read the temperature. You may need to have your parent or someone else help you do this. Sometimes it is hard to read. Write the temperature of your animal down on a piece of paper so you won't forget it.

What is your temperature when you are well? (98.6°F) A calf's normal temperature is higher than yours. It is 101.5°F. If the calf's temperature is higher than 101.5°F, you will know for sure that it is sick.

Elicit swelling or blowing up like a balloon responses.

Another illness to watch for is called **bloat.** It is very much like when you have a stomachache caused by a lot of gas in your stomach. This sometimes occurs after eating food like beans. People generally have a way of relieving gas (be prepared for laughter), but sometimes cattle can't do this. What do you think might happen to a calf if it can't pass gas? The part of the stomach where gas builds up in cattle is called the **rumen.** You will know if this happens to your animal if its left side begins to swell, because that is where the rumen is located.

See discussion on treatment in Level III, Common Cattle Diseases: Bloat

If your calf bloats, try walking it to relieve the gas. If the calf is still bloated after 15 minutes of walking at a good pace, call a veterinarian or someone who can help. You **must** find a way to get rid of this gas, or the animal may die.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What are some of the signs of a sick calf?
2. What happened when taking the temperature of a calf or model?

Process:

3. What problems, if any, did you have taking the temperature of a calf?
4. Why do you not put the thermometer in the calf's mouth?
5. Why is the temperature of a calf so important?

Generalize:

6. How is the calf thermometer different from others you have seen?

Apply:

7. What will you do different the next time you take a calf's temperature?
8. What types of thermometers might you need for other animals?

GOING FURTHER:

1. Ask each member to make a chart for a pet or farm animal observing its behavior and bring these observations to the next meeting.
2. Visit a zoo or farm.
3. Visit a veterinarian.
4. Visit a feedlot sick pen.

REFERENCES:

Minnesota Project Meeting Guide

Author:

This lesson was modified from original material authored by Brian A. Swisher, County Extension Agent, Kansas, adapted from *Examining a Healthy Animal*, Thomas D. Zurcher, University of Minnesota, with adaptation by:
Larry R. Corah, Extension State Leader, Animal Sciences and Industry, Kansas State University
Marcia R. McFarland, Extension Specialist, 4-H Youth Programs, Kansas State University
James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

Charades–Have each member choose an animal, duplicates are okay, and act out a behavior of an animal. On slips of paper that you have already prepared, write normal or abnormal behaviors on each piece of a paper. Have each member identify the animal they have chosen before they begin. The rest of the group attempts to identify the behavior, if it is normal or abnormal, and what it might mean about the animal. If members cannot think of a behavior, you may want to write some on pieces of paper and have them draw. Examples, cat stalking, dog barking and growling, rabbit thumping feet, calf limping.

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Cattle Identification

Beef, Level I

What Members Will Learn . . .

ABOUT THE PROJECT:

- Name four animal identification methods
- Why animal identification is used
- What types of identification are needed for different situations

ABOUT THEMSELVES:

- How they identify their belongings
- How to appreciate differences
- The need for identification of valuable items

Materials Needed:

- Chalkboard, chalk, or newsprint and markers
- Blank paper and pencils for members
- Actual identification equipment (branding irons, tattoo set, ear tags, neck chain)
- Activity Sheet 5, Cattle Identification Summary
- Leader's Activity Guide, Brand Prints

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

IMPORTANCE OF ANIMAL IDENTIFICATION

A permanent mark of animal identification to establish ownership has been used since the early days in history. Many animals were branded or tattooed. Ear notching and branding were among the early methods used in the cattle industry followed by tattooing and tagging. Several of these methods will be discussed and demonstrated during today's lesson.

Ear Tagging Method

4-H project animals are often identified with ear tags. Ear tags are usually made of plastic and come in many shapes, colors and sizes. The tag is not a permanent means of identification, however, as it can be lost. Tagging is easy to do and can be read from a distance if properly done with the appropriate size of tag.

Registered calves should be tagged with the same number that is tattooed in their ears. The tag should be placed between the ribs in the ear, and it should be placed in a position so as to not injure the animal's eye.

Leader Notes

Hand out Activity Sheet 5, Cattle Identification Summary. Leader should print members' verbal answers on chalkboard or newsprint in one or two words so that members can copy on their activity sheet as you discuss each method or at the end as a review.

Show several brands of popular ear tags and the applicator used by each. Demonstrate how to apply.

Leader Notes

Show tag and chain.

Neck Chain Method
This method is often used by persons new in the cattle business and has many disadvantages. It consists of a chain or nylon rope with a plastic or metal number that hangs around the neck.

This is a good means of identification on horned cattle in open pasture land. However, cattle without horns will often lose them over their heads. In wooded pastures, cattle can hang themselves if the chain is caught by a tree limb. The chain must also be adjusted as the animal gains weight so it does not become too tight.

Show tattoo set and explain and/or demonstrate on a dummy ear, a piece of cardboard or a live calf.

Tattooing Method
Cattle are often tattooed in the ears. Tattooing is required by most registered cattle breed associations. Unlike ear tags and neck chains, tattooing is a permanent method of identification, if done correctly.

The calf's ear should be large enough when applied so that no numbers will be in the hair or the outside end of the ear. The tattoo should be placed in between the ribs of the ear. To ensure a legible, permanent tattoo, the following steps are suggested.

1. Clean the ear with an alcohol-dampened cloth.
2. Dry the ear and rub tattoo ink on desired location.
3. Firmly apply the tattoo instrument. Correct numbers can first be checked by tattooing a piece of paper.
4. After tattooing, rub on more ink.

Show pliers and demonstrate various notches on the chalkboard.

Ear Notching Method
This is a very old method of marking cattle, once used all over the world. Ear notching can be done with a pocket knife or a commercial ear notching plier. There are under bits, over bits, swallow forks, tipped split, and bobbed ear marks.

They are a poor means of denoting ownership because they can be altered, but they are often used to indicate the month a calf was born, or whether a calf has been vaccinated or not.

Show a desirable and an undesirable branding iron to the members. Show on chalkboard some good and bad brands and explain what blotting is and why they blot.

Branding Method
Most ranchers brand their cattle to prove their ownership. The brand of ownership is known as a "holding" brand and this brand is usually recorded in the county clerk's office in each county in which they have cattle. This brand is kept as simple as possible to enable the brand to be easily read. Care should be taken to prevent blotting. Following is an explanation of various methods of branding.

1. Fire branding: The irons are heated in a butane or wood fire until they are gray-hot (before they are red-hot). The animal must be secured so it will not move. The brand should be applied in a fleshy area. The brand should never be applied when the hair or hide is wet, as this causes scalding and blotting.

2. Electric branding: This is simlar to fire branding except the brands are heated by electricity.

Show iron if available.

3. Acid branding: This is done with an iron which has been submerged in acid. This is a simple method, but not often used because the acid can run or be smeared, which creates an ugly, slow-healing brand.

4. Freeze branding: This is a slow method that requires special equipment. The irons are cooled down in a mixture which contains dry ice. The area to be branded must be shaved close and cleaned with alcohol. The cold iron is held in place for 30 to 40 seconds. The cold kills the color-producing cells and the new hair that grows from the brand site will be white. The process takes six to eight weeks to complete, and until then there is no identifying mark. Also, this method is not suitable for white animals. However, it is painless and does not damage the hide.

5. Horn branding: Breeds of cattle with horns can be horn branded, usually with the same number that is tattooed in their ears. A small number is used and heated on a wood fire or gas heater. The horn is cleaned by rasping, and then the hot numbers are applied to the front of the horn. This is a semi-permanent method of identification, as the numbers need to be re-branded every few years.

Show small horn branding iron, if available.

Using Leader's Activity Guide, Brand Prints, have members create their own brand.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. How is your calf identified?
2. What is the most popular cattle identification method? Why?
3. Which method of cattle ID is easiest/hardest to use? Why?
4. Which method of cattle ID is easiest/hardest to read? Why?

Process:

5. Why is it important for every cow or calf to have an individual identification?
6. When might an animal need more than one identification? Why?
7. Why is it important for each farm or ranch to have its own brand or special identification?

Generalize:

8. What ID methods are used to identify other animals?
9. How do you identify things you own?

Apply:

10. What helps you identify your things from others?

GOING FURTHER:

1. Take a field trip to a ranch to observe branding or identification of cattle.
2. Research history of local brands in library or in the county clerk's office and report to group.
3. Watch ear tagging animals for identification at county weigh day.
4. Give demonstration on tattooing beef cattle or other identification method.
5. Practice fire branding by heating a branding iron and have members take turns branding pieces of wood.

REFERENCES:

Author:
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CATTLE IDENTIFICATION

BEEF, LEVEL I

Activity Sheet 5, Cattle Identification Summary

Summarize the advantages and disadvantages of each of the following methods of identifying cattle.

Advantages	Method	Disadvantages
	Ear Tagging	
	Neck Chain	
	Tattooing	
	Ear Notching	
	Fire/Electric Brand	
	Acid Brand	
	Freeze Brand	
	Horn Brand	

CATTLE IDENTIFICATION

BEEF, LEVEL I

Leader's Activity Guide, Brand Prints

Instructional Areas
Art and History

Agricultural Subject
Beef Science

Objective
To teach prints and creativity. To learn about an aspect of agricultural history.

Motivation
Discuss brands with the class. They are all unique. Each brand represents a certain person or ranch. Talk about why we need brands. Explain how brands were especially important in the late 1800s when cattle roamed freely, before fences existed. Some ranchers still use brands in case their cattle are lost or stolen.

Vocabulary
Brand — A mark or symbol which is burned on the cattle's hide with a hot iron.
Print — A line or mark made by pressing one thing against another.

Materials
Pipe cleaners, construction paper, paint, pie pan.

Procedure
Have students design brands with pencil and paper by drawing symbols or initials into interesting designs. Then have them twist pipe cleaners into the shape they designed. Spread paint into pie pan. Dip pipe cleaner brand into paint. Brand (print) the design onto a piece of construction paper.

Enrichment
Have students draw cattle. After their drawings are done, have a roundup and brand the herd. Talk about how brands are similar to labels or logos. You might let your students design logos for new or old products.

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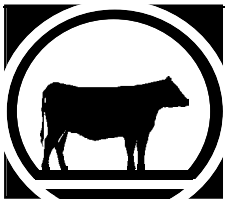
Developed by Janis Abbott



Practical Farm Knots

Beef, Level I

What Members Will Learn . . .

ABOUT THE PROJECT:

- How to tie at least four basic farm knots
- Understand the importance of tying knots that hold but that are also easy to untie
- Name a situation in which a knot might be most useful

ABOUT THEMSELVES:

- Develop learning-by-doing skills to enhance self-concept
- Improve ways of getting along with others

Materials Needed:

- 3 to 4 feet of rope for each member (the white-braided cord sold for curtain pulls or blinds works best—it is fairly flexible and yet holds the shape of a knot well enough so members can see its construction clearly)
- Handout 5, Knot Patterns (two pages)
- Chairs or other objects on which to tie knots
- Optional: A knot board which illustrates the major knots displayed

ACTIVITY TIME REQUIRED: 60 MINUTES

ACTIVITY

Leader Notes

The tying of knots does not come naturally, like eating or watching TV or falling down stairs. Tying knots, like playing a guitar, driving a car, or hammering a nail, *without* hammering your thumb, takes practice. You will find that tying knots will require at least some practice before you can tie them easily, quickly, and without having to think about what you are doing. And like any skill, if you don't continue to practice it, you forget some of what you have learned.

The ability to tie a variety of knots is a useful skill to have when working with livestock, particularly beef animals. Not only do you need to know how to tie knots that will stay tied, but it is also useful to be able to tie a knot that you can untie easily after pressure or strain has been put on the knot. The mark of a good knot is one that is easy to tie, stays tied when you want it to, but is also easy for you to untie after the knot has done its work.

It might be best to start off with some definitions so that we can easily communicate about how to tie knots. This will make tying knots easier if we all remember what part we're referring to.

Leader Notes

Refer to Handout 5, Knot Patterns. Have members demonstrate the parts of the rope.

The end that we will be tying knots with will be called the **working end.** Normally, the remainder of the rope that we don't use for knot-tying is called the **standing part.** Whenever we put a bend in a rope, that is called **taking a bight.** Whenever a rope crosses over itself, this is called a **loop.**

Sometimes ends of rope that have been out will unravel. To prevent this, the cut ends must be whipped, dipped, or burned, depending on the type of rope you purchase. Most synthetic ropes can simply be burned to prevent any unravelling.

Even though most people know how to tie this knot—even young children—you will probably need to demonstrate it for them.

THE OVERHAND KNOT

The easiest knot to tie—and one that most of you are probably familiar with—is the simple overhand knot. This is the knot that you first make to tie your shoes. The purpose of the overhand knot is to prevent the rope from slipping through something. Although it is one of the simplest knots to tie, it is also one of the least useful when used by itself. However, it is the first step in the formation of more complex knots.

Show how, then allow them to try.

To tie an overhand knot, make a loop, then bring the working end over and around the working part, pass it through the loop, and draw it tight. Let's practice this so that everyone understands.

THE SQUARE KNOT

The square knot is a more useful version of the overhand knot. In fact, the square knot is just two overhand knots—one tied on top of the other. Tied correctly, it is an excellent knot for joining two pieces of rope with equal or nearly equal thickness, or for tying the ends of a single rope together to form a loop. In raising animals, the major use of square knots is to tie or secure gates.

There are two ways to begin the second overhand knot. Depending on how you start the knot, the ends may or may not come out alongside their own working part. Demonstrate both ways, emphasizing the difference.

To tie a square knot, start by tying an overhand knot. Next, tie another overhand knot on top of it, but this time **in reverse** in such a way that each end comes out alongside its own working part, and on the same side of the loop through which they pass. Left loose, the knot appears as two closed loops leading in opposite directions and linked together.

QUICK RELEASE KNOT

The quick release knot (also known as the bowknot or the reefer's knot) is the standard knot used to tie an animal to a post or fair stall. Like the square knot, it is a good non-slip knot with which to tie ends of rope together. It has the added advantage, though, that it can be untied under tension—a most important feature of any knot used to restrain livestock.

To tie a quick release knot, the steps are identical to those used in tying the square knot: a simple overhand knot, coming from right over left (A).

Now, begin to tie the second overhand knot, coming from left to right, by laying the new left-hand strand over the new right-hand strand (B).

Instead of inserting the running end of the new left-hand strand into the loop formed by the crossing strands, form a bight, or small loop, in the new left-hand strand and insert it into the loop (C).

Grasp the bight with the thumb and index finger of your right hand and pull it part-way through the loop.

Grasp the left-hand strand and left working end in your left hand and the right-hand strand in your right hand. Pull to shape and secure the knot. Be certain that the end of the bight is "trapped" in the center of the knot.

Some animals have a habit of biting on the knots restraining them and freeing themselves. To prevent this with the quick release knot, insert the running end of the rope into the bight.

In an emergency, the free end of the bight can be pulled sharply, immediately releasing the knot.

Let's all practice tying a quick release knot.

THE BOWLINE KNOT

Knot users, from livestock producers to seafarers, consider the bowline knot one of the most useful knots around. It is a non-slip knot, and as such it can be used to form a loop that will not tighten or draw-down when placed around an animal's body or a post. Moreover, it is relatively easy to untie.

To tie a bowline knot, position the rope so that the standing part is to your left, the working end to your right. Form a right-hand loop by passing the working end of the rope over the standing part.

Secure the loop by positioning the strands where they cross between the thumb and index finger of your left hand (A).

Insert the working end of the rope into the loop from the back (B).

Cross the working end over the top of the standing part and wrap it around the rear of the standing part. Reinsert the working end into the loop from the front (C).

Grasp the working end of the rope and the right-hand strand of the loop in your right hand, the standing part of the rope in your left hand. Pull to shape and secure the knot. The size of your loop will depend on the amount of working end originally allowed for use (D).

A common way to remember how to tie a bowline knot is the following story. If you consider the first loop to be a "rabbit hole," the standing part to be a "tree," and the working end to be the "rabbit," remember that the rabbit comes out of the hole, runs around the tree, and goes back down its hole.

DOUBLE HALF HITCH KNOT

The double half hitch knot is an extremely useful knot for the handler of livestock. It is quick, easy to tie, acts like a slip knot, and provides a convenient way to tie the end of a rope when no other knot seems appropriate.

Begin by positioning the standing part of the rope to your left and grasp the working end of the rope in your right hand. Pass the running end of the rope over or around the post.

Bring the running end over the standing part of the rope, under it, and then insert it into the loop (the one around the post) from the bottom.
Repeat this same step again to form the second half of the hitch.

THE HONDA KNOT

A honda is a small loop secured into the working end of a rope through which the standing part of the rope passes as it forms a much larger loop. Most lariats come with the honda knot already tied into an end. A few are manufactured with a quick release honda tied into the end. Bulk ropes or broken lariats must have honda knots retied into their ends.

Start by tying an overhand knot tightly into the end of the rope. Approximately 8 inches below this, tie another overhand knot, only this time leave it in the loosened state.

Grasp the loose overhand knot in your hands and study it until you have determined how to orient it so that the working end of the rope comes out from the loop and toward you. From there it runs upward to the end knot. Grasp the running end of the rope and bend it so that it lies over the bend of the overhand knot loop.

Insert it into the overhand knot loop between the bend of the loop and its own standing part. Study the diagram on the handout because it is easy to place the running end improperly.

Depending on how long the meeting has gone at this point, you may want to continue to let the youngsters practice these knots. Also, you can follow up by asking them to demonstrate particular knots.

CONCLUSION

I have provided each of you with a handout picturing the knots we have started practicing here today. You should continue to practice since only by practicing will you be able to tie these knots almost as second nature.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.
Share:

1. What knots did you know before this lesson?
2. What knots did you learn?
3. Which knot was easiest/hardest? Why?

Process:

4. What problems have you had when learning to tie knots?
5. Why is it important to know how to tie knots?

Generalize:

6. What knots do you use with other projects? Why?
7. What is the easiest way for you to learn to do something with your hands? Why?

Apply:

8. Where else do you use knots?
9. How can you help your friends learn to tie knots?

GOING FURTHER:

1. **Conduct a knot relay.** Divide your members into two or more teams. Have each member of each team tie a particular knot you call out. The first team finished wins.
2. **Situation Relay.** Instead of telling members which knot to tie, give them a situation requiring a particular knot. They then choose a knot, tie it, and tell why they chose that particular knot. Repeat for the next member.
3. **Conduct a Knot Demonstration.** Knot tying makes an excellent demonstration topic for members. Let each member or team of two members draw the name of a knot from the hat. Ask them to prepare and give a demonstration for the rest of the members. Allow about 15 minutes preparation time. As the leader or teen leader, you may want to move from group to group to answer questions and provide support.

(The above activities were taken from 4-H Project Meeting Guides, Agricultural Extension Service, University of Minnesota, 1983).

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Useful Knots for Everyone, Edward Montgomery, New York, Charles Scribner's Sons, 1973

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The Handbook of Knots and Splices, Gibson, 1976
The Encyclopedia of Knots and Fancy Rope Work, 1946

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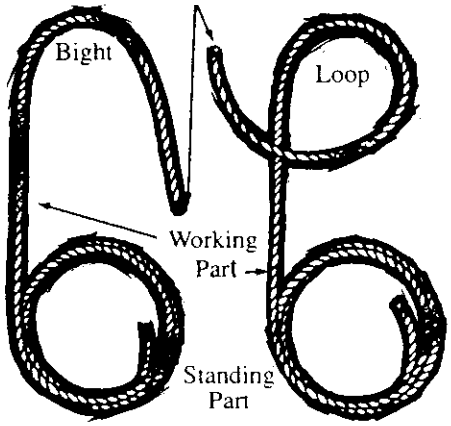
PRATICAL FARM KNOTS

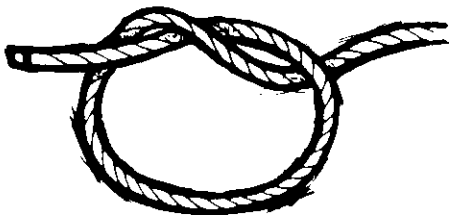
BEEF, LEVEL I

Handout 5, Knot Patterns

Rope Part Definitions

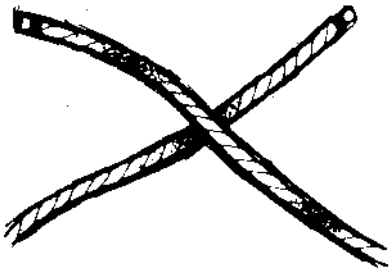


Overhand Knot



Square Knot

1.



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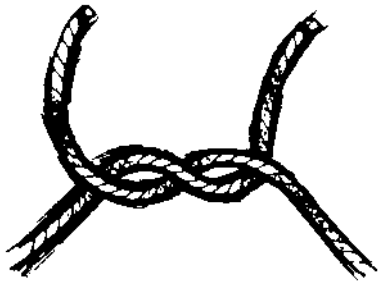

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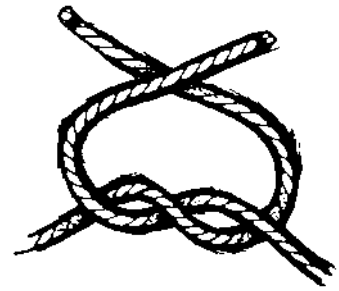


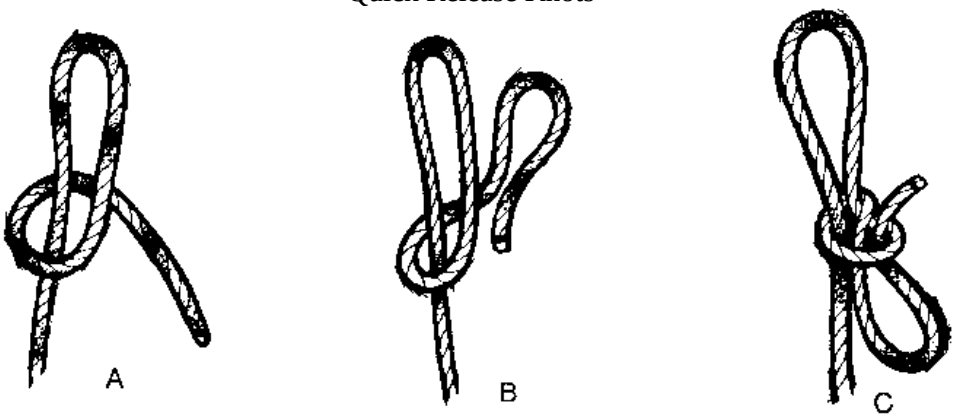
4.

PRACTICAL FARM KNOTS

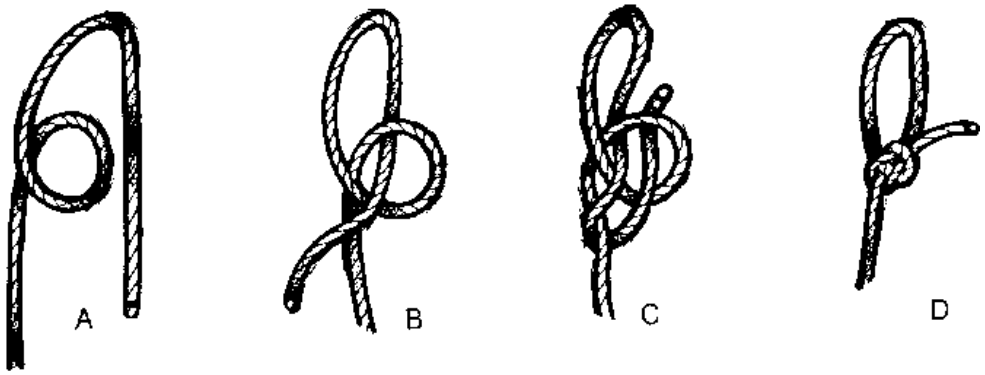
BEEF, LEVEL I

Handout 5, Knot Patterns, *continued*

Quick Release Knots

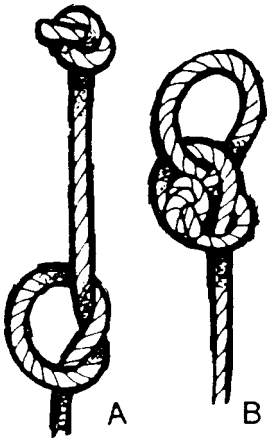


Bowline Knot



Double Half Hitch

Honda Knot



The Proper Way to Wash Your Calf

Beef, Level I

What Members Will Learn . . .

ABOUT THE PROJECT:

- How to wash a calf
- The equipment needed to wash a calf

ABOUT THEMSELVES:

- Importance of following directions and sequence

Materials Needed:

- Bucket calf
- Livestock soap
- Rubber brush
- Sponge or rag
- Wash bucket
- Rice root brush
- Scotch comb
- Water hose
- Safe place to wash your calf—wash racks
- Fly repellant or livestock dip
- Activity Sheet 6, Washing Your Calf Word Search
- Leader's Key, Activity Sheet 6, Washing Your Calf Word Search

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Step 1
Washing your calf can be fun, but it can also be dangerous. This is not a time for games. Move slowly so as not to frighten your calf. Put a plastic halter on your calf as a rope halter will swell once it gets wet. Tie the calf leaving only a few inches of room on the rope. This will keep him from moving around.

Step 2
Fill a wash bucket with water from the hose and add enough livestock soap to form a lather. Use only soap that is recommended for livestock. Don't put the soap directly on the calf as it may irritate the skin and cause dandruff and scaling.

Step 3
Before wetting down the calf, use the scotch comb and rice root brush to remove as much of the mud and dirt accumulated from the body of your calf as possible. Turn the hose on medium pressure and use your finger to form a spray. Starting at the calf's feet, wet down its legs completely.

Leader Notes

Discuss major steps or see if members can list the major steps in order. Let members volunteer or draw for each step. Encourage teamwork and cooperation.

Then, slowly wet down its underline and work up its body toward the topline. Last, wet its head, holding the ears cupped closed with your hand. Don't get water into the calf's ears. If water enters the calf's ear, the ear will hang down. If the water is allowed to remain, there is danger of infection. Once again, use the scotch comb to remove any mud on the calf.

Step 4
Using the sponge or rag, apply soapy water from the wash bucket to the calf and scrub the calf with the rubber brush. Wash the legs and underline as well as the sides and topline. When you wash the head, again, be careful so that you don't get water or soap in the ears.

Step 5
To rinse the calf, work from the top down. First, rinse its head, cupping the ears closed with your hand. Then starting at the topline, rinse the soap completely out of the calf's haircoat. Pay careful attention to this step as any soap left will cause dandruff.

Step 6
Empty the wash bucket and rinse well. Then, fill it with clean water and put one capful of fly repellant or livestock dip into the water. Pour the bucket over the calf's topline, starting at the shoulder and pouring toward the rump. Don't pour this on the calf's head. This will cut down on the number of flies attacking your calf and will help with grooming.

Step 7
The last step is to brush and dry your calf. Using a scotch comb followed by a rice root brush, comb the hair on the body and legs up and forward at an angle. Don't stop when all the hair has been combed. Continue combing over the whole body until the calf is nearly dry. This is a **big** job, but it is well worth the work. When you are finished, your calf's haircoat will be easier to fit for the show and will look great while your calf is relaxing in the stalls.

Give members copies of Activity Sheet 6, Washing Your Calf Word Search. You can complete it now or send it home and ask members to complete it and bring back to the next meeting.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.
Share:

1. What happened when you or your group began getting the calf wet?
2. What were the easiest/hardest parts of the calf to wash? Why?

Process:

3. Why do you need to use a plastic halter when washing your calf?
4. Why is it important to use the correct type of soap?
5. Why is it important to keep water out of the calf's ears?

Generalize:

6. Why do you think you were told to wash the calf by doing things in a special way or order?
7. Why is it important to follow directions closely when washing a calf or doing something important?

Apply:

8. Where else would you use this washing process? Discuss.
9. Why do you think your parents or teacher ask you to do certain things in a particular way?

GOING FURTHER:

1. View the video on *Fitting Your Club Calf*, Kansas Cooperative Extension Service.
2. Do above in conjunction with the lesson plan on clipping cattle.

REFERENCES:

Author:
This lesson was modified from original material authored by Deborah K. Lyons-Blythe, County Extension Agent, Agriculture, Kansas, and Twig Marston, Extension Aassistant, Animal Sciences and Industry, Kansas State University, with adaptation by:
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THE PROPER WAY TO WASH YOUR CALF

BEEF, LEVEL I

Activity Sheet 6, Washing Your Calf Word Search

Directions: Look for and circle only the items on this list which you need in order to properly wash a calf. Some letters may be used more than once. To check yourself, write the letters you *did not circle in the blanks below in the order they appear as if you were reading left to right, top to bottom.*

rice root brush
water hose
tail ties
calf
livestock dip
wash racks
rope halter
scotch comb
livestock soap
rubber brush
cage
show stick
ear muffs
sponge
wash bucket
fly repellant

T	H	O	W	A	S	H	R	A	C	K	S	P
P	S	W	A	S	H	S	A	C	A	L	A	F
I	U	F	Y	O	U	U	T	D	O	O	L	L
D	R	N	O	T	N	R	E	E	S	A	S	Y
K	B	E	E	D	A	B	K	K	C	C	P	R
C	R	A	S	G	E	T	C	A	O	S	O	E
O	E	H	O	O	W	O	U	S	T	T	N	P
T	B	I	H	C	T	O	B	K	C	A	G	E
S	B	R	R	S	O	R	H	P	H	E	E	L
E	U	H	E	A	L	E	S	T	C	E	R	L
V	R	V	T	E	A	C	A	R	O	M	U	A
I	I	F	A	F	S	I	W	O	M	R	T	N
L	A	I	W	L	T	R	I	E	B	S	X	T

__ ____ _ ____ ___ __ ___ ____ _
____, _ _____ ______, _ _____ _______,
_________ __ _____ _____.

THE PROPER WAY TO WASH YOUR CALF

BEEF, LEVEL I

Leader's Key, Activity Sheet 6, Washing Your Calf Word Search

Directions: Look for and circle only the items on this list which you need in order to properly wash a calf. Some letters may be used more than once. To check yourself, write the letters you *did not circle in the blanks below in the order they appear as if you were reading left to right, top to bottom.*

rice root brush
water hose
tail ties
calf
livestock dip
wash racks
rope halter
scotch comb
livestock soap
rubber brush
cage
show stick
ear muffs
sponge
wash bucket
fly repellant

T	H	O	W	A	S	H	R	A	C	K	S	P
P	S	W	A	S	H	S	A	C	A	L	A	F
I	U	F	Y	O	U	U	T	D	O	O	L	L
D	R	N	O	T	N	R	E	E	S	A	S	Y
K	B	E	E	D	A	B	K	K	C	C	P	R
C	R	A	S	G	E	T	C	A	O	S	O	E
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Training Beef Animals for Show

Beef, Level I

What Members Will Learn . . .

ABOUT THE PROJECT:

- Methods to use in halter breaking a beef animal
- How to teach a beef animal to lead
- How to set up a beef animal for show

ABOUT THEMSELVES:

- Patience is needed when working with animals
- Differences between positive and negative re-enforcement

Materials Needed:

- Handout 6, Pen with Built-In Chute
- Halters (two or three styles or types)
- Show stick
- Scotch comb
- Gentle beef animal

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Leader Notes

The purpose of training a beef calf is to be able to show the animal to its best advantage. The calf must be willing to let the judge touch it. A judge will not favor an animal that will not stand still. It takes a lot of skill and patience to train a calf properly.

The first few weeks of a beef project are probably the most important. The way the animal is started on feed and handled has a tremendous effect on the success of the project.

Regular care, hard work, doing the “right” things, and patience will accomplish more than tricks and short cuts.

As soon as members get a calf they should begin handling the animal. It is important to work around animals quietly, without quick movements or loud talking. Scratching and rubbing will help gentle the animal and help it become used to the feel of hands. Begin scratching animals on the back, not the head.

HALTER BREAKING

A small working chute will allow members to easily catch new animals to put halters on them. Crowding the animal into a small pen will also work.

Pass out Handout 6, Pen with Built-In Chute.

Leader Notes

Show different types of halters.
1. Halter with chains.
2. Rope halter.
3. Halter with padded nose band.

There are various types of halters and ways to halter break calves. Some people prefer halters with chains, others rope halters. A halter with a padded nose band is recommended to prevent serious injury and scarring of the nose.

After selecting the type of halter to use, place the halter on the calf and adjust the halter so that it fits properly. The halter should apply pressure over the nose, not behind the ears. For proper fit, the nose piece should be up on the nose just under the eyes. The halter should not be too loose so that it will come off or too tight so that sores will develop behind the ears.

Halter Breaking by Dragging the Halter

Ask members to share their preferred method of halter breaking a calf and why. Use the lesson to add to their experiences.

After haltering the animal, pull on the lead rope a time or two and then let go. Let the animal drag the lead rope on the ground. As the calf walks, it will step on the lead rope and pull its head around. This will teach the calf to respond to pressure. The animal may be allowed to wear the halter and drag the lead rope for several days.

Halter Breaking by Tying

A calf may be tied to a post to halter break the animal. As the calf pulls back, the halter tightens and as the calf comes forward, the halter releases pressure. The calf learns to stop the pressure on his head by coming forward.

For several days, a calf may be tied in its stall between feeding, watering, and exercise periods. The length of the rope should be long enough for the calf to eat and lie down, but not so long as to get tangled up. As soon as the calf is gentle enough, it should be brushed.

It is important to begin brushing the calf as soon as possible because brushing and petting will help gentle a calf.

Training to Lead

Demonstrate with beef animal or divide members into small groups to share their experiences in training a calf to lead.

When you teach a calf to walk with you, we say you are training it to lead.

When teaching to lead, pull on the lead rope and then give slack so the animal comes forward. *Do not apply continual pressure*. Always pull and then release the pressure as the calf responds. When the animal learns that the rope loosens when it walks, it will lead. Have someone walking behind the calf to make it move when it stops instead of pulling on its head constantly. This will help it learn quicker.

Pulling slightly to the side instead of straight forward may help the calf lead. Reward the calf by petting when it does what you want.

Some calves are more difficult. If a calf does not begin to lead after three or four days of pulling and then giving slack, get some help and lead the calf away from the pen. It may take two people on two ropes. Tie the animal and bring feed and water. That night, with some help, lead the calf back to the pen. Feed the animal and turn it loose for the night. Continue

this routine for several days until the animal associates leading with getting to eat.

There are several methods that should not be used in training a calf to lead.

Discuss why these methods should not be used.

DO NOT

- Tie the calf behind a vehicle and pull
- Beat the calf with a stick or whip
- Pull on the rope with hard jerks
- Punch the calf with a sharp object
- Use an “electric prod”

Training for the Show Ring

As soon as the calf begins to lead, begin daily exercise and practice proper show ring procedures. Daily exercise is important not only to the condition of the animal, but also its response to the handler.

Demonstrate with beef animal.

Start teaching the calf to stand correctly. For this you need a show stick. This is a light stick about 4½ feet long with a blunt nail or point on one end. Begin by placing the beef animal’s front feet. Push the feet back with the end of the show stick and pull them forward with the nail. After the front feet are set squarely, set the back ones in the same manner. The feet should be set squarely under the calf. One leg should be under each of the four corners of the body. Do not stretch the calf out too much or do not pull its rear feet up under it too far. Make the calf look natural. Do not have the feet too narrowly spaced, but do not set them so wide that they look unnatural. After much training, the calf will soon understand what is expected and will almost set up without help. The calf should be taught to stand in one place for 10 or 15 minutes as the animal may have to stand this long in the ring. When a calf is standing correctly, use the show stick to rub under the belly. The beef calf will associate standing still with the rubbing. Use slow long motions rubbing its underline in front of the navel. This is a calming motion for the calf.

Always practice with the show halter a few times at home before going to the show so the calf gets used to the chain under the chin.

SUMMARY

A member cannot always have the best calf at the show, but the member can always have a well-trained, well-shown animal. The well-trained, well-shown animal **always** impresses the judge favorably.

In order to review training procedures you may simulate a conference judging situation. The leader should play the role of judge, while selected members role play an entrant. The leader should ask questions about training and may coach members about how to respond to judges’ questions.

Leader Notes

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. How did you get your calf used to a halter?
2. Was it easy or hard to get your calf to lead? What happened?
3. What happened when or if you tried to teach your calf to stand correctly?

Process:

4. Why should you train your calf by being kind?
5. Did positive or negative methods work best for you? Why?

Generalize:

6. What did you learn about your calf while training it?
7. How do you like to learn new things?

Apply:

8. What will you do different the next time you train a calf?
9. What did you learn while training your calf that can be used in other 4-H projects?
10. If you could enter a contest where other animals are being judged, or a fitting and showing class where what you do is judged, which would you choose and why?

GOING FURTHER:

1. Show the video: “Showing Beef Cattle.”
2. Give a demonstration on how to train a beef animal for show.

REFERENCES:

Author:

This lesson was modified from original material authored by Brian Cummins, County Extension Agent, Texas, with adaptation by:
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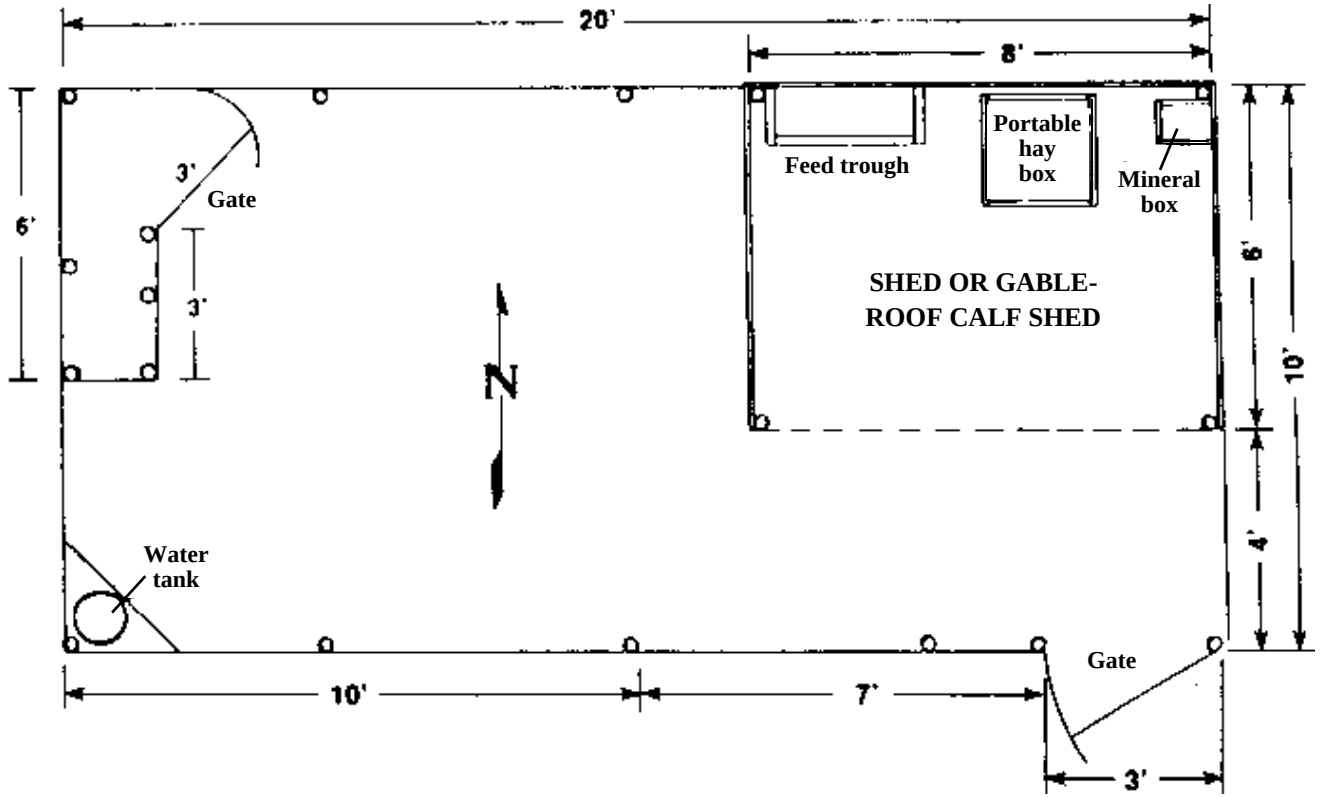
TRAINING BEEF ANIMALS FOR SHOW

BEEF, LEVEL I

Handout 6, Pen with Built-In Chute

(Chute may have head gate or have a solid front.)



For each additional calf, allow 100 square feet more pen space, 1 running foot more feed trough space, 24 square feet more shed space, 1 running foot more hay box space and 10 gallons more water trough capacity.

Being Prepared: How to Pack a Tack Box for a Show

Beef, Level I

What Members Will Learn . . .

ABOUT THE PROJECT:

- Identify important items to be packed in a tack box for a beef cattle show
- Why each item is necessary and how it is used

ABOUT THEMSELVES:

- Importance of being organized

Materials Needed:

- Tack box packed with items listed below—could be obtained from an older member
- Paper and pencils for each member
- Activity Sheet 7, Equipment Match

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

The tack box is a box used to carry equipment needed at a beef cattle show.

Water buckets—not the 5-gallon buckets, but instead, a bucket that a calf can get its head into all the way to the bottom
Feed pans—one for each calf
Show halters—one for each calf and one spare in case another breaks
Show sticks—one for each exhibitor in your family because at some time, you may be in the same class and cannot share one show stick
Safety Pins—at least four for each exhibitor for pinning on numbers—a show harness could also be used
Scotch comb—one for each exhibitor in your family—use them to groom your animal and carry it into the showring in your pocket
Rice root brush—at least one, use it to groom your animal with a scotch comb
Wash brush or rubber comb—use it to get your animal clean when you wash it—be sure it is sturdy enough to get wet
Scissors—to cut the tail down after the show, cut stall cards to size and other odd jobs—be sure they are sharp
Tail ties—use these to tie the tail up for the show—you can also use the tail hair on your calf or pipe cleaners painted the color of your calf
Tail comb—to tease the hair on the tail for show
Clippers—for last minute jobs before the show

Leader Notes

There are many ways you could do this. If you have a packed tack box, empty it and, as you refill it, identify each item and explain it – this can be done in any order. Or you could hold up an item and have members identify and explain it. You could even make a game out of it.

Give each member a piece of paper and pencil and have them list what they think are the five most important things to have in a tack box. There are no right or wrong answers. Have each member read his/her list and explain why they picked these items.

Leader Notes

Adhesive—to keep the tail tied up for the show and can be used on the hair on the legs for better hold
Show sheen—purple oil, or a mist to give your calf a shine for the show
Spray paint—the color of your calf to paint its tail after applying the adhesive or for hooves and poll
Baby powder—for a white calf, apply this to make its hair seem whiter and cleaner
Blower—use to dry your calf after washing or rinsing or to blow out dirt after being tied in the stall
Water hose and nozzle—to wash your animal
Padlock—to lock your tack box and keep supplies safe
Magic marker and stall cards—to hang above your calf's stall for identification
Extension cords—in case an outlet is not nearby when you use the clippers or blower
Electrical adapter—in case the outlet is not grounded
Pencil and pen—to write down your class number, exhibitor number, and class placings at the show
Spare rope halters—in case the one your animal is wearing breaks
Neck ropes—to tie on your calf in the stall in case it gets out of its halter
Health Kit—contains syringe, antibiotics, etc., for your animal
First Aid Kit—in case of minor accidents to yourself

Identify five important items used if showing a bucket calf, as opposed to a steer or heifer.

Use Activity Sheet 7, Equipment Match, as a review and take-home piece.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. How big is your tack box?
2. What is in the tack box that you use the most? Why?

Process:

3. Why do you need a tack box?
4. How important is it to be able to find things quickly? What can you do to keep the tack box organized?

Generalize:

5. How will having a well-organized tack box help you be better prepared for the next show or fair?
6. What else might you need at a show? Why?

Apply:

7. What are other uses for a tack box?
8. What other 4-H or school events do you need to plan for, to be well organized?

REFERENCES:

Author:
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BEING PREPARED: PACKING TACK FOR SHOW

BEEF, LEVEL I

Activity Sheet 7, Equipment Match

Match picture with correct word by drawing a line.

Halter

Soap

Pail

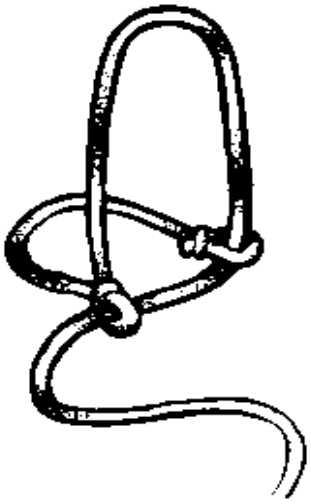
Clippers

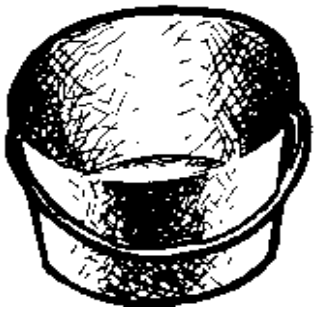
Show Stick

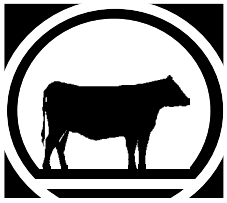
Comb

Brush, Rice Root

Scotch Comb







Facilities for a 4-H Beef Project

Beef, Level I

What Members Will Learn . . .

ABOUT THE PROJECT:

- The space needs of a beef animal
- Basic parts of an ideal facility for a beef animal

ABOUT THEMSELVES:

- How their needs for living space compare to beef animals
- All animals and people have basic shelter needs
- The member is responsible for the well-being of their animal

Materials Needed:

- Portable feed and water troughs
- Handout 6, Pen Design with Built-In Chute, from Training Beef Animals for Show lesson
- Handout 7, Shelters
- Pictures of facilities (prints, or slides)
- Samples of insulation material (fiberglass, plastic foam, straw)
- Samples of woven and welded wire
- Chalkboard and chalk
- Paper and pencils for members
- Present lesson at actual beef project facility (optional)
- Graph paper

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

A facility is something that is built, in this case a pen for the keeping of a beef animal. Any facility that keeps calves cool, clean, and comfortable and provides some exercise area is a good one. The basic facility needs of a beef animal are:

- Protection from summer heat and winter cold.
- Availability of convenient feed trough.
- Availability of water.

Write important points on a chalkboard or poster.

HOUSING

In the summer in Kansas, it is important to cool one area of the pen. This can be accomplished with a shed, or even a big tree.

Pass out Handout 7, Shelters, and other picture examples you may have collected.

In the winter, animals must have protection from wind, rain, sleet, and snow. A protected area can also be used as a feeding area with proper feed trough placement. It is best to keep the feed trough under cover to protect the feed from getting wet from rain or snow.

Leader Notes

The best housing facilities are as open as the weather will allow. This means a roof (the higher the better for more air circulation) with sides added only as needed to keep out blowing rain or extreme cold.

BEDDING

Clean, dry bedding helps to reduce fly problems and keeps the shed cooler in the summertime. Cleanliness also helps to prevent stains on hair coats. Four to 6 inches of coarse, damp sand could be used for summer bedding. Wood chips or straw is best used in winter, but use caution because animals may eat the straw especially if there is more left in the pen than is needed.

FEED AND WATER TROUGHS

Have troughs or pans to show. Leaders might have pre-cut the lumber to make a trough during the meeting.
Demonstrate use of tape measure or yardstick. You may allow members to practice measuring with these instruments, or relate units of measure (foot, 20 inches, yard) to parts of their bodies.

Feed troughs can be made of any solid material. Each calf requires the following trough dimensions:

Length—24 to 36 inches
Width—15 to 18 inches
Depth—6 to 8 inches
Height from ground 20 inches

This large-size trough will reduce feed waste by the calf.

Portable pans made of plastic or metal will also work. Remember, the trough needs to be 20 inches above the ground.

Use calculator to demonstrate how to figure how much a calf should be fed at two selected weights.

Small stands can be built to hold pans 20 inches above ground.
Every calf should have an individual feed trough or feed space. At times during the feeding period, each calf may eat a dffierent amount of feed (i.e., more hay or more grain). A calf should eat approximately 2 percent of its body weight in grain per day.

WATER

Show automatic waterer—explain float or cut-off system. Show pictures or sketches of various water troughs. Explain that the automatic waterer does not need the capacity of others.

All beef animals need a continuous supply of clean water. Water location should be away from the feed location.

A 300-pound bucket calf will need 1 to 5 gallons of water per day. A 1,000 pound steer will drink 10 to 20 gallons of water daily. Anything that will hold water and can be cleaned easily will work (i.e., old bathtubs, wash tubs, half barrels).

In Kansas during the winter, fresh water must be provided so that an animal's water will not freeze.

PENS

Catch pen and feeding pen

Using tape on the floor or paper squares cut to 1 square feet show what is meant by
8 feet × 9 feet. Use Handout 6, Pen with Built-In Chute, from Training Beef Animals for Show lesson. Use the diagram to step off the area if space is sufficient.

A pen where a beef project can be enclosed in a small area will aid in catching steers or heifers. This pen can also serve as the feeding area. The catch pen should be stronger than the remainder of the pen. Feeding pen size can be 8 feet × 9 feet or 10 feet × 10 feet—nothing smaller. A working chute in the pen will help you catch and restrain a calf for haltering or treating for sickness.

Loafing or exercise pen

An animal will spend most of its time in an exercise pen. Single animals need at least 900 to 1,000 square feet. This can be provided by a number of different dimensions such as 10 feet × 100 feet, 20 feet × 50 feet or 30 feet × 30 feet. For every additional calf add 200 to 300 square feet of space. The summer shade should be placed in this area.

Explain how graph paper can be used to represent square feet. Use graph paper to sketch several size areas for loafing or exercise pen. Have members sketch a catch pen and loafing pen for the member's own situation.

Each calf needs 100 square feet of summer shade. Some method of moving air such as a fan will aid this shade area. This area needs to be dry and well drained. Construction of the entire area needs to be planned with drainage and dryness as a number one priority. Sand can be put under the shade area to ensure dryness. Also, consider how easily the area can be cleaned.

Refer to shade structure in Handout 7, Shelters.

CONSTRUCTION MATERIALS

Pen and fences can be constructed of woven wire, welded wire, and metal or wood panels. Posts need to be 4 to 6 feet apart to provide strength enough to hold a beef project.

Show woven wire and welded wire materials.

Shed

A shed needs to provide protection from rain, sleet, snow, and wind. Discuss wind direction for all seasons for the local area. The shed also needs electricity, light, and water.

Show insulation materials ranging from fiberglass to straw. Show protection material-sheet iron, etc. Sketch a shed and barn combination with wind direction located.

ADDITIONAL WORK AREAS

Barn space—Needs to be large enough to store:

- feed and feed containers
- shelves for tack and equipment
- storage for show box
- storage for tack—rope halters, sprayers, brushes, scotch combs, and electric blowers.

Wash Rack—This can be a grassed area or a concrete pad area. It is most important that this area be well drained.

Show pictures or sketch a simple wash rack.

Drying, Trimming, Clipping Area—This space can be under the shed or in a separate area. For a market steer or breeding heifer it needs to be at least 10 feet × 10 feet minimum, and large enough to hold a blocking chute. The area needs to be protected because lots of work may be done in disagreeable weather. Electrical outlets to run electric dryers and electric shearers are also needed.

Show pictures of various work areas in various weather conditions. Help students understand how to read the references to inches and feet.

Leader Notes

SUMMARY

Facilities should:

- provide overhead protection from sun, rain and other elements,
- be easy to clean and maintain,
- provide appropriate feed and water troughs,
- provide adequate space for animals,
- provide washing and working area,
- provide storage space, and
- be convenient for people to work.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What should your calf's shed provide?
2. What type of feed trough and water tank is best for the size of your calf? Why?
3. What size of pan is best for your calf? Why?

Process:

4. Why is wind direction important when building a calf shed?
5. How can you keep your calf's water from freezing in the winter?
6. How can you keep your calf's feed from getting wet while in the trough?
7. Why is it important to have a feeding area and an exercise area in the pen?

Generalize:

8. What did you learn about the shelter needs of animals?
9. What did you learn about the size of shed or pen needed for an animal?

Apply:

10. If you get another calf, what will you change in your pen or shed? Why?
11. How will what you learned in this lesson help you with other 4-H projects?

GOING FURTHER

1. Tour individual member’s beef feeding facilities.
2. Have members draw a sample sketch of facilities for one, two, or three animals.
3. Have members draw a sketch of their own facilities.
4. Have members build a feed trough.
5. Have members help construct or repair a catch pen or some other part of the facility.
6. Have members compare types of housing used in various countries around the world.

TAKE HOME ACTIVITY—FOR FAMILY TO DO TOGETHER

Send home graph paper for members to draw a catch/feeding pen to scale if it was not done during meeting and also to draw their bedroom to scale. Cut them out and compare. Which is larger?

REFERENCES

Author:

This lesson was modified from original material authored by Duery Menzies, County Extension Agent, Texas, with adaptation by:

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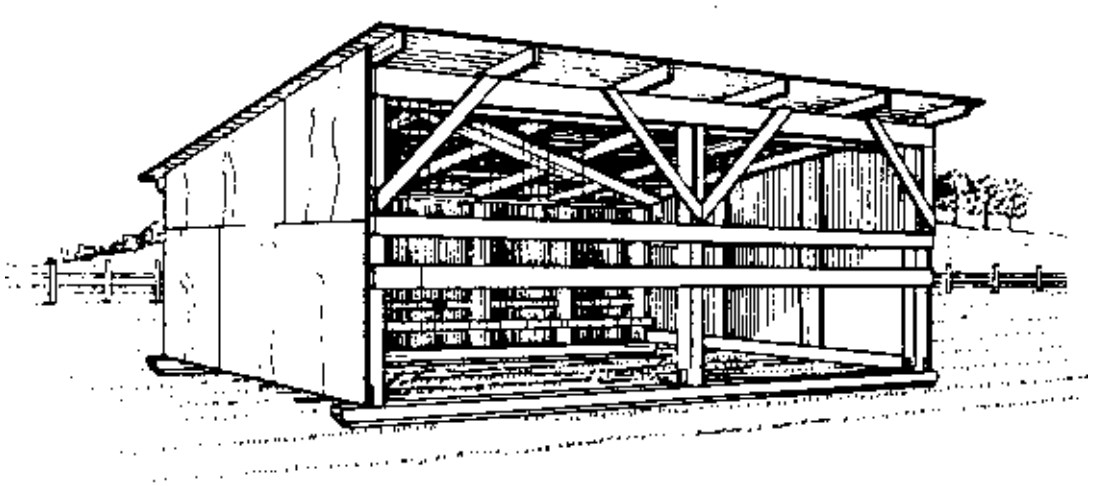
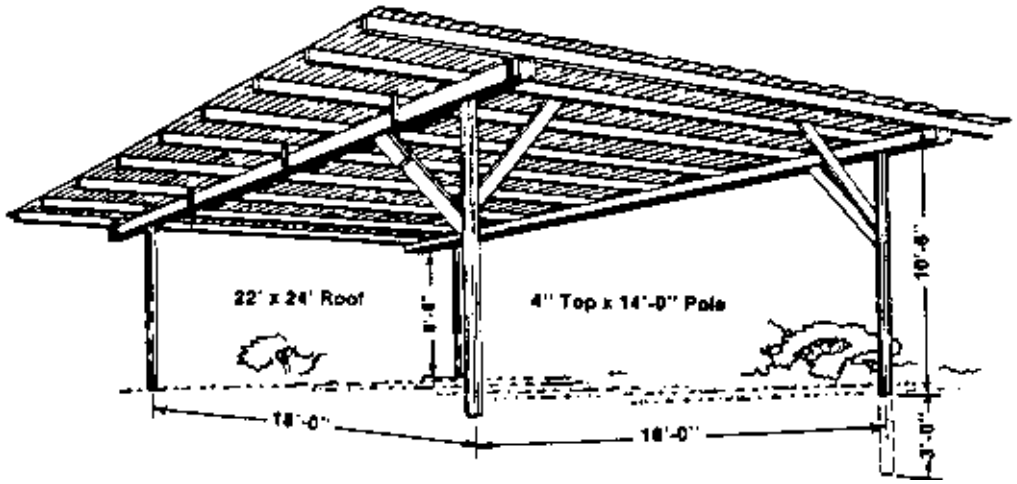
FACILITIES FOR A 4-H BEEF PROJECT
Beef, Level I
Handout 7, Shelters

Calf Shelter



Sun Shade



Comparing Low- Versus High-Fat Meat

Beef, Level I

What Members Will Learn . . .

ABOUT THE PROJECT:

- How to relate fat on the animal to fat on the meat
- Why choose lower fat (lean) hamburger
- Why an excessive amount of fat is unhealthy
- How to cook a hamburger
- To taste the difference between low-fat and high-fat hamburger

ABOUT THEMSELVES

- The importance of fat in their diet
- The importance of making decisions

Materials Needed:

- Handout 8, Excessively Fat Steer
- Handout 9, Extremely Trim Steer
- Handout 10, Correctly Finished Steer
- Pictures of excessively fat and extremely trim beef steaks and a steak with the right amount of fat (actual steaks where possible or color pictures from magazines)
- Fat and lean hamburger samples (members could visit the grocery store with you to pick out the hamburger at the meat counter)
- Access to a two-burner stove
- Two skillets, one hamburger turner, hot pads, two 2-cup measuring cups
- Activity Sheet 8, Hamburger Data Sheet
- Hamburger buns and “fixings”

ACTIVITY TIME NEEDED: 60 TO 90 MINUTES

ACTIVITY

Leader Notes

FAT COMPARISONS ON LIVE ANIMALS

This is an excessively fat steer. Where do you see fat deposited?

Pass out Handout 8, Excessively Fat Steer.

Fat is deposited on animals from front to back, so the ribs and across the top will be fat first, then the flank, then around the tailhead.

Point out fat deposits on ribs and down back, at brisket, flank, around tailhead.

Look at the same areas on this steer. How is he different from the other one?

This steer is too thin. He is so thin you can see his ribs. A little bit of fat is important on a market steer because we get meat from steers and meat with very little fat is dry and the steaks will be tough, with little flavor. So if a steer has some fat, the meat we get from him will also have some fat. But this steer does not have enough fat.

Pass out Handout 9, Extremely Trim Steer. Point out ribs showing clean flank and tailhead, etc.

Leader Notes

Pass out Handout 10, Correctly Finished Steer.

This steer is finished correctly. He has enough fat, allowing his meat to taste good, but not too much, causing it to be unhealthy. Usually about ¼ inch of fat on a live steer is enough for him to produce good-tasting meat.

Show picture of excessively fat steak.

From fat steers, like the one in the picture, we get fat steaks like this one. This much fat is unhealthy, if you eat too much of it.

Show picture of extremely lean steak.

From thin steers, like the one in the second picture, we get extremely lean steaks like this one. It doesn't have fat around the outside of the steak, but it also doesn't have fat inside. Inside fat is called marbling. And marbling is important to give the steak good flavor and make it tender. The fat breaks up the muscle to make it more tender and contributes to good beef flavor. So, we want meat that is somewhere in between these two extremes.

Show the steak with a correct amount of fat.

This is what a steak with the right amount of fat looks like. Notice that there is a bit more fat around the outside when compared to the thin steak. But the important part is the fat that is within the muscle called marbling. It looks like white flecks within the red of the muscle. This marbling will melt when cooked and will leave the meat tender and tasty.

If we had broiled the burgers on a grill, the excess fat could have caused flaming problems.

Show hamburger samples. Record on Activity Sheet 8, Hamburger Data Sheet, how the two samples look before cooking.

FAT COMPARISONS IN MEAT

Which one is the fatter hamburger? How can you tell?

Have members wash their hands and form the hamburger into patties—one patty for each member. Place one patty from the fat hambuger in a skillet and one patty from the lean hamburger in another skillet. Put them on burners side-by-side on the stove and turn the burners on the same heat. Wash hands, dishes and utensils after forming patties and placing in a skillet.

When hamburger cooks, some of the fat turns into a liquid and can be drained off the meat. How much fat do you think we will be able to drain off the fat hamburger? How much off the lean hamburger?

Cook the hamburgers, turning once to cook both sides evenly. Press down on the hamburgers with the hamburger turner to squeeze excess fat into skillet. Cook until outside is slightly browned and center of pattie looses its pink color (medium, 160°F). When done cooking, remove the hamburgers and place on labeled plates (Fat and Lean). Take a measuring cup and one skillet to a sink and pour the remaining fat into the cup. Place the cup by the corresponding

Look at the difference. How much fat was cooked off the fat hamburger? How much was cooked off the lean hamburger? What is the difference between the two? They are both good now, but it is easier to cook lean hamburger and not pour off so much grease than to cook fat hamburger and have all that grease and less meat. Many people are not active enough to use the excess energy created by the excess fat.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. How much fat cover should most steers have when they are ready for market? Why?
2. What happened when cooking the high- and low-fat hamburgers? What differences did you see? Why?
3. Which hamburger did you like the best? Why?

Process:

4. What problems did you have when cooking the hamburgers?
5. Which hamburger had the most grease in the skillet? Why?
6. How would over/undercooking affect the taste of your hamburgers?
7. How else could we determine the amount of fat in a hamburger sample?

Generalize:

8. Why do we want leaner meat?
9. How do we buy leaner meat?
10. What helps you make decisions when buying other items? (Select a specific item)

Apply:

11. What will you do to help purchase food items the next time you go to the food store?
12. What can you do to help your family choose a healthy diet?

GOING FURTHER:

1. Attend a meats judging workout and learn about quality and yield grading.
2. Cook a high Choice quality steak and a low Standard quality steak. What is the difference?
3. Visit a local grocery store and pick out fat versus lean meat.

REFERENCES:

Extension Publication, *Let's Talk About Cholesterol and Cardiovascular Health,* XL-673
Kansas Beef Council Publication, *Beef Measures Up to a Heart Healthy Diet,* American Heart Association & Kansas Beef Council
National Live Stock and Meat Board Publication, *Beef: A New Look at Its Nutritive Value* ($.50)

Author:

This lesson was modified from original material authored by Deborah K. Lyons-Blythe, County Extension Agent, Agriculture, Kansas, with adaptation by:
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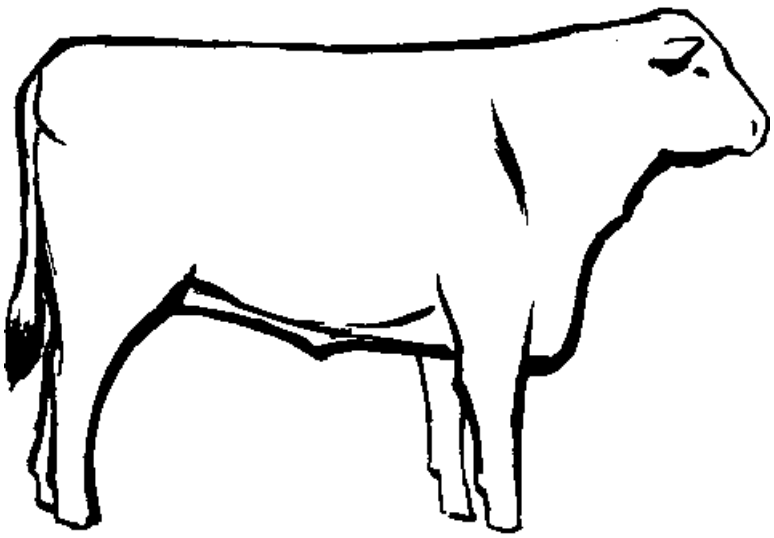
hamburger. Do the same for the other skillet. Avoid splatter or spills of hot grease. Use hot pads and keep people away from sink while you are pouring. Have paper towels to wipe up spills.

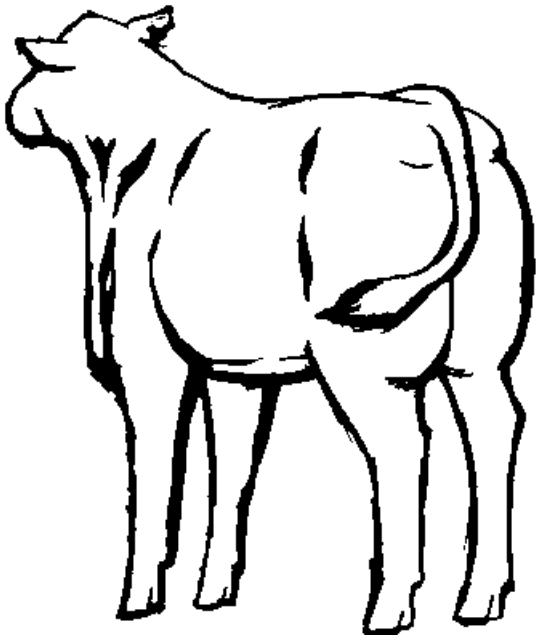
Use the data sheet to record the level of fat drained from the two kinds of hamburger. Get out hamburger fixings and any other food to complement your "barbeque" and ask the Discussion Questions while eating. Review the optimum amount of fat on a steak by using the bottom half of Activity Sheet 8, Hamburger Data Sheet.

COMPARING LOW- VERSUS HIGH-FAT MEAT

BEEF, LEVEL I

Handout 8, Excessively Fat Steer

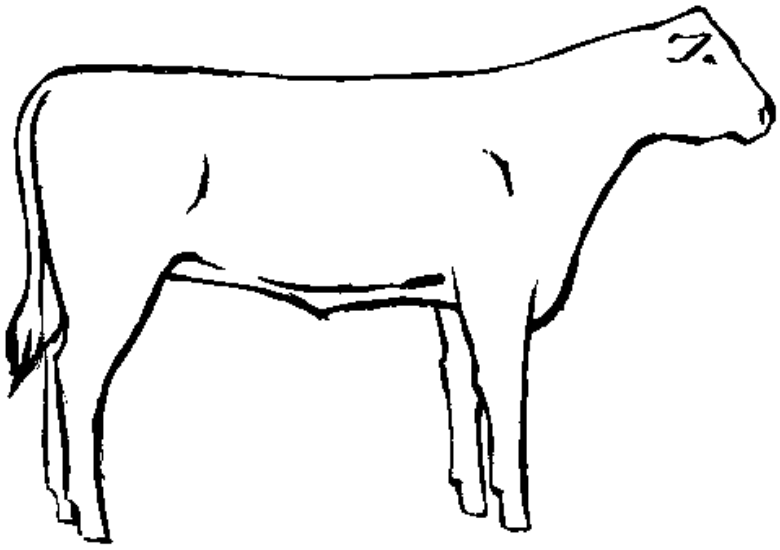


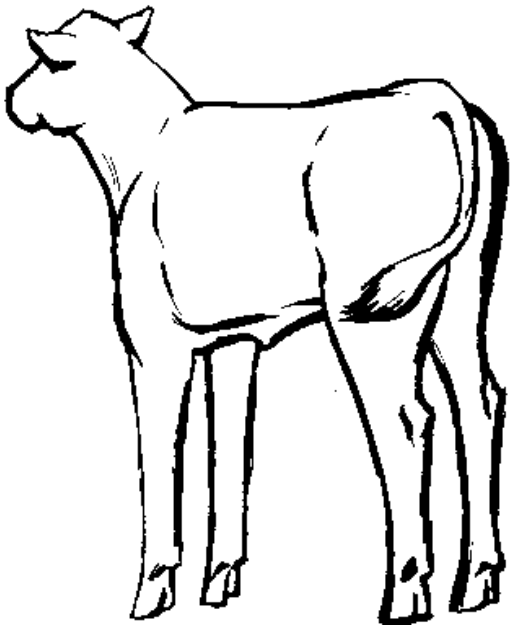


COMPARING LOW- VERSUS HIGH-FAT MEAT

BEEF, LEVEL I

Handout 9, Extremely Trim Steer

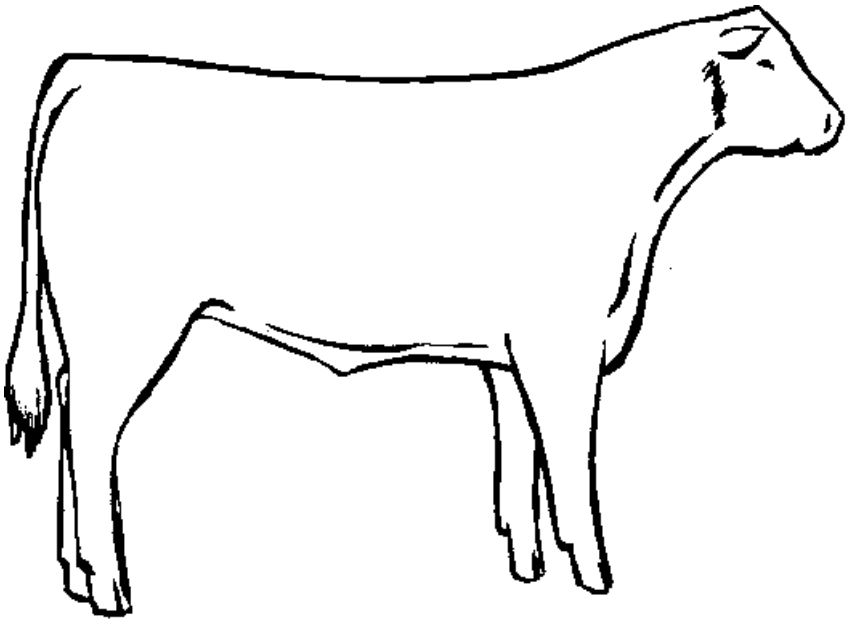


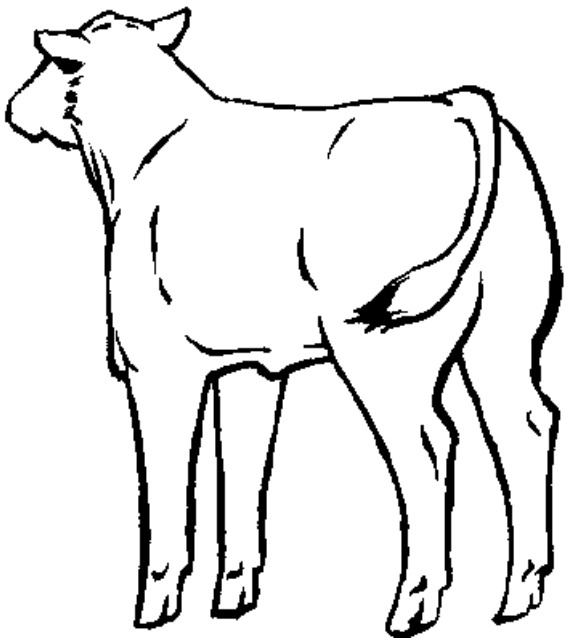


COMPARING LOW- VERSUS HIGH-FAT MEAT

BEEF, LEVEL I

Handout 10, Correctly Finished Steer



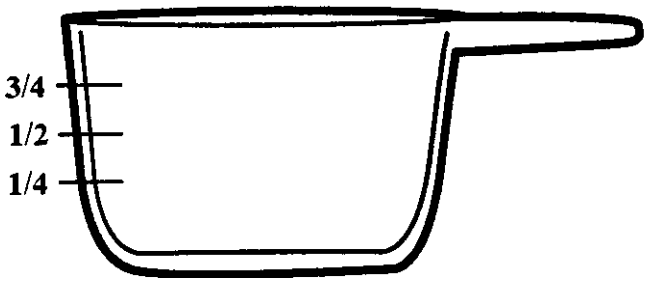


COMPARING LOW- VERSUS HIGH-FAT MEAT

BEEF, LEVEL I

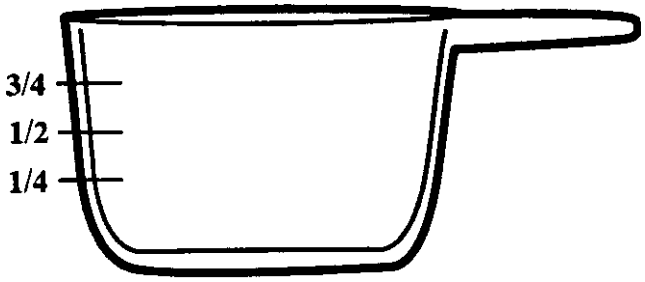
Activity Sheet 8, Hamburger Data Sheet

Hamburger No. 1 _____
Description _____



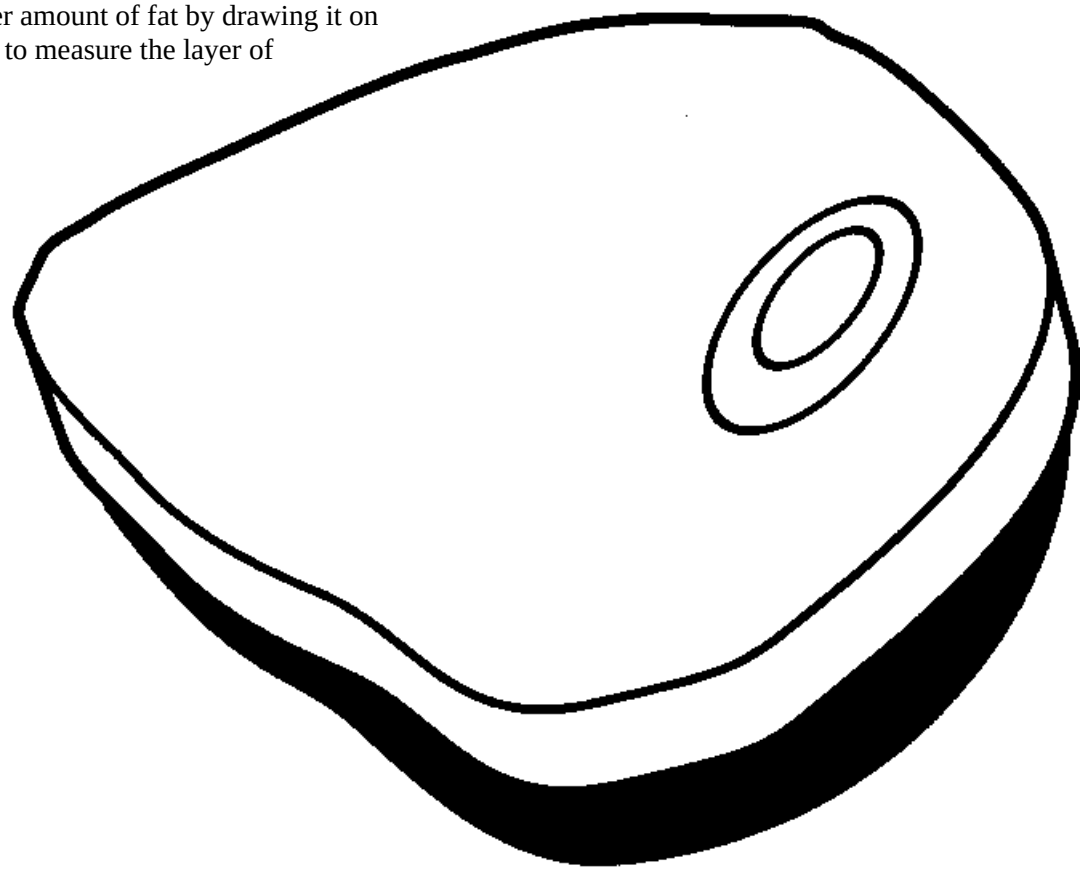
Show how much fat was collected after cooking hamburger No. 1.

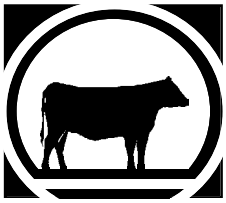
Hamburger No. 2 _____
Description _____



Show how much fat was collected after cooking hamburger No. 2.

Try to show the proper amount of fat by drawing it on this steak. Use a ruler to measure the layer of fat you have drawn.





Kansas 4-H Beef Leader Notebook

Level II

Cooperative Extension Service ■ Kansas State University ■ Manhattan

Flanking Your Calf

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- How to properly subdue a young calf
- Practice what they have learned

ABOUT THEMSELVES:

- Some tasks are more easily done when working together
- The value of respect for other people and animals

Materials Needed:

- Small corral
- Several small calves (under 300 pounds)
- Rope
- Gloves (optional)
- Activity Sheet 1, Word Scramble
- Leader's Key, Activity Sheet 1, Word Scramble

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

If you have a large cattle herd, or just one animal, you need to know how best to manage and handle these animals. Understanding why cattle behave as they do can help reduce stress and injury to the animal and to you. Today, we're going to help you learn how to handle young calves without injuring yourself or the animal.

Handling cattle requires practice and a knowledge of cattle as well as the proper handling techniques.

Cattle like to be in groups. The separation of an individual animal from the group results in stress to that animal. When separating cattle, do it as quickly as possible and get them far apart from the main herd. Cattle should never be penned individually for long periods of time. It is best to pen two or more animals together to minimize stress. When new cattle are added, or when cattle are mixed, it is best to do it at sunset—there will be less fighting during the night.

One of the first things that you will need to learn how to do is to control your calf. Remember that a young calf is just as frightened of you as you are of it. If you become excited, your animal will also become excited and will be harder to control. Move slowly and stay calm when trying to gain control of your calf. The best way to control a young calf is by using a technique called "flanking."

Leader Notes

As members arrive for your project meeting, have them sit in a circle in a comfortable place–either outside near your barn under the shade of a tree or in your home. After all members have arrived, ask each one to tell the group one interesting fact that they know about beef cattle or the beef cattle industry. Start the group off by sharing one fact yourself (you'll find several in the following lesson plan).

Demonstrate the following procedures and allow the members to try them as well.

Flanking a calf can be used efficiently by members on calves up to 300 pounds in size. The calf can be approached, cornered if necessary, and can be caught or roped. Many of the beef management techniques such as treating the navel with iodine, eartagging, tattooing, castrating, and giving vitamin injections can be performed when calves are flanked and restrained on the ground.

1. Approach, corner if necessary, and catch or rope the calf.
2. Two methods can be used when flanking the calf. The choice of method is dependent upon the approach used.
   If the calf is approached, cornered, and caught, stand beside the calf, grasp its neck with one hand to keep the calf from moving forward, and grasp the opposite flank with the other hand.

   The procedure is slightly different if the calf is roped. The main difference is that the calf is usually pulling back on the rope instead of trying to go forward. Therefore, stand beside the calf and reach over and grasp the opposite side front leg (cannon bone) just below the knee with one hand and flank with the other.
3. Bend your knees slightly for leverage, lift and pull the calf toward you, and allow the calf to gently slide to the ground on its side.
4. Restrain the calf on the ground.
   Newborn calves can be restrained by placing one knee on the calf's neck and one on the calf's side. This allows you to perform whatever you need to do with both hands free.

   Calves more than several days old may need further restraint. Place one knee and most of your weight on the calf's neck and curl the calf's front leg back into a position that allows you to hold the calf down.

   Calves approaching 300 pounds or more may require two people to restrain them on the ground. The first person places a knee on the calf's neck and curls the front leg back. The second person places his or her foot on the hock of the bottom rear leg and pulls back on the top rear leg to extend it.
5. Release pressure on the calf when you are finished to allow the calf to get up.

OTHER HELPFUL HINTS

Tail Twist

Use care when you are demonstrating these techniques or allowing the members to practice. Avoid kicks or other injuries.

When an animal doesn't want to move through a chute or doorway, its tail can be twisted. Care should be taken that the tail is not twisted so hard, though, that it breaks. Two methods can be used successfully, depending on the animal. The first method involves curling the tail into a loop. The second method involves grasping the tail and pushing it up to form a "lazy" S curve. When either method is used, stand to the side of the animal to lessen the risk of injury from being kicked.

Tail Hold

Sometimes it is necessary to control an animal by distracting it in addition to restraining it. The tail hold works well in a chute to prevent an animal from backing up or when the animal is being

castrated. Stand beside the animal, grasp the tail near its base, and pull it straight up and over the animal's back. Generally speaking, an animal will not kick when the tail is in this position.

SUMMARY

Remember to treat your animal with respect and to stay calm. Once you get excited and start waving your arms about, your animal will also become excited.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What happened when you moved into position to flank your calf?
2. What was most difficult/easiest when flanking your calf?

Process:

3. Why might you need to flank a young calf?
4. What problems occur when flanking calves?
5. What can you do to avoid injury to you or the calf during this process?

Generalize:

6. How important are your attitude and actions when restraining cattle? Why?
7. What did you learn about yourself while flanking a calf?

Apply:

8. How will you restrain a calf when it becomes too big to flank?
9. What safety precautions will be needed when working larger animals? Why?

REFERENCES:

Author:

This lesson was modified from original material authored by: Kirk A. Astroth, Extension Specialist, 4-H Youth Programs, Kansas State University, with adaptation by:

Danny D. Simms, Extension Specialist, Livestock Production, Kansas State University

James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

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Manhattan

FLANKING YOUR CALF

BEEF, LEVEL II

Activity Sheet 1, Word Scramble

Below are five things you need in order to learn how to handle your animal. Unscramble the words. Then write them in the blanks. The word in the circle will spell the term we use for controlling your animal.

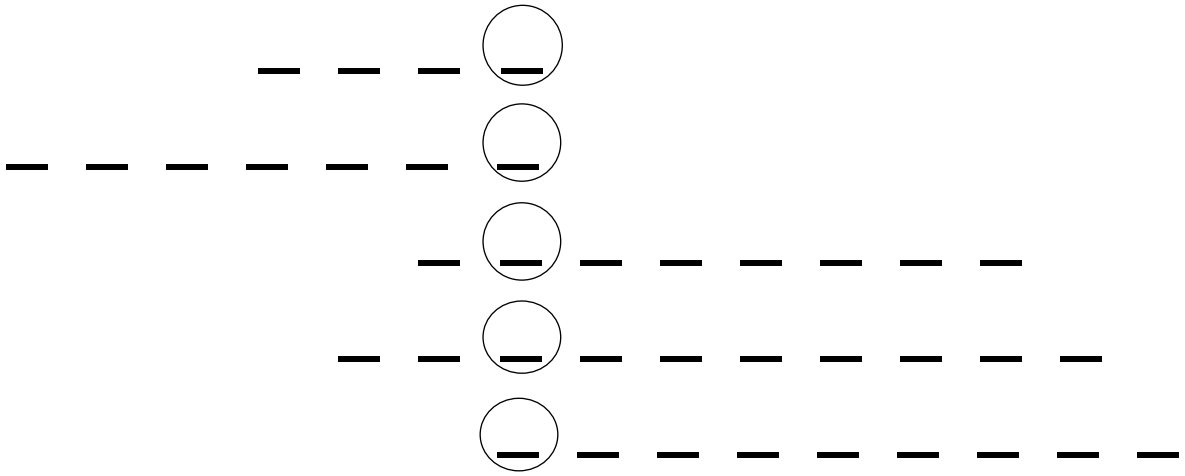
S S C M A N L E _ _ _ _ _ _ _ _

R O C T N L _ _ _ _ _ _ _

F A C L _ _ _ _

D K W N G E O L E _ _ _ _ _ _ _ _ _

S E S G N E L T E N _ _ _ _ _ _ _ _ _ _



FLANKING YOUR CALF

BEEF, LEVEL II

Leader's Key, Activity Sheet 1, Word Scramble

Below are five things you need in order to learn how to handle your animal. Unscramble the words. Then write them in the blanks. The word in the circle will spell the term we use for controlling your animal.

SSCMANLE **C A L M N E S S**

ROCTNL **C O N T R O L**

FACL **C A L F**

DKWNGEOLE **K N O W L E D G E**

SESGNELTEN **G E N T L E N E S S**

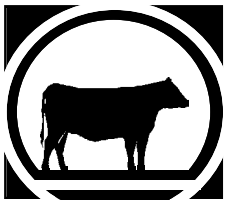
C A L (F)

C O N T R O (L)

C (A) L M N E S S

G E (N) T L E N E S S

(K) N O W L E D G E



Safety with Beef Cattle

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Five farm animal safety rules
- Safety procedures that may be used in safe handling of animals while training for show
- Restraint measures for routine management skills such as castration, dehorning, vaccination and clipping

ABOUT THEMSELVES:

- How actions and attitudes affect safety

Materials Needed:

- Rope
- Rope halter
- Nose tongs
- Hobbles
- Foot trimming rack or pictures of rack
- Activity Sheet 2, Beef Safety Tips
- Leader's Key, Activity Sheet 2, Beef Safety Tips
- Handout 1, Squeeze Chute
- Gentle beef animal, if possible

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

Leader Notes

Proper and safe handling of beef animals can prevent injury to both the animal and the handler.

Animal injuries can be costly to you because of extra veterinary fees and reduced gains. Injuries to members can be prevented or minimized by observing safety precautions and using proper restraint and handling procedures.

People tend to give animals human qualities and forget that animals quickly revert to reflex reactions when they are threatened or under stress. Animals will fiercely defend their food, shelter, territory and young. When frightened or in pain, animals may react in ways that threaten both their and our health and safety.

Handlers must be fully aware of the different ways livestock and humans react to certain situations. Handlers must remain in control of potentially dangerous situations and avoid actions which make them vulnerable to injury. The more predictable our actions, the less likely we are to injure livestock or be injured by livestock.

Leader Notes

GENERAL HANDLING

Divide members into small groups of three or four and ask them to share some cattle handling experiences. Have each group list problems and why they had the problem. Discuss possible solutions.

The best way to handle beef cattle is quietly and with little force.

Livestock move and react more predictably when they are calm and feel secure. Speak quietly, move steadily and let livestock move at their own pace. Excited and aggressive handling causes livestock to watch the activity rather than move in the right direction.

Beating and whipping animals causes them to distrust you and will reduce their carcass value because of the bruises. Bruises are one of the major problems for the packing industry. They can reduce the carcass value $10 to $25 per head because bruises must be trimmed.

Although cattle are not likely to attack a person, they can overwhelm a person with their size and weight. Leave an "out," or escape for yourself, when trying to corner or work with cattle. Beware of the area in front of the rear leg when working with cattle. They tend to kick forward, then back. Pulling the kicking leg forward can be used as a means of preventing a kick while working in the udder or flank area.

Project animals may be crippled or injured by improper handling and restraint.

Animals which escape are less likely to be restrained later. Prepare corral and catch facilities before livestock enter. Keep animals calm.

Cattle are more dangerous when handled in a confined area. Excited cattle will attempt to escape. Do not wave your arms, holler and scream, or use whips or electric prods. Speak quietly and calmly. Prod them with a blunt stick, if necessary, or twist their tails to get them to move.

FACILITIES

Handling facilities are any buildings, gates and fences that restrict animal movement and restrain livestock. These facilities must be 1) well-designed, 2) strong, and 3) safe for animals and handlers.

Adequate handling facilities do not have to be elaborate. A few gates placed in selected locations may be adequate for small herds. An inexpensive facility which is well-designed and properly constructed is better than a poorly designed, elaborate and expensive facility.

Pass out Handout 1, Squeeze Chute.

Facilities should be free from trash, protruding nails, wire, sharp objects or other things that might injure an animal. Proper equipment such as squeeze chutes, loading chutes, trimming tables or chutes make the handling of cattle safer for the animal and the handler.

HALTERING

The two classes of livestock that are usually haltered and trained to lead are horses and cattle. The best time to train them is while they are young.

Hold the first training session in a small pen so the animal is less likely to bolt and drag the handler. Never wrap the lead rope or strap around your hands, wrists or arms. Release the animal if it bolts.

Demonstrate how to halter a beef animal safely.

LEADING

Beef animals should be trained to lead by pulling and then releasing as the calf walks forward. Force and constant pressure, such as leading behind a vehicle can injure animals, tear up equipment and cause injury to handlers.

Demonstrate how to train a beef animal to lead safely.

TYING

Animals should be tied with a slip knot so that the knot can be released quickly in case of an emergency.

Demonstrate how to tie a beef animal safely. Refer to Level I, Practical Farm Knots, if needed.

HANDLING BEEF BULLS

Big, powerful, and generally aggressive beef bulls tend to be more unpredictable than other cattle. All beef bulls should have a ring in their nose to provide a "handle" at a sensitive part of the animal for control in an emergency. Always have two people move bulls. When inspecting beef cows on pasture, first locate the bull and keep your eye on him. Bulls should be shown by older teens or adults.

PET CATTLE

Little "pet" calves are extremely attractive. Mature cattle treated as pets when young may still like attention and may want to be scratched. A 1,000-pound steer is too big to be a playmate. When you quit scratching him, he may remind you to continue with a toss or shove of his head. That playful action may be enough to break your leg or bruise your rib cage.

It is easy to drop your guard around former pets. Don't treat mature cattle as pets. The risks, particularly to children, are too great.

Other Safety Tips or Guidelines

List safety guidelines on a poster or chalkboard.

- Good housekeeping is essential, not only for your personal safety, but also for the health and well-being of your stock. Put things away after use. Keep aisles, steps and work areas free of clutter. Keep walking and working surfaces cleaned of manure, mud, ice and grain spills.
- Keep facilities and equipment in good repair. Check out pens, chutes, stalls, fences, ramps and confinement devices. Make sure ladders, steps, flooring and such are sound. Check for protruding nails, sharp edges, and such problems.
- Ask an adult. There are several important safety tips that you should help your parents be aware of. The electrical system in all of your buildings should be regularly checked for overloading and deterioration. Power tools should be put away when not being used, and should never be used while standing in water or mud. All chemicals and pharmaceuticals should be properly stored out of reach of small children.
- Use caution around strange animals or animals that are frightened.
- Be calm and deliberate when working with animals. Always leave yourself an "out" when working in close quarters.

- Use adequate restraining and handling facilities.
- Most animals tend to be aggressive when protecting their young; be extra careful around newborn animals.
- Be alert for sudden movements, kicking, etc.
- Wear protective footwear.
- Don't tie an animal to a vehicle to break it to lead.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What happened the first time you put a halter on your calf?
2. How did you break your calf to lead?

Process:

3. What handling techniques make working cattle easier? Harder?
4. How can facilities contribute to a safer environment for the cattle? For you?

Generalize:

5. Why are your manners around cattle important?
6. What did you learn about yourself while working with cattle?

Apply:

7. How can the actions and attitudes learned in this lesson help you in other activities you do?

REFERENCES:

Author:

This lesson was modified from original material authored by Brian Cummins, County Extension Agent, Texas, with adaptation by:
Danny D. Simms, Extension Specialist, Livestock Production, Kansas State University
James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

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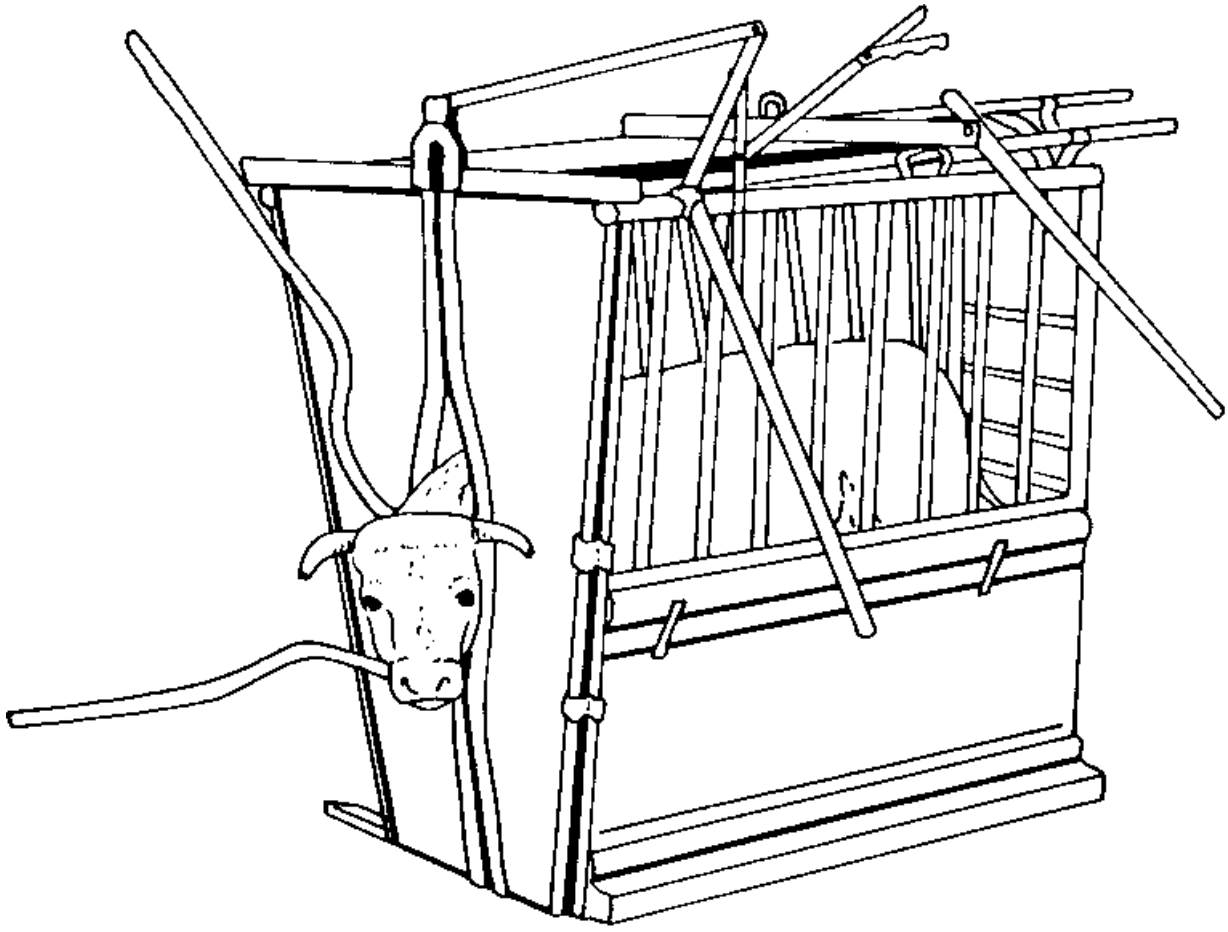
SAFETY WITH BEEF CATTLE

BEEF, LEVEL II

Handout 1, Squeeze Chute



SAFETY WITH BEEF CATTLE

BEEF, LEVEL II

Activity Sheet 2, Beef Safety Tips

Organize the items at the bottom into the following outline to help you remember safety precautions in handling beef cattle.

I. Your manner in handling the animal
A.
B.
C.
D.
E.
F.
G.

II. Handling techniques
A.
B.
C.
D.
E.
F.

III. Facilities
A.
B.
C.

well-designed	be alert	think ahead, anticipate	beware of kicking leg
use little force	tie with a slip knot	be quiet and calm	strong
use a halter	have an “out”	respect the animal	prod with a blunt stick if necessary
twist tail gently if necessary	clean	be cautious	be predictable in your movement

SAFETY WITH BEEF CATTLE

BEEF, LEVEL II

Leader's Key, Activity Sheet 2, Beef Safety Tips

Organize the items at the bottom into the following outline to help you remember safety, precautions in handling beef.

I. Your manner in handling the animal
- A. be quiet and calm
- B. use little force
- C. be predictable in your movement
- D. think ahead; anticipate
- E. be alert
- F. be cautious
- G. respect the animal

II. Handling techniques
- A. have an "out"
- B. beware of kicking leg
- C. use a halter
- D. prod with blunt stick if necessary
- E. twist tail gently if necessary
- F. tie with a slip knot

III. Facilities
- A. well-designed
- B. strong
- C. clean

well-designed	be alert	think ahead, anticipate	beware of kicking leg
use little force	tie with a slip knot	be quiet and calm	strong
use a halter	have an "out"	respect the animal	prod with a blunt stick if necessary
twist tail gently if necessary	clean	be cautious	be predictable in your movement

Recognizing a Healthy Beef Animal

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Identify normal habits, attitudes and behaviors of a beef animal
- Recognize the color and conditions of a normal animal's body characteristics
- The importance of vital signs in measuring animal health

ABOUT THEMSELVES:

- Improve observation skills

Materials Needed:

- A healthy beef animal
- Thermometer
- Activity Sheet 3, Animal Health Observation Sheet
- Activity Sheet 4, Animal Health Matching Exercise

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

It is important to learn to recognize an animal's normal characteristics in order to recognize when a characteristic becomes abnormal.

HABITS, ATTITUDES AND BEHAVIOR

An animal exhibits many different attitudes during one day and throughout its lifetime. A change in attitude may be a sign of disease. **Attitude** may also be called mental condition, state of mind, disposition or temperament. **Behavior** is the manner by which attitude is exhibited or displayed. The types of behavior which are indicators of attitudes are:

1. Stance/Posture
2. Movement/Gait
3. Appetite/Eating habits
4. Voice

The different attitudes of animals which are displayed are:

1. Hungry
2. Nervous
3. Excited
4. Cautious
5. Frightened
6. Confused
7. Stubborn
8. Angry
9. Sad
10. Happy

Hand out Activity Sheet 3, Animal Health Observation Sheet to each member. Have them note observations from animals the week previous to this meeting or prepare a video for them to watch.
Note: Most useful when beginning with a sick animal.

Observe a normal, healthy beef animal and the four types of behavior exhibited or videotape these animals.

Note whether it is normal or abnormal. Observe animal and note any attitudes displayed.

Leader Notes

BODY CHARACTERISTICS

Observe a healthy beef animal's hair coat, skin, mucous membranes, feces, and urine for normal color and condition.

Evaluation of body characteristics of a beef animal can be determined by the color and characteristics of the:

1. Hair coat
2. Skin
3. Mucous membranes
4. Body discharges
5. Degree of fatness

To determine an animal's body characteristics, one will need to do more than listen and watch the animal, as can be done to determine behavior and attitude. One will need to touch the animal. While touching the animal, the hair coat, skin, mucous membranes and degree of fatness can closely be examined. Mucous membranes line all body openings such as the eyelids, nostrils, mouth, anus, and vagina. These tissues should be moist and pink. Abnormal color and conditions are:

1. Dry, flaky skin
2. Dry, rough hair coat
3. Dull hair coat
4. Pale mucous membranes
5. Yellow mucous membranes

Body discharges are excellent indicators of an animal's health. Feces and urine should be normal in color and consistency. Feces are normally firm and dark brown or green. Urine is normally clear and yellow as opposed to bloody or milky white. Any deviation from normal may be an early sign of digestive or urinary disease.

MEASURABLE VITAL SIGNS

Use a rectal thermometer to determine the body temperature of a healthy beef animal.

If you have observed signs that your animal is not well, there are several checks you can make to verify your observations. Body temperature, pulse, and respiration rate are measurable vital signs of a beef animal. A rectal thermometer is used to determine an animal's body temperature. A reading of 101.5°F is normal for beef animals. An elevated reading can indicate fever which may be caused by anemia, cold weather, shock, or terminal illness.

Have the member try to count respiration rate of a live animal.

Pulse and respiration rates of animals are determined by a veterinarian using a stethoscope. Normal pulse rate for a beef animal is 60 beats per minute and 20 inspirations/expirations per minute for normal respiration rate. Rates faster or slower than normal can indicate an abnormal condition.

SUMMARY

Hand out Activity Sheet 4, Animal Health Matching Exercise.

Recognizing that a beef animal is healthy can usually be done by observing and recording characteristics of attitudes, behavior, body condition and vital signs. A systematic method is a physical exam. Knowledge of a healthy animal makes it easier to recognize an animal with health problems and treatment can be started quickly.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What are the normal habits, attitudes, and behaviors of healthy beef animals?
2. What abnormal characteristics did you observe in sick animals?

Process:

3. How can you verify if a calf is ill?
4. What weather changes might cause a calf to become ill?
5. What are some of the costs of a sick animal? Direct or cash? Indirect?

Generalize:

6. What is the affect of a sick 4-H calf compared to an entire herd or a huge feedlot of cattle?
7. How do you recognize illness in other animals?

Apply:

8. As a result of this lesson, how will you react to signs of illness in the future? Why?
9. What can you do differently to better prepare you to identify illness symptoms in the future?

GOING FURTHER:

1. Visit a pen or herd of cattle and observe healthy and unhealthy animals.
2. Conduct a physical exam on a beef animal at regular intervals.
3. Record observations and data on an Animal Health Record Sheet for one week.
4. Visit a veterinarian and use the stethoscope to measure pulse and respiration rate.
5. Videotape signs of healthy and/or sick animals.

REFERENCES:

The Normal Animal, 4-H Member Guide, VM1.110
The Normal Animal, Leader Guide, VM1.120

Author:

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RECOGNIZING A HEALTHY BEEF ANIMAL

BEEF, LEVEL II

Activity Sheet 3, Animal Health Observation Sheet

By recording information at regular intervals on this chart, you will gain experience in animal observation skills.

1. Record normal (N) or abnormal (A) for behavior and body condition characteristics.
2. Record a check (✓) for attitude characteristics displayed.

DAY	1	2	3	4	5	6	7
DATE							
BEHAVIOR							
Stance/Posture							
Movement/Gait							
Eating habits/Appetite							
Voice							
ATTITUDES							
Hungry							
Nervous							
Excited							
Cautious							
Frightened							
Confused							
Stubborn							
Angry							
Sad							
Happy							
BODY CONDITION							
Hair coat							
Skin							
Mucous membranes							
Body discharges							

RECOGNIZING A HEALTHY BEEF ANIMAL

BEEF, LEVEL II

Activity Sheet 4, Animal Health Matching Exercise

(Draw a line from the sign to the correct animal condition.)

	Signs of healthy and sick animals
	humped-back
H E A L T H Y	
	snotty-nosed
	frisky
	yellow, runny feces
U N H E A L T H Y	
	slow-moving
	doesn’t come to feeder
	ears forward, alert
	shiny hair coat
	skinny
	moist nose

How to Give a Shot

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Different types of shots given to cattle
- How to give intramuscular, intravenous and sub-cutaneous shots to cattle
- How to identify various syringes

ABOUT THEMSELVES:

- Sometimes it is necessary to get a shot to ensure good health
- Importance of using medicines or drugs according to the directions

Materials Needed:

- Disposable 100 cc syringes (1 per group)
- Disposable needles (1 per group)
- Various sizes of disposable syringes
- Various glass and metal syringes
- Bananas (1 per group)—oranges may be used if bananas are unavailable
- Water in a cup (1 per group)

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

Leader Notes

Just like people, cattle must have their shots in order to stay healthy. There are many different kinds of shots and each kind has its own way of working on the calf's body. Some vaccines work best when they are inserted just below the skin, but not into muscle. Some should be given into the muscle and some are even given directly into the vein. We're not going to talk about which ones go where, because there are so many, but we're going to talk about the places to give the shot.

There are many kinds of syringes used to give shots. Some are plastic and are used a few times and thrown away. Some are glass and metal and can be washed and used many times. There are many sizes of syringes, because some vaccines require small amounts to be effective, while others require large amounts for larger animals.

Show the different kinds of syringes, but do not pass them around. Set up a display table where the members can see the syringes after the lesson.

We are going to use real needles and syringes to learn how to give shots, today. So you must be **very** careful. Do not play with them, they are sharp and will puncture your skin. The banana has a thick skin just like a calf and we can use it to learn how to give shots.

Leader Notes

To each group, hand out a banana, cup of water, and syringe with the needle already on it and still covered.

Be sure everyone understands the danger of the needles and do not let anyone misuse them. You should stand at the front or middle of the group with your own equipment to show how to do the shots.

INTRAMUSCULAR

The first shot we'll give is intramuscular or IM. "Intra" means within, and "muscular" means the muscle, so intramuscular means within the muscle. So when we insert the needle, it needs to go through the skin and inside the muscle of the calf. This shot is for medicine or vaccines that must be absorbed slowly by the calf. Intramuscular shots are usually given in the rump or the neck of the animal.

Taking turns and being very careful, let one person in the group take the cap off the needle. Holding the needle facing the table top and away from people, pull the plunger back to fill the syringe with air. Push it out to get the feel of the syringe. Then place the end of the needle into the cup of water and pull the plunger back again to fill the syringe with water. Now, pick up your banana. Insert the needle through the skin of the banana and into the soft "meat" of the fruit. The needle should go into the banana nearly the full length of the needle. Holding the syringe steady, push the plunger in slowly so that you release a little water into the fruit. Don't release very much as the fruit isn't big enough to hold much extra water. When you've released the water into the banana, let go of the plunger and holding the syringe, pull it slowly out of the banana. Put the cap back on the needle and hand it to the next person in your group. Be sure everyone understands the danger of the needles and do not let anyone misuse them.

SUB-CUTANEOUS

The next shot is called sub-cutaneous. "Sub" means under or below and "cutaneous" is the skin. So "sub-cutaneous" means under the skin. This shot is not to be given in the meat of the calf, but just under the skin. So when we practice, we need to be careful that we only get the water under the skin of the banana. It is most common to give this shot in the neck of an animal.

Carefully take the cap off the needle (there should still be water in it from the first time) and pick up the banana. Holding the syringe at a slight angle with the banana, slowly insert the needle into the skin and slide it just under the skin of the fruit, not into the meat. Holding the syringe steady, slowly release a little water into the fruit. Then withdraw the needle, put the cap back on and hand it to the next person in the group.

INTRAVENOUS

The last shot is called intravenous. What does "intra" mean again? "Intra" means within and "venous" means the vein. So what does "intravenous" mean? It means within the vein. This may be used to draw blood from the calf or give it a medicine that must get into its system very quickly. The vein that is usually used to give an intravenous shot is the jugular vein in the neck of the animal alongside the throat.

Pick up your banana. The corner that runs along the side of the banana is going to be the vein for us today. So you will want to insert the needle into the vein, but not through it. Carefully take the cap off the needle and hold the syringe at a slight angle to the banana. Push the needle through the first layer of skin and slowly push it along the vein until most of the needle is buried in the skin. Do not get under the skin as in the last shot, you should still be inside the skin and in the corner of the banana. Slowly release some water into the banana and withdraw the needle and put the cap back on.

Now, let's review these shots and the locations we give them on a live calf.

Using a live calf or a picture or drawing, review the name and abbreviations of shots and the locations each are given.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What happened to the banana after each type of shot? How did it look? Was there a different feel when handled? Why?
2. Which shot was most difficult? Easiest?
3. What type of shots (injections) did your calf need? Why?

Process:

4. What problems did you have while giving the shots? Why?
5. Why is it important to give a shot (injection) in the correct place or manner?
6. Which type of shot is absorbed fastest? Slowest? Why?

Generalize:

7. How important are shots, vaccinations, or injections in other animal projects?
8. When have you needed a shot? Why did you need it?

Apply:

9. How will understanding shot location help you understand the purpose of the medicine in the future?
10. What can you do different next time to make it easier to give each type of shot?

GOING FURTHER:

1. Visit a veterinarian and watch he/she give shots to live animals.
2. Visit each member's home and give their calf the shots it needs. Let the member give the shots to their own cattle so you can supervise.
3. Have group members give demonstrations on giving shots at a club or project meeting.

Leader Notes

REFERENCES:

Kansas Beef Cattle Handbook, Animal Sciences and Industry, Kansas State University, Weber Hall, Manhattan, Kansas

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Identifying Parts of a Beef Animal

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Identify the body parts of a live beef animal
- Relate live body parts to the wholesale carcass components

ABOUT THEMSELVES:

- Their preferred learning method or style

Materials Needed:

- Activity Sheet 5, Beef Animal Parts
- Leader's Key, Activity Sheet 5, Beef Animal Parts
- Activity sheet 6, Relating Wholesale Cuts to Live Animal
- Chalkboard, butcher paper, chalk or marker

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

One of the first things for a member to learn when a beef project is started is the name and location of the various parts of the beef animal.

Leader Notes

There are a number of ways to teach this information.

1) Distribute Activity Sheet 5, Beef Animal Parts, with blank lines to be filled in by member. Have each member fill in as many names as possible. Use the completed Leader's Key, Beef Animal Parts, to discuss answers and assist members in completing their activity sheet. Review and ask questions to see if members have learned the parts.

2) Using the blank Activity Sheet 5, Beef Animal Parts, or a large drawing or poster, point to a part of the animal and have different members name the part. Team competition can be accomplished by having animal part names on slips of paper, dividing group into two teams and having teams take turns in drawing a part and trying to identify where the part is on the animal.

3) Roll Call—At the beginning of the meeting, have each member answer roll by naming a part of the animal.

4) Parts on the Back—Write an animal part on a slip of paper. Pin a part on the back of each

member. Members ask each other questions to find out what part is pinned on their back. Answers to questions should only be "yes" and "no."

5) Number Game—Using a large drawing or blank Beef Animal Parts activity sheet, leader points to a member and calls out a number. The member must name the part of the animal with that number.

Use Activity Sheet 6, Relating Wholesale Cuts to Live Animal, and have members fill in names of wholesale carcass parts or use other activities as described in this lesson.

Discuss relationship of carcass parts to live animal parts.

As members, you also need to learn the parts of the wholesale carcass. You need to learn to recognize the relationship between the parts of the live animal and the carcass and which parts of the live animal are the most valuable because of consumer preference.

SUMMARY

Being able to identify the parts of the live animal as well as the wholesale cuts is a good beginning in learning about beef cattle. This information will be helpful in learning what to look for in selecting beef animals, in describing injuries or other problems and in general descriptions. It is also a good beginning in learning about the end product of beef—meat products and how the meat products affect the beef industry.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What beef animal parts did you know?
2. What new parts did you learn?
3. Which parts were hardest to learn? Easiest? Why?

Process:

4. Why is it important to know the parts of a live beef animal?
5. What beef animal parts are the best indicators of muscling? Why?
6. Why do we have wholesale meat cuts? What are they used for?

Generalize:

7. What techniques did you use to learn the parts of an animal that will help you learn other things?
8. What did you discover about your learning habits?

Apply:

9. How will knowing the parts of an animal and wholesale cuts help you in the future?
10. What learning techniques might you use next time to learn the purpose or importance of each part in addition to the name?

GOING FURTHER:

1. Members can give illustrated talks on parts of an animal.
2. Visit local beef processing or packing plant.
3. Attend beef cattle field days, livestock shows, and carcass contests or demonstrations.
4. Prepare an exhibit showing the different parts of an animal.
5. Illustrate parts of an animal on a halter-broken, gentle, live animal, allowing members to touch animals.
6. View educational video, “Selecting a 4-H Club Calf,” Kansas Cooperative Extension Service.
7. Review sources for obtaining 4-H Club Calves.

REFERENCES:

Retail Cuts of Beef, National Live Stock and Meat Board, 444 North Michigan Avenue, Chicago, Illinois 60611
Purebred Beef Cattle Breed Associations
Livestock Judging Guide

Author:

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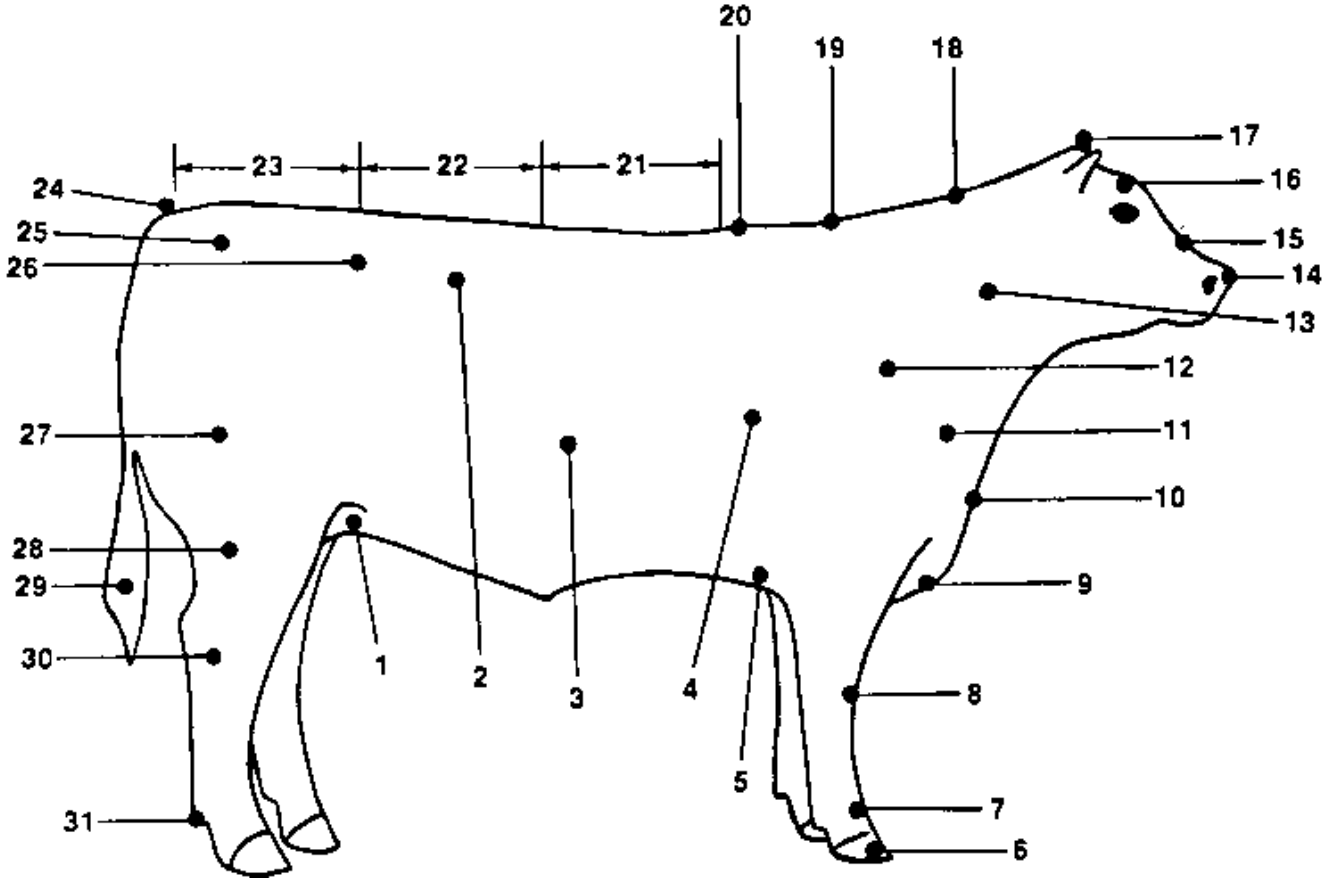
IDENTIFYING PARTS OF A BEEF ANIMAL

BEEF, LEVEL II

Leader's Key, Activity Sheet 5, Beef Animal Parts

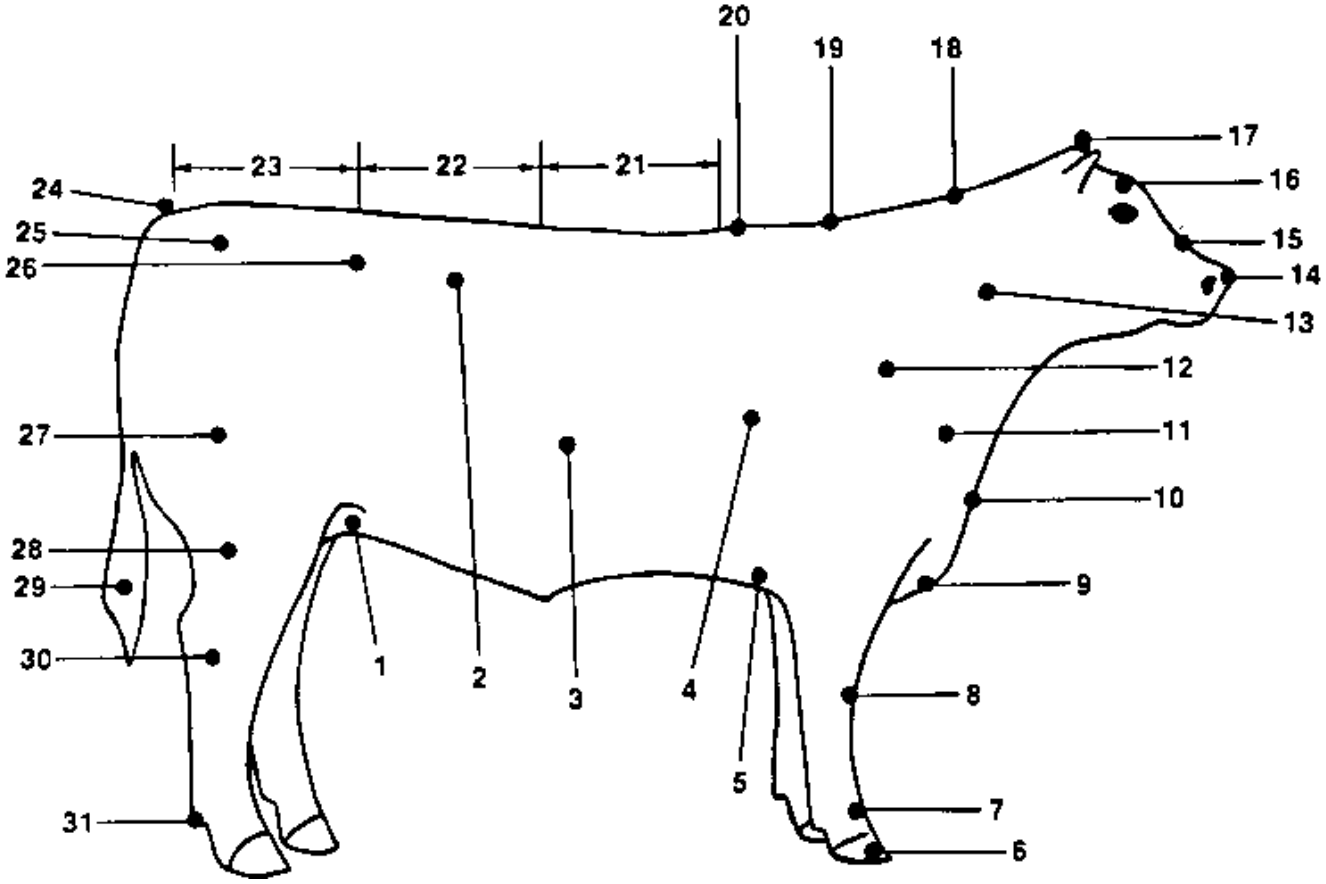


1. Rear flank
2. Edge of the loin
3. Ribs
4. Heart girth
5. Fore flank
6. Hoof
7. Pastern
8. Knee
9. Brisket
10. Dewlap
11. Point of shoulder
12. Shoulder
13. Neck
14. Muzzle
15. Bridge of nose
16. Forehead
17. Poll
18. Crest
19. Top of shoulder
20. Crops
21. Back
22. Loin
23. Rump
24. Tail head
25. Pins
26. Hip or hook
27. Round
28. Twist
29. Switch
30. Hock
31. Dewclaw

IDENTIFYING PARTS OF A BEEF ANIMAL

BEEF, LEVEL II

Activity Sheet 5, Beef Animal Parts

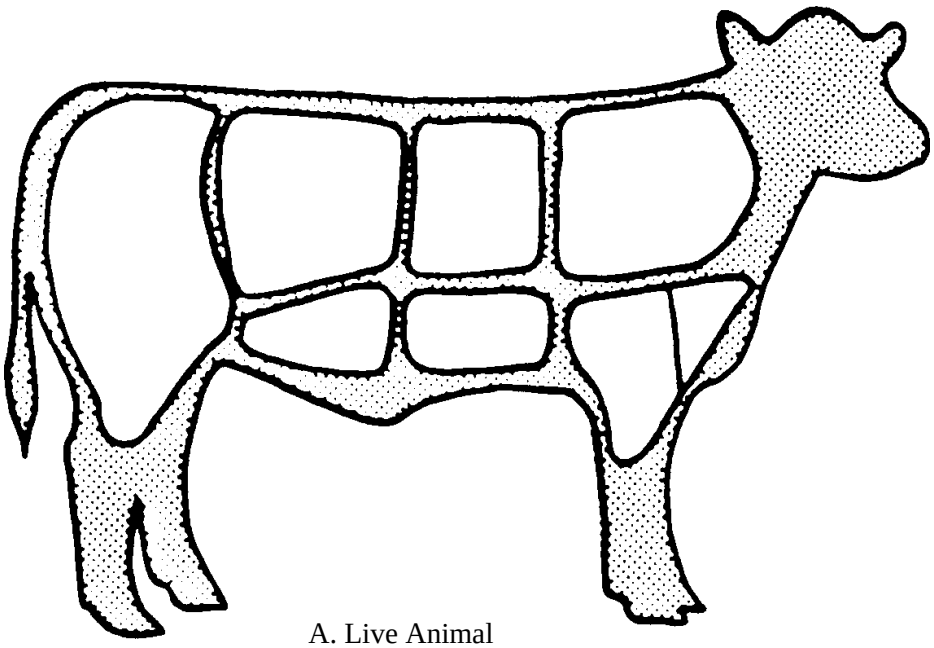


1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____
31. _____

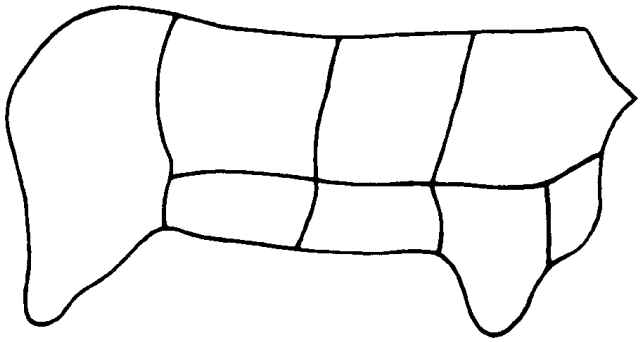
IDENTIFYING PARTS OF A BEEF ANIMAL

BEEF, LEVEL II

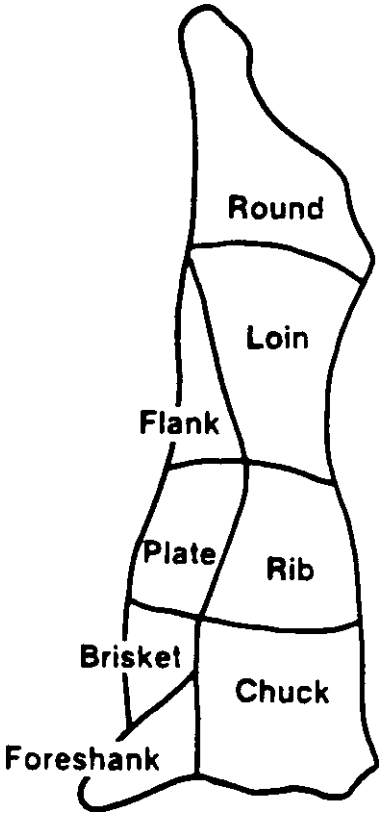
Activity Sheet 6, Relating Wholesale Cuts to Live Animal



A. Live Animal

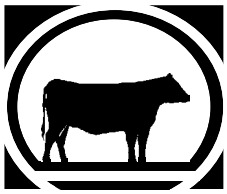


B. Horizontal look at wholesale carcass cuts



C. Carcass

The carcass hangs vertically from hock attachment after slaughter. Label carcass wholesale cuts on live animal drawing above.



Introduction to Judging Beef Cattle

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Major parts of the beef animal
- What to look for in judging beef cattle
- Procedure to follow in judging a class of animals

ABOUT THEMSELVES:

- Importance of planning tasks step by step
- Decision-making process

Materials Needed:

- Beef animals for judging, if possible 2 to 4 market steers or 2 to 4 heifers, pictures or slides
- Activity Sheet 5, Beef Animal Parts (from previous lesson)
- Handout 2, Side View
- Handout 3, Front and Rear Views
- Handout 4, Close Inspection
- Handout 5, Wholesale Cuts

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Learning to properly judge beef cattle for contest or business purposes is one of the best ways to become aware of beef production goals. Beef are raised according to guidelines set forth by individuals, businesses and research, but most of all by the demands of the consumer as to the type of product they desire. So, as beef is being produced, producers are striving to supply the consumer with what they want in order to receive top price from the buyer.

Before beginning to judge there are several factors to consider before placing or rank ordering, a group of animals:

1. What is the purpose of the animals being judged? (slaughter or reproduction)
2. What characteristics make an animal valuable for the purpose?
3. How do the animals compare with the ideal animal?

JUDGING MARKET ANIMALS

As you judge, develop a definite pattern or system. The first step is to get a good overall impression of the group and of each individual. You can get this best from about 25 feet away from the class.

Next, view the animal from the side.

Leader Notes

Some terms in this lesson, such as “placing,” “conformation,” “finish,” and “structural defect” may be new to some members. Be prepared to explain them if the need arises.

To introduce the idea of judging, you may ask members to judge a series of common objects, such as pencils, for certain criteria, and explain their reasons for rank ordering them as they did. This could be done in small groups, or individually, as members arrive.

Beef judging should be taught in steps or stages in order to make it easier to understand and to build on previous knowledge. Knowing the parts of the animal is the first step. Review Activity Sheet 5, Beef Animal Parts, from previous lesson.

Leader Notes

Go over desirable conformation using Handouts 2 through 4.

Seek these answers from the members before you pass out Handout 2, Side View.

Side View

The following characteristics should be considered when viewing the beef animal from the side.

1. General conformation and size. A good animal is rectangular in appearance.
2. Straightness of top and bottom lines.
3. Length of rump.
4. Levelness of rump.
5. Length of body measured from nose to tailhead.
6. Trimness of body.
7. Length of leg.
8. Correctness of leg (straightness).
9. Amount of muscling in forearm and round.
10. Trimness and cleanliness of brisket.

Seek rear and front view observations, then pass out Handout 3, Front and Rear Views.

Rear View

In observing an animal from the rear, the animal is evaluated for:

1. Width and depth of round.
2. Depth of twist.
3. Turn or roundness of top.
4. Uniformness of width in back, loin and rump.

Front View

In observing an animal from the front, the following characteristics are observed.

1. Width between the front legs.
2. Muscling in the shoulders.
3. Trimness of brisket.
4. Soundness and correctness of front legs.
5. Size and shape of the head.

Ask members to share items to consider during close inspection. Have members compare the finish on live animals, if available. Review by using Handout 4, Close Inspection.

Close Inspection

This final step measures the smoothness and amount of finish, or fat covering.

1. Check finish on forerib since it is the first place an animal will put on finish.
2. Move hand over crops, the fore and hind ribs, loin, back, and finally the rump. A properly finished animal will have some finish from the fore rib to the rump. Evaluate the smoothness and amount of finish.
3. Check length of rump by locating the hip or pin bone.
4. Check width and thickness of loin.

Give high-priced cuts first and most consideration when judging.

Pass out Handout 5, Wholesale Cuts.

High-Priced Wholesale Cuts

1. Loin
2. Rib
3. Rump
4. Round

Low Priced Wholesale Cuts

5. Chuck
6. Plate
7. Flank
8. Brisket
9. Shank

JUDGING BREEDING CATTLE

The procedure is much the same as in judging market animals except that individual type is more important than condition or finish.

Show live breeding animal or picture and discuss things to look for in judging breeding beef animals.

Attention should be paid to smoothness, uniformity, and structural defects. Emphasis should be placed on femininity in females and masculinity in males.

Breed characteristics should also be oberved. Knowing the parts of the animal and being able to describe an ideal beef animal are the first steps in learning to judge breeding cattle.

The next step will be to compare individual animals to the ideal and to each other in a class.

PLACING A CLASS

Now you know what to look for in an ideal beef animal and you are ready to compare beef animals or judge a class of four beef animals. The animals will be numbered from left to right with you standing behind them. Place the animal that is closer to the ideal first, the next one second and so on.

If it is possible, have two market steers and two breeding beef animals to compare, or a class of four animals as a summary to this lesson. Have members select the best animal in each pair or place a class and tell why they selected the animals. Pictures or slides could also be used.

If you become confused, step back and remember what the class is being judged for and how the animals compare to the ideal. Remember, your first impression is usually correct.

An orderly system of judging should be followed each time a group of animals is judged. Judging is composed of five steps: 1) an overall view, 2) side view; 3) rear view; 4) front view; and 5) close inspection.

SUMMARY

Live animal appraisal is used by all segments of the cattle industry—whether you are a producer selecting a project animal or a member of a livestock judging team.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What items do you see best from each view? Side? Rear? Front?
2. What items do you determine by touch? Why?
3. What was the most difficult item to determine? Easiest?

Process:

4. What are the major differences to consider when selecting market versus breeding cattle?
5. Why is it important to develop a pattern, procedure, or sequence when judging cattle?

Generalize:

6. When do you need a procedure or pattern to do other things? List and discuss.
7. What did you learn about yourself as a result of the process in this lesson?

Apply:

8. When might you use this evaluation process in the future? Why?

GOING FURTHER:

1. Evaluate your project animal(s) and describe good and bad points.
2. Judge your project animals. If there is more than one, select the best animal. Tell why the decision was made.
3. Visit a local livestock auction and practice evaluating animals and guessing weight.
4. Judge a class of four beef animals.
5. Participate in a livestock judging contest.
6. Take a field trip to a livestock show and judge animals in a class. Compare decisions with official judge.

REFERENCES:

4-H Livestock Judging Guide, slide sets and videos from Kansas State University Distribution Center

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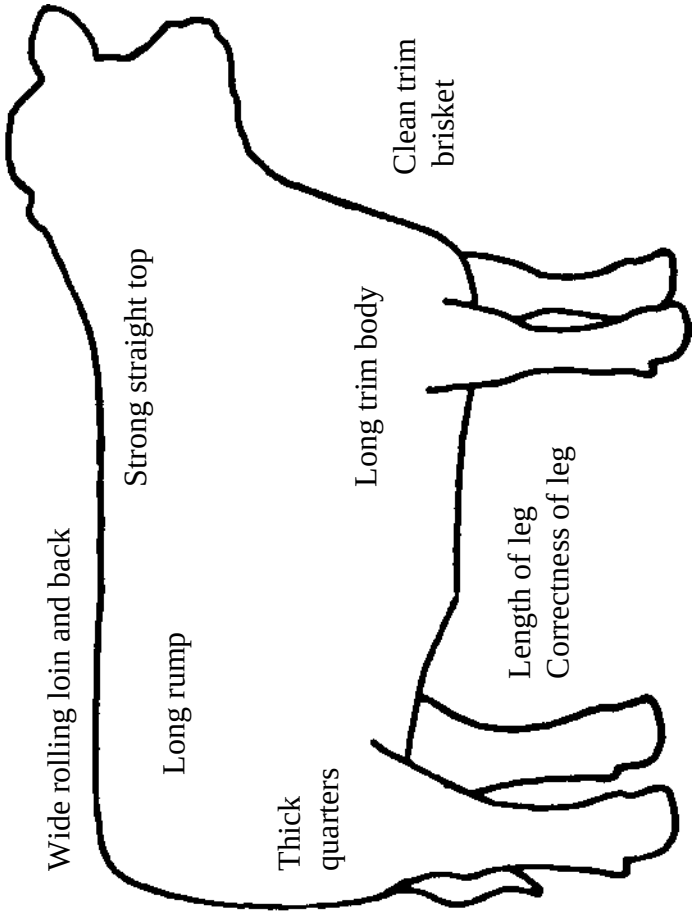
INTRODUCTION TO JUDGING BEEF CATTLE

BEEF, LEVEL II

Handout 2, Side View

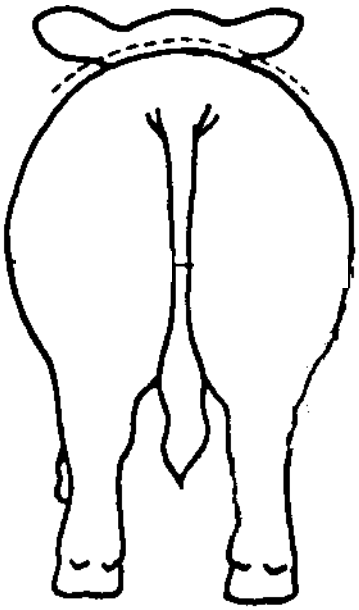


INTRODUCTION TO JUDGING BEEF CATTLE

BEEF, LEVEL II

Handout 3, Rear and Front Views

Rear View

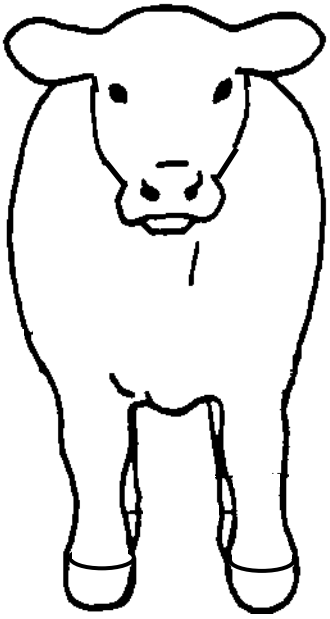


Roundness of top

Thickness of quarters

Clean twist

Front View



Head

Muscling of forearm

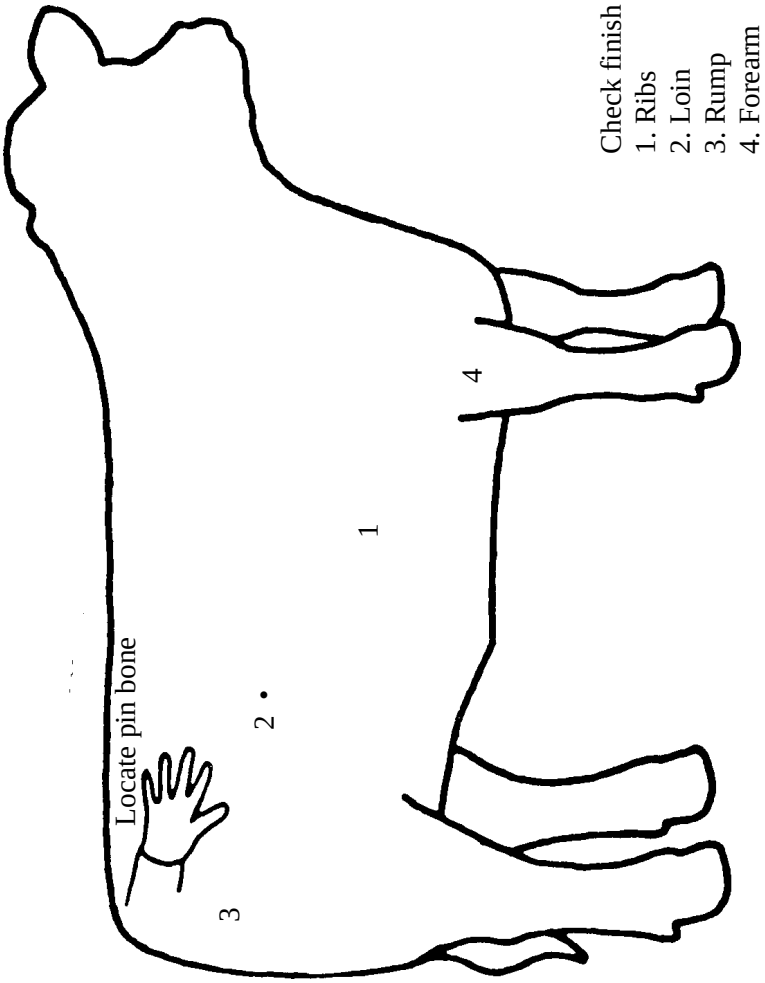
Trimness of brisket

Width between front legs

INTRODUCTION TO JUDGING BEEF CATTLE

BEEF, LEVEL II

Handout 4, Close Inspection

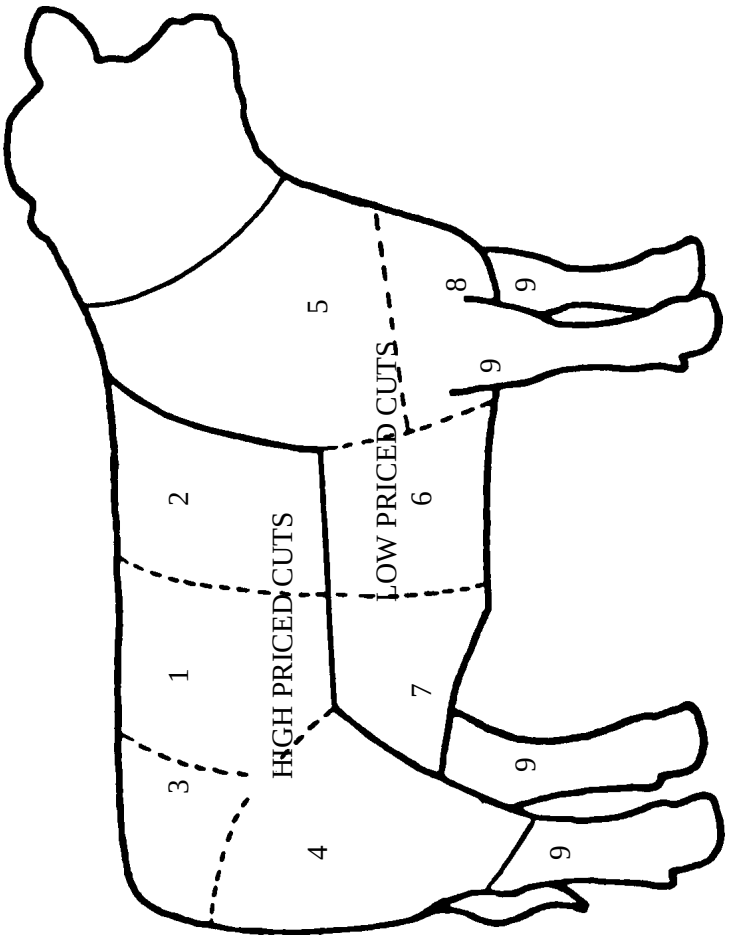


Close Inspection

INTRODUCTION TO JUDGING BEEF CATTLE

BEEF, LEVEL II

Handout 5, Wholesale Cuts



High Priced Wholesale Cuts
1. Loin
2. Rib
3. Rump
4. Round

Low Priced Wholesale Cuts
5. Chuck
6. Plate
7. Flank
8. Brisket
9. Shank

Basic Economics of the Beef Project

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- How much they should reasonably pay for a beef project animal
- Identify three sources of money for the purchase of a project animal
- Identify three places to purchase calves
- Plan a cash flow for their project

ABOUT THEMSELVES:

- Patience and determination needed for long-term projects requiring time and money
- Reponsibilities associated with borrowing or using money

Materials Needed:

- Paper and pencils
- Chalkboard or flip chart
- Large markers
- Activity Sheet 7, Cash Flow Calf Sheet
- Leader's Activity Guide, Steer Project Finance Sheet

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

Learning basic economics is one of the important parts of the beef project. Members should know how much they should pay for an animal and how much they are going to have to spend on feed and other related items throughout the project.

WHEN TO BUY

It is usually best to buy calves in the fall or early winter. This is the time of year when there is the greatest choice. A calf purchased at this time of year will also be the correct age for your project.

List important points on flip chart.

WHAT KIND OF STEER TO BUY

It is usually wise to avoid buying an animal that is extremely small-framed or extremely large-framed. Instead, try to select a large-framed British or a small-framed exotic calf for your beef project.

Remind members that the British breeds are Angus, Hereford and Shorthorn. The exotic breeds are Simmental, Limousin and Charolais, etc.

Extremely early maturing calves will stop growing and become fat too early. On the other hand, extremely late-maturing calves will undergo skeletal growth too long and will not accumulate enough finish to grade

Choice until they become too heavy to market profitably.

As a rule, steers should grade Choice when they weigh from 1,000 to 1,350 pounds. An even more desirable weight range would be 1,100 to 1,300 pounds.

Ask members to give or list good prospect steer traits. Make a list on flip chart or chalkboard

It makes little difference what breed or combination of breeds you buy as long as the calf is the right type. It is important to select a calf that is:

1. Large-framed enough to ensure that the animal will grow, gain weight, and grade Choice at a desirable weight, but not so extreme that the calf will fail to finish in the correct weight range. Use of frame scores will help in determining what size of animal to purchase.
2. Thick and heavily muscled in the quarter, but not so extreme as to indicate double muscling (an extremely muscled condition that is not a desirable trait in the U.S. beef industry).
3. Trim in the brisket, middle, and underline, but not so shallow-bodied that the calf is unable to eat and grow normally.
4. Straight in the topline and long and reasonably level in the rump.
5. Try to pick a quiet, gentle calf. Never pick a wild calf even if the calf is of high quality; it will be hard to train and will not gain as fast in the feedlot.

Ask members to list places to purchase calves as you write them on chalkboard or flip chart.

WHERE TO BUY CALVES

Calves can be purchased at a number of places in your community, including:

1. Home beef herd
2. Local purebred and commercial breeders
3. Breed association feeder cattle sales
4. Individual feeder calf sales
5. Weekly auction special feeder cattle sales
6. Commission firms
7. Special club calf sales

If you feed home-raised calves, weigh them when they start on feed and figure their value using the current market price. Many times, it is better to feed several calves instead of one, since calves competing for feed will eat better and gain faster than “loners.”

HOW MUCH TO PAY

Good beef project animals can be bought at or near top market prices. You will probably sell your calf at or near market price at the end of the project, so don’t pay much more than market price at the beginning of the project.

Remember: One of the purposes of feeding the calf is to make a profit. Be practical. Members who pay extremely high prices hoping to buy a future champion are taking a big chance and usually defeat the purpose of the project.

If you choose calves from a large group, expect to pay a premium because you are getting above-average quality, but never pay more than $5 above market price. Buy your calves by the pound instead of by the head.

A calf at a sale may cost more than one at individual farms and ranches, but may not be any higher when the time and expense of driving and looking for calves is considered. Do not be tempted to pay high, unrealistic prices for calves. As beginning members, you should be especially careful not to spend large sums of money for a calf. When you become experienced in feeding calves, you can justify spending a little more for a high-quality calf even though spending more money will not guarantee a champion.

WHERE DO YOU GET THE MONEY?

Your problems are the same as any other cattle feeder: "Where will I get the money for my project animals?" and "How much money will I need?" There are probably three sources of money available to you:

1. Your own bank account
2. Borrowing the money from your parent(s)
3. Borrowing the money from your local bank

Have members brainstorm sources of money to purchase calves. What might be the advantages and disadvantages of each source?

If you obtain the money from your parents, pay them interest on the money as if you were borrowing money from a bank. Keep it on a business-like basis.

Borrowing from your local bank will give you good business training. Your parent must go along with you. Your banker will need to know three things:

1. How much money will you need?
2. How long will you need the money?
3. How will you repay your loan if your calf dies or your project loses money?

If you need to borrow money to buy feed for a project calf, how much will you need? If your 500-pound calf purchased in November is sold in August at 1,150 pounds, he will need to gain 650 pounds total. You can estimate that it will take 10 pounds of feed to get one pound of gain. Therefore, the total feed required should be about 6,500 pounds of feed.

Have members participate in arriving at these figures through mathematical calculation. Update prices according to your local situation.

If you estimate that one-fourth of the total weight of the feed is roughage (hay) and three-fourths is grain, you will need 1,625 pounds of roughage and 4,875 pounds of grain or other concentrate. If hay is $40 per ton (or 2 cents per pound) and your grain mixture cost $100 per ton (or 5 cents per pound), your feed costs will be $276.25.

If you borrow $276.25 for a year to buy feed for your beef animal, and the interest rate is 12 percent, you will pay $33.15 ($276.25 \times .12$) in interest. So, when you repay the bank, you will need to pay them $309.40 (the original $276.25 borrowed plus $33.15 in interest).

Members may be unfamiliar with the payment of interest and how to figure interest. Move through this part of the lesson at a rate appropriate to the backgrounds and knowledge of your members. You may have to define "interest."

Leader Notes

Paying off your loan when it comes due will help your reputation as a borrower. This is called your credit rating. Whether you obtain the money from your parents or borrow it from a bank, it is important to pay off your debts by the due dates. Honesty and integrity are important to you as a member and citizen of a community.

Your profit on only a few calves or one calf will not be great. It will depend on the cost of the calves when you start the project, the cost of the feed, other costs, and the price you receive when you sell the calves. If you market the calves at your county fair, people in your community may pay more for the calves than their true market value. Often, this extra added money is called a "premium." Such a premium increases your chances for a profit. It is important to know the difference between the regular livestock market price or value of your calves and the price you receive at the sale sponsored by your county fair or show.

Have members use the Activity Sheet 7, Cash Flow Calf Sheet, to do calculations for a sample calf.

If you receive more than the regular market price for the weight and grade of your calves, consider this difference as a reward for participating successfully in the beef project. But if the total sale price is less than expenses, remember that your project is small and may be less efficient than a large commercial beef enterprise. Besides, profit and loss is not everything—what you learn and do are even more important.

Use Leader's Activity Guide, Steer Project Finance Sheet, to discuss now or to take home problems for next meeting.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. When and where will you purchase your beef project animal?
2. What kind of calf will you buy? Why? For what purpose?
3. How much will you pay for your calf and where will you get the money?

Process:

4. What criteria will you use in determining what calf to buy? Consider: final frame, weight, muscling, rate of gain, breed, cost, selling value, disposition, etc.
5. When and how will you purchase feed?
6. What other costs might you have?
7. What affect will care and management have on expenses?
8. What is the significance of "interest" if you borrow money?

Generalize:

9. What did you learn about using money and making decisions in this lesson?

Apply:

10. How will the process used in this lesson be useful in the future?

GOING FURTHER:

1. Attend a cattle auction with your members and make note of the quality and price of the cattle.
2. Practice calculating feed costs and approximate costs for various animals.
3. Visit a feed mill and compare the price and quality of various concentrates available for feeding your beef animal.
4. Survey local hay producers and determine the cost of hay in your area.
5. Visit a local bank and meet with the loan officer to find out about the bank's lending policies and current interest rates.
6. View, Econ and Me, videotape, available through your county Extension office, to learn about basic economic concepts.

REFERENCES:

Author:
This lesson was modified from original material authored by Kirk A. Astroth, Extension Specialist, 4-H Youth Programs, Kansas, adapted from "Your 4-H Market Beef Project," Kenneth R. Geuns, Extension Specialist, Department of Animal Science, Michigan State University, East Lansing, Cooperative Extension Service, 1983, further adaptation by:
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Manhattan

BASIC ECONOMICS OF THE 4-H BEEF PROJECT

BEEF, LEVEL II

Activity Sheet 7, Cash Flow Calf Sheet

Assume you have decided to buy a 450 -pound calf for $ _____ ,using money you have borrowed at an interest rate of 11 percent. You want it to weigh 1200 pounds on sale day. Use the feed needs and prices given in the lesson.

Cost of Calf _____

Cost of Feed

Number of pounds calf needs to gain _____

Number of pounds of feed needed _____

Number of pounds of hay needed _____

Cost of hay at 2¢ per pound _____

Number of pounds of grain needed _____

Cost of grain at 5¢ per pound _____

Total cost of feed _____

Cost of Calf and Feed _____

Interest (11%) to be Repaid _____

Total Amount to be Repaid _____

What price must you get for the steer in order to make a profit? _____

BASIC ECONOMICS OF THE 4-H BEEF PROJECT

BEEF, LEVEL II

Leader's Activity Guide, Steer Project Finance Sheet

ACTIVITY 1

Let's figure the financing on a make-believe calf. In order to do this, we have to know certain information—the starting weight and price of your steer.

Let's say this steer weighs 600 pounds and we paid 80¢ per pound. To figure the purchase price, we multiply pounds by price per pound.

$$600 \times \$.80 = \$480$$

So we paid $480 for this steer.

Show the calculations on a paper in front of the group and let them try it with a calculator. Go over the calculations slowly as they can be difficult.

If we are going to borrow this money from a bank, we need to know certain information—the interest rate, and the length of time that the money will be borrowed. If a banker is present ask what the current rate of interest is and use that in the following calculations.

Let's say the interest rate is 12 percent and that we own the steer for 200 days by the time he is sold at the fair. Since the interest rate of 12 percent is for an entire year, we would pay for a fraction of the year.

$$200 \text{ days} \div 365 \text{ days} = .548 \text{ or } 54.8\% \text{ of a year}$$

So, when the steer was sold we would owe:

amount of loan × annual interest rate × % of a year, or

$480 × .12 × .548 =	$ 31.58	interest
plus the original	480.00	borrowed
Total	$511.56	

ACTIVITY 2

The cost of purchasing the steer is not the only cost we have. We also have to pay for the feed. In order to figure how much the steer will need to eat to reach market weight, we can do the following calculations: Use the paper and calculators to figure these calculations.

If we assume that the steer will weigh 1,200 pounds when he is fat, and we bought him at 600 pounds he must gain another 600 pounds before fair time. A steer normally requires 8 pounds of feed for each pound of gain. So, the example steer will consume:

$$600 \times 8 = 4{,}800 \text{ lbs of feed}$$

To figure how much this feed will cost, we have to know how much the feed costs per pound. Let's say in this example that feed costs 8¢ per pound. If we buy 2,000 pounds of feed now, we can buy another 2,800 pounds in 100 days. So, our costs will be:

$$2{,}000 \times 8¢ = \$160 \text{ at the start, and}$$
$$2{,}800 \times 8¢ = \$224 \text{ in 100 days}$$

Since most members don't have this much money in their piggy banks it must be borrowed. Using the same time (200 days) and the same interest rate as for the steer, in Activity 1 we can figure interest on the first load of feed:

$$\$160 \times .12 \times .548 = \$10.52 \text{ interest on the first ton of feed}$$

The second shipment weighs 2,800 pounds and would only be needed for 100 days. The interest on this feed would be:

$$\$224 \times .12 \times .274 \text{ (\% of a year)} = \$7.37 \text{ interest on the second load of feed}$$

BASIC ECONOMICS OF THE 4-H BEEF PROJECT

BEEF, LEVEL II

Leader's Activity Guide, Steer Project Finance Sheet *(continued)*

ACTIVITY 3

Now we know how much money we will need for a steer and his feed. Let's determine how much we will need to borrow.

Steer cost	$480	Interest	$ 31.56
First feed cost	160	Interest	10.52
Second feed cost	224	Interest	7.37
Totals	$864		$ 49.45

The total amount borrowed, or principle, would be $864 plus interest $49.45. So, at the end of our project, we would have to pay the bank $913.45.

Recording Your Beef Project

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- How to record receipts and expenses
- How to record feed fed
- Other costs involved in a beef project

ABOUT THEMSELVES:

- Importance of record keeping

Materials Needed:

- Beef Member Guide and Annual Report (MG-14)
- Activity Sheet 8, Beef Project Worksheet (2 pages)
- Pencil

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

After you have bought your calf, the work really begins. It is now time to record your learning and doing goals on the Member Achievement Page (MAP) of your Beef Member Guide and Annual Report.

The Journal page of the member guide is where you record what you learn about your calf and yourself and also what you do, have trouble with, or maybe what you tried and could not do!

But, where do you record what it costs to feed and take care of your calf? Some may wish to list these items on the Journal page, while others may keep a notebook in the barn. It doesn't really matter "where" you keep this information, but it is important to keep the information where you can easily find it and know what your calf is doing and the costs involved in keeping a calf.

This information needs to be available so that you can use it in times of sickness, to prepare a talk, or maybe to share with a banker to help get another loan for additional feed.

Here is another option to record your project information. The "Beef Project Worksheet" may be used for bucket calves, steers, or heifers. A cow production record is in level III for older members.

The market animal section includes a description of your animals and their weight and value at the beginning and end of the project, plus total gain and days on feed columns.

Leader Notes

Pass out "Beef Member Guide and Annual Report" if members have not received it at a previous meeting. Review page two of each member's "MAP" to be sure they have goals for the year.

Pass out Activity Sheet, "Beef Project Worksheet." Ask members what they will list in each section. Discuss with examples.

Leader Notes

A market animal carcass information section is included. Hopefully, you will be able to get at least some of this information.

The heifer section provides a place to record identification plus weights at weaning and one year of age. If your heifer is registered with a breed association, you can list the sire and dam so that important registration papers may be kept in a safer place.

The second page of the worksheet begins with a place to list all feed purchased or used for the project. Any hay or grain grown at home that is fed to your calf should be weighed and given a market value at the time it is fed.

Pasture rent for heifers should be listed by number of days and rent price or value for the specific type of pasture (native, brome, stalks, etc.).

Ask members to bring Activity Sheet 8, Beef Project Worksheet to every meeting for updating.

Other expenses include everything you bought or paid for except original cost of animal and feed costs. This might include costs of implants, eartags, shots, registration fees for heifers, veterinary costs, feed pans or buckets, pens, shed, halters, grooming supplies, show expenses, such as entry fees, and gas for the pickup.

Other income might include show premiums or perhaps money received to take your calf somewhere for a public education display or presentation.

The profit or loss summary is where you add up all of your income after you sold a market animal or the value of a heifer at the end of the year. Subtract all of your feed costs (including pasture), other expenses, and, of course, your cost of paying for the calf at the beginning.

If you sold your calf at a premium auction rather than on the regular market, figure your profit or loss using both income values and compare the differences.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What do you think will be the largest expense? Smallest expense? Why?
2. What do you think will be the most difficult part of the worksheet? Easiest? Why?

Process:

3. Why is it important to keep a recording of what happens in a beef project and the costs involved?
4. What is the difference between “market price” and a “premium price” that you might receive at a 4-H auction?

Generalize:

5. What will you learn from using this worksheet? Why?

Apply:

6. How can similar worksheets be used in other projects or with personal purchases that you make?
7. How might a computer enhance your record keeping efforts?

GOING FURTHER:

1. Compare this record to those your parents keep.
2. Visit a feedlot or downtown business and ask them to show and explain their record keeping system.
3. Put your records on a computer and develop your own form.
4. Give a talk on record keeping.
5. Ask a banker what records are required for a loan.

REFERENCES:

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Activity Sheet 8, Beef Project Worksheet

Description of Project Animals				Beginning of Project			End of Project			Death Loss	Final Production		
Breed	Sex	Eartag. Ear Notch, or Tattoo Number		Date	Weight	Cost or Value	Date	Weight	Selling Price or Value		Days on Feed	Total Gain	Avg. Daily Gain
		L. ear	R. ear										
Example: char-angus X	Steer	Eartag No. 650		Nov. 1	500	$225.00	Aug. 15	1230	$553.50		285 da.	730 lbs.	2.56
			TOTAL	XXX			XXX						

Carcass Information (Not all members will be able to get carcass information. Include as much as you can. If not available, make a note so stating.)

Identification	Live Weight	Warm Carcass Weight	Carcass Marbling	Quality Grade	Fat thickness	Rib eye area	Yield Grade

Breeding Heifer Performance Record

Breed	Name and/or Registration Number	Ear Tattoo		Birth Date	Birth Weight	Weaning Weight	Yearling Weight	Sire	Dam
		left	right						

RECORDING YOUR BEEF PROJECT

BEEF, LEVEL II

Activity Sheet 8, Beef Project Worksheet, *continued*

FEED RECORD

Date	Kind of Feed or Type of Pasture	Amount or Days on Pasture	Cost or Value
	Total		

_____ - _____ = _____
(Total Income) (Total Expenses) (Profit or Loss)

OTHER EXPENSES

(Expenses other than cost of animals and feed)

Date	Kind of Expense	Cost
	Other Expenses	$

OTHER INCOME

Date	Kind of Income	Amount
	Total	$

Profit or Loss Summary

Income:
Total selling price _____
Other income _____
Total Income _____

Costs:
Beginning value or purchase price _____
Feed Costs _____
Other Expenses _____
Pasture Expense _____
Total $ _____

Leader Notes

Determining Frame Score and Weight Requirement of Steer for County Fair

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- How to determine frame score of steer
- How frame score relates to finished weight
- How to measure steer for height at hip
- How to predict finished weight based on frame score and age

ABOUT THEMSELVES:

- Importance of gathering accurate information to make decisions
- The value of making predictions or setting goals

Materials Needed:

- Tape measure
- Flip chart or chalkboard
- Small calculator
- Paper and pencils
- A live steer (must know age in months) that is halter broke or placed in a chute
- Handout 6, Frame Score Table
- Handout 7, Frame Score Types and Weights

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

The height of a steer in relation to age determines his frame score or mature frame size.

The age of this steer is ____ months and his height is ____ inches. Therefore, by reading the charts, the steer is a frame score ____. Example: This steer is 8 months old and 44 inches in height. The steer is half way between a frame score 4 and a frame score 5.

The steer in the example with a frame score of 4.5 would finish at about 1,100 pounds. The date of the county fair may vary from county to county, but let's say it is August 3. Today is ____. We can figure how many days it is until the fair. For example, let's say today is February 1.

Leader Notes

This lesson is most appropriate before members purchase calves, but should be preceded by the lesson on "Projecting and Computing Average Daily Gain."

Before the meeting, write names of various measurements that can be taken on an animal on slips of paper. Have different members show you on the steer where these measurements would be taken.

Show live steer and where measurement is taken. Handout 6, Frame Score Table, to confirm this reading.

Leader Notes

Work through the calculations carefully. Be sure each member understands. Refer to Handout 7, Frame Score Types and Weights.

We list the months until August and count the days.

February	28
March	31
April	30
May	31
June	30
July	31
August	2
Total	183 days to the fair

Pass out Handout 7, Frame Score Types and Weights.

We know a steer with a 5 frame score should weigh about 1150 pounds at fair time.

Let members try the calculations and give you the answers.

If we multiply the number of days he could be on a finishing ration by the number of pounds he should gain each day, we can figure how much weight we can expect him to gain in 183 days.

150 days × 2.8 lbs per day =	420 lbs
33 days × 2.25 lbs per day =	75 lbs
Total	495 lbs

List steps to calculate frame score and Weight on flip chart or chalkboard.

1. Find the frame score of the animal.
2. Use the frame score to determine finishing weight.
3. Figure how many days until the fair.
4. Figure expected weight gain over the period before the fair by multiplying the number of days by the daily weight gained from a ration.
5. Find the weight the steer needs to have when purchased by subtracting expected weight gain (4) from the finishing weight (2).

So, if we want to have a 5 frame score steer at fair time, that will weigh 1,150 pounds, we must figure what the steer must weigh now when we buy him to ensure that we buy the right steer. To do this, we subtract the amount of weight to gain from the desired finished weight and the answer will be the weight we will look for a steer to weigh.

$$1150 - 495 = 655 \text{ lbs}$$

This is the weight needed for an 8-month-old steer on February 1.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What happened when you measured hip height and converted that to a frame score?
2. How difficult or easy was it to measure the calf?

Process:

3. Why is actual date of birth so important when using frame scores?
4. What is the significance of using frame score to predict a finished weight?
5. What do you think is an ideal frame score and weight for a steer? Why?

Generalize:

6. How are frame scores and weight predictions used elsewhere in the beef industry? Why?
7. What other tools do you use to make predictions?

Apply:

8. What will you do different next time you use frame-weight predictions?

GOING FURTHER:

1. Visit each member's calves early in the year to determine frame score and average daily gain needed.
2. Visit a feedlot and determine frame score on a large number of steers and heifers.

REFERENCES:

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DETERMINING FRAME SCORE AND WEIGHT REQUIREMENT OF STEER FOR COUNTY FAIR

BEEF, LEVEL II

Handout 6, Frame Score Table

Frame Type

Number 1 steers are the smallest feeders available in the U.S. cattle population, and Number 7 steers are the largest. They are expected to weigh within the limits indicated in the drawings (on Handout 10) at 14 to 15 months of age. Eighty percent or more are expected to grade Choice under the feeding system used by the commercial feedlots (140 to 200 days on feed).

Frame Score Table

Measure height at hip. Point of measurement is level with center of back at hook (hip) bone.

Hip Height in Inches

Age in Months	Frame Score 1	Frame Score 2	Frame Score 3	Frame Score 4	Frame Score 5	Frame Score 6	Frame Score 7
5	34	36	38	40	42	44	46
6	35	37	39	41	43	45	47
7	36	38	40	42	44	46	48
8	37	39	41	43	45	47	49
9	38	40	42	44	46	48	50
10	39	41	43	45	47	49	51
11	40	42	44	46	48	50	52
12	41	43	45	47	49	51	53
13	41.50	43.50	45.50	47.50	49.50	51.50	53.50
14	42.00	44.00	46.00	48.00	50.00	52.00	54.00
15	42.50	44.50	46.50	48.50	50.50	52.50	54.50
16	43.00	45.00	47.00	49.00	51.00	53.00	55.00
17	43.50	45.50	47.50	49.50	51.50	53.50	55.50
18	44.00	46.00	48.00	50.00	52.00	54.00	56.00

The base point is 43 inches shoulder height at 12 months of age for a Frame Score of 3. Allow 2 inches for each Frame Score at the same age. Allow 1 inch per month from 5 to 12 months of age, 0.50 inch per month from 12 to 18 months, and 0.25 inch up to 2 years.

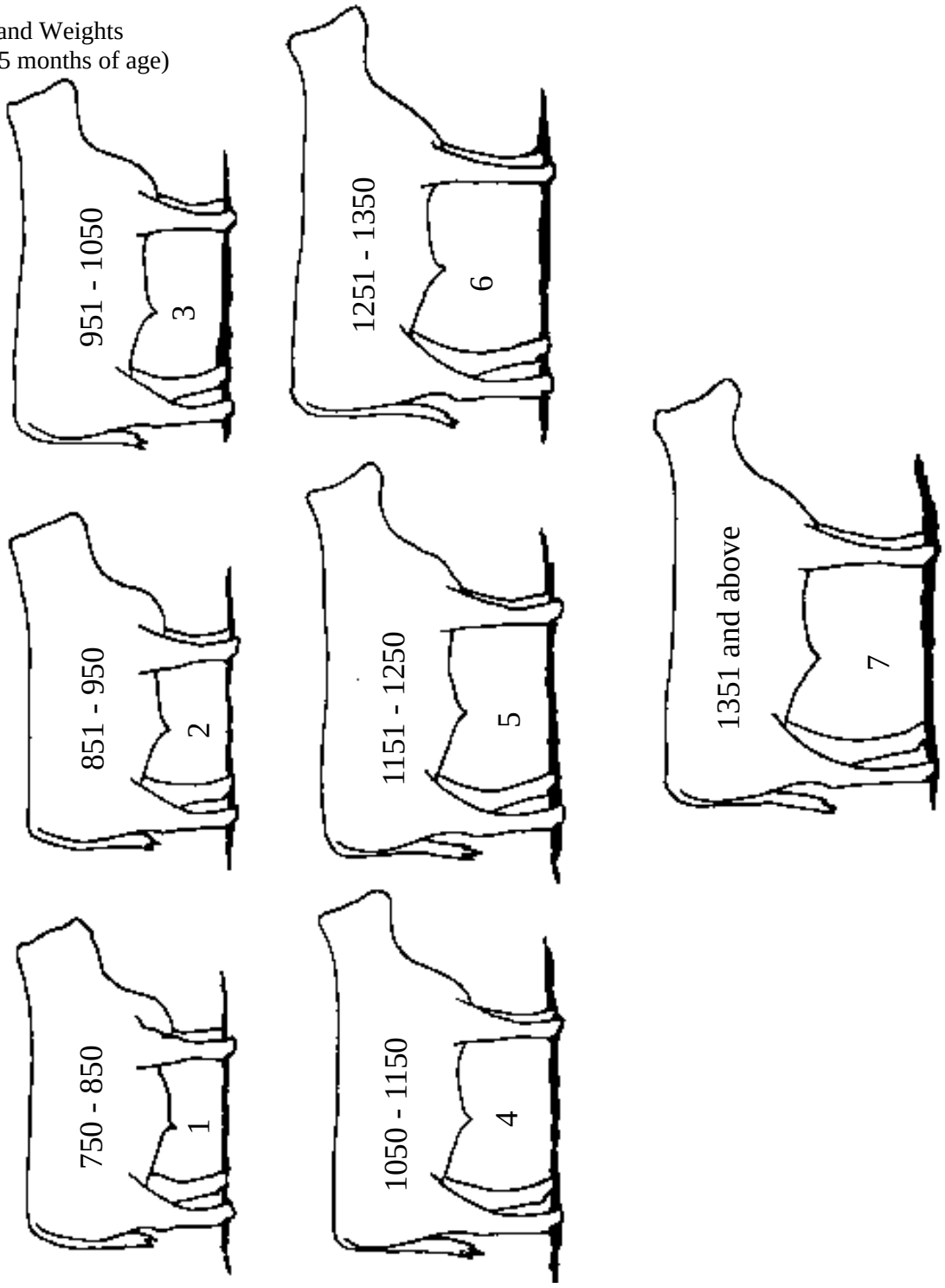
DETERMINING FRAME SCORE AND WEIGHT REQUIREMENT OF STEER FOR COUNTY FAIR

BEEF, LEVEL II

Handout 7, Frame Score Types and Weights

Understanding Frame Scores

Frame Score Types and Weights
(At approximately 15 months of age)



Projecting and Computing Average Daily Gain

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Why Average Daily Gain (ADG) is important
- Explain Average Daily Gain to someone else
- Compute Average Daily Gain on their own

ABOUT THEMSELVES:

- Importance of mathematical skills
- Importance of information in making predictions

Materials Needed:

- Paper
- Pencils
- Calculators
- Activity Sheet 9, ADG Problems
- Handout 8, Expected Choice Steer Weights by Breed

ACTIVITY TIME NEEDED: 30 MINUTES

Leader Notes

ACTIVITY

Feeding is an important part of any beef project. We feed high-quality feeds so that our market animals can attain the best market weight in the least amount of time with the greatest efficiency. A calf may have the inherited ability to grow rapidly, but it will not do so unless fed properly. What you feed and how you feed will help determine how much money you make or lose on your calves.

Having already completed the lesson on frame scores will be helpful in understanding this lesson.

In 4-H, it is best to try to feed a calf for a particular marketing date or show. Decide when you want to show or sell, and feed your calves on a program that will have them at the correct weight, finish, and grade at that date.

For example, a market steer should weigh 1,000 to 1,300 pounds, have about 0.25 to 0.45 inches of outside fat, and be grade Choice when it is sold. A market heifer will finish at a lighter weight than a steer of the same age and should weigh about 900 to 1,000 pounds.

We know that most beef animals have to eat at least 7 pounds of feed to gain 1 pound of weight. Depending on its ancestry, a growing steer should be able to gain 2.0 to 3.0 pounds per day. You can quickly figure out that you will need to be feeding 15 to 20 pounds of feed each day at a minimum to make this kind of gain.

Ask members how many pounds it would take for a calf to gain 2.5 to 3.0 pounds per day if it takes 7 pounds of feed to gain 1 pound.

Leader Notes

By knowing the expected or desired weight of an animal and its beginning weight, you can calculate the expected gain needed to get that animal ready for your anticipated sale or show date. By also knowing the total number of days until sale or show time, you can determine the necessary average daily gain (or ADG as we sometimes abbreviate it) required to get that animal to the correct condition.

Refer members to Handout 8, Expected Choice Steer Weights by Breed, that you should provide with this lesson.

For example, if you purchased a 500-pound feeder steer with the show date 200 days away, you can use the following formula to figure out how much the animal must gain if he is expected to grade Choice at 1,100 pounds:

Market weight – present weight ÷ Number of days until sale or show = ADG

1,100 pounds – 500 pounds ÷ 200 days = 3.0 pounds per day

A good average daily gain for a steer is 2.5 to 3.0 pounds a day. A good average daily gain for a young heifer is 1.5 to 2.0 pounds per day.

Work these problems on the board or flipchart with the members, allowing them to supply the numbers for you.

Let's now try a few examples to see how important it is to know the beginning weight and the days until you want to show or sell your animal.

Refer to the handout for approximate finished weights.

At the county-wide weigh-in on February 11, steer #1 was 12 months old and weighed 855 pounds. The county fair premium sale was scheduled for August 7 later that year. Since this steer was relatively small framed (frame score of 2.9) and stood only 45 inches at the hip, the projected finished weight was 940 pounds. Calculate the ADG.

Remember, a critical factor is the time between the weigh date and the sale. What is that time? (177 days).

It might be helpful to have pictures of steers of these frame scores if available.

So, to figure out the Average Daily Gain that this steer needs to reach the finished weight, we set up the formula as in our previous example:

Help your members set up the problem.

940 pounds – 855 pounds ÷ 177 days = 0.48 pounds per day

What does this calculation tell you about this animal? What conclusions can you draw?

This steer must not gain any more weight or it will be too fat for the county fair. It is already so close to its ideal finished weight that it can only gain less than half a pound a day for the next 177 days! An unreasonable situation. This steer will be ready long before the fair and should be sold when it reaches its finished weight.

Let's try another example using the same weigh-in day and county fair premium sale date. Steer #2 checks in on February 11 weighing 700 pounds. Its hip height is nearly 50 inches, and it has a 6.4 frame score. Its projected Choice finished weight is 1290 pounds. What kind of average daily gain does this steer need to be able to make this finished weight?

Again, we set up our formula the same way:

1,290 pounds – 700 pounds ÷ 177 days = 3.33 lbs/day

What does this calculation tell you? Is this steer going to be ready for the county fair?

This may be an unreasonable expectation for this steer. It would be difficult for this animal to gain this much each day. And at a 7 to 1 conversion ratio, you would need to be feeding about 25 pounds of feed each day. This steer can't finish in time for the fair and it might be best to look at another show, like the Kansas State Fair or the Wichita Junior Livestock Show, both of which occur in September.

Review meaning of "conversion ratio."

Finally, let's look at one more steer. Steer #3 comes in on weigh day and weighs 540 pounds. This medium-framed steer is nearly 45 inches tall at the hip, and rates a 3.7 frame score. Thus, its projected finished weight is 1,020 pounds. Calculate the average daily gain for this steer using the same show date as before.

Our formula should look like this:

1020 pounds – 540 pounds ÷ 177 days = 2.71 lbs per day

How does this steer compare to the others? Is this a reasonable expectation? This animal's average daily gain is much more reasonable and it can probably make this kind of daily gain with little trouble. These are the kinds of average daily gains you should be looking for.

Hand out Activity Sheet 9, ADG Problems, to do at meeting or take home.

Now you should be able to compute the average daily gain for lots of animals. Remember, it is extremely important to know the weight of an animal and to know approximately what its finished weight should be.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What math calculations did you do to compute average daily gain (ADG)?
2. What was the most difficult part of determining average daily gain? Easiest?

Process:

3. Why is it important to know the average daily gain of your calf or the needed daily gain to reach market weight at a particular date?
4. What can you do to increase or decrease ADG of an animal?
5. Why is it important to monitor the weight of your animal?

Generalize:

6. What problems can occur if weight gain is not monitored closely in a 4-H beef project?
7. What is significant about ADG in a feedlot as compared to a 4-H steer?

Apply:

8. How can use of ADG be useful when purchasing and feeding animals in the future?
9. How can you use this lesson information for different results next time?

GOING FURTHER:

Give your members other hypothetical situations and ask them to compute ADG for shows like the Kansas State Fair and the Wichita Junior Livestock Show.

REFERENCES:

Author:
This lesson was modified from original material authored by Kirk A. Astroth, Former Extension Specialist, 4-H Youth Programs, Kansas, with adaptation by:
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PROJECTING AND COMPUTING AVERAGE DAILY GAIN
BEEF, LEVEL II
Activity Sheet 9, ADG Problems

1. County Weigh Day is February 24
   County Fair is July 25
   Days on full feed is 152
   Steer weight is February 24
   Steer weight at State Fair is 1,100 pounds

If steer gains 2.0 pounds per day during full feed, what must weight be on February 24?
What type and breed of steer might this be?

2. County Weigh Day is April 30
   Kansas State Fair is September 7
   Days on full feed is 130
   Steer weighs 800 pounds on April 30

What must the ADG be for the steer to weigh 1,200 pounds at the State Fair?
Is this reasonable for a Simmental-cross steer? Why or why not?

3. County Weigh Day is February 24
   Kansas State Fair is September 7
   Days on full feed is 196
   Minimum steer weight at State Fair is 1,000 pounds
   Minimum ADG to show is 1.8 pounds per day

What must your steer weigh on February 24 to be able to show at State Fair?
Is this realistic? Why or why not? What types or breeds of animals might this be?

Expected Choice Steer[1] Weights (lbs)

Breed	Angus	Hereford	Shorthorn	Charolais	Simmental	Limousin	Holstein
Angus	1000	1050	1050	1225	1225	1125	1225
Hereford		1050	1075	1250	1250	1150	1250
Shorthorn			1050	1250	1250	1150	1250
Charolais				1400	1425	1325	1425
Simmental					1400	1325	1425
Limousin						1200	1325
Holstein							1400

[1]Corresponding heifers would be approximately 80% of these weights.

Feeding 4-H Show Steers

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Identify common ration requirements
- Know basic nutrition principles
- Know steer feeding management principles
- Develop an awareness of feeding a steer toward the ideal end-product

ABOUT THEMSELVES:

- The effect of a goal or purpose on daily activities

Materials Needed:

- Activity Sheet 10, Beef Ration Ingredient Match
- Feedstuff samples: oats, corn, milo, commercial sweet feeds, cotton seed hulls, vitamin premixes, salt, minerals, antibiotics
- Various consistency of feedstuffs such as crimped, coarsely ground, finely ground
- Set of small scales and a container to weigh feed
- Livestock scales to weigh steer
- Handout 8, Expected Choice Steer Weights by Breed (from previous Average Daily Gain lesson)

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Many families think that champion steers are made by a "secret" ration with a group of magical ingredients that make that animal grow taller, longer, faster, and with a more uniform and firm finish than anyone else's ration. Nothing could be further from the truth! Many successful programs over the years have proved that rations and management programs vary and yet are successful.

The factors which all of these progams have in common are that successful feeders:

1. Follow basic principles of nutrition.
2. Have the knowledge of what the end-product should look like.
3. Have developed feed rations and determined how much to feed in order to end the project with the steer at the size, weight, and degree of finish appropriate for that particular steer.

GENERAL CHARACTERISTICS OF FEEDS

There are a number of grains and feed additives which may be included in rations. Included below are some commonly used ration ingredients and their characteristics.

Leader Notes

Activity Sheet 10, Beef Ration Ingredient Match, can be given out before lesson and then correct answers discussed or used at end of lesson as review.

Leader Notes

Samples of these feedstuffs should be on display for members to see as they are discussed. Use a skillathon situation to let members identify feedstuffs and discuss value to the ration.

Oats. Oats have long been used as one of the major ingredients of rations for show cattle. Oats are slightly higher in protein and fiber and lower in energy than milo or corn and, therefore, tend to promote more growth and less fat than milo or corn. However, they are quite expensive.

Corn and Milo. Grains which are high in carbohydrates and promote the fattening process.

Sweet Feeds. Commercial feeds which contain a variety of grains mixed with molasses. These feeds are usually highly palatable, or appetizing.

Protein Supplements. Commercial products usually range from 32 to 44 percent protein and are added to rations. Protein is a muscle builder and promotes growth.

Cottonseed Hulls. Add bulk and fiber to the diet, are appetizing, and stimulate rumen development. Chopped hay or alfalfa pellets can also be used.

Vitamin Premixes. These supplements are usually added to ensure an adequate supply of vitamin A, which is needed if cattle do not get green forage. The B complex vitamins are sometimes added to stimulate vigor, appetite, hair growth and bloom (shine).

Salt. Salt is needed for all classes of livestock to maintain healthy tissue.

Antibiotics. Such as chlortetracycline may be added to rations to prevent respiratory infections and encourage animals to eat enough.

Minerals. In addition to salt for sodium and chlorine, mineral elements such as calcium and phosphorus are required for proper bone growth. Others that are important are potassium, zinc, and copper.

PRINCIPLES OF SHOW STEER NUTRITION

Display various consistencies of feedstuffs.

Consistency of Feedstuffs. Grain which has been steam rolled, crimped, or coarsely ground causes fewer problems with bloat and scours than finely ground feed.

Protein. Levels need not exceed 12 percent. Excess protein is expensive and may cause calves to lose their appetite.

Vitamins and Minerals. These should be added to the feed to balance the ration, make it more digestable, and promote hair bloom. High grain diets are high in phosphorus so the mineral used should be high in calcium to achieve a proper calcium:phosphorus ratio. A vitamin premix high in vitamin A should be used.

Amount to Feed. Feed two to three percent of body weight for steers weighing from 500 to 900 pounds. Adjust the amount of feed according to height and weight relationship of steer and amount of fat covering (0.3 to

0.4 inch is preferred). Late-maturing cattle, such as Charolais, Simmental, or Limousin, may have to be full-fed most of the time to get them finished while early maturing breeds, such as Angus, Hereford or Shorthorn, may need to be hand-fed to keep from getting too fat.

Have a demonstration using scales to weigh calves and feed. Use Handout 8, Expected Choice Steer Weights by Breed, from previous lesson.

STARTING THE STEER ON FEED

Calves may be stressed by weaning, transportation, disease, or other causes when bought. It would be good to begin the diet with a high-fiber mix containing an antibiotic. A simple set of rations for steers is listed below. However, other feed combinations will be equally useful. Cost of feed ingredients should be closely considered.

Question: How many pounds of feed should this steer be fed as a general rule of thumb?
Answer: 2 to 3 percent of body weight or 10 to 15 pounds for 500 pound steer.

Steer (500 to 900 Pounds)	**Pounds per Ton of Feed**
Whole oats	800
Rolled corn or milo	600
Cottonseed hulls or hay	200
32% Protein Concentrate	100
Calf Manna	50
Molasses	50
High Calcium Mineral Mix	15
Vitamin Premix	5

Steer (900 Pounds and Over)	**Pounds per Ton of Feed**
Crimped oats	600
Rolled corn or milo	900
Cottonseed hulls	100
32% Protein Concentrate	100
Calf Manna	50
Molasses	50
High Calcium Mineral Mix	15
Vitamin Premix	5

Feed a small amount of long hay—one block or flake per steer daily.

Tour members facilities and let other members look at their feeding facilities, feed storage or mixing facilities.

STEER FEEDING NUTRITION AND MANAGEMENT GUIDELINES

Steer feeding management is the art of using animal nutrition to feed an animal for a specific purpose. Feeding programs will vary, depending on:

1. Age and size of steer
2. Feeds available
3. Degree of finish on steer
4. Final weight and finish expected

Some guidelines are:

1. Keep feed trough and feeding area clean and free of manure. Control flies.
2. Facilities should allow calves to be fed separately if the need arises.
3. Feed twice each day. Feed at the same time each day and do not skip a feeding.

4. Feed proper amount at each feeding. Weigh feed at each feeding for exact amounts.
5. Make feed changes slowly and gradually—not over 5 pounds per week.
6. If hand feeding, feed only what steer will eat in 30 to 60 minutes. Remove excess feed.
7. Provide free access to mineral mix. A mineral containing 15 to 30 percent salt, 15 to 25 percent calcium and 3 to 8 percent phosphorus is appropriate.
8. Feed only amount of hay calf will clean up in one day. Remove excess stale hay.
9. Provide fresh clean water at all times and clean water trough regularly.

SUMMARY

Remember that feeding and nutrition are only part of an overall management scheme. No ration can produce a champion. It takes a combination of hard work and experience. Follow the basic principles of nutrition and seek the help of those who have fed show cattle with success.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What did you learn about the purposes of different feeds?
2. If you have a steer, what happened when you started him on feed and how did you manage feed increases and ration changes?

Process:

3. Why is it important to adjust the ration as your steer matures and grows?
4. What would happen if you fed a steer the same ration and quantity for the entire feeding period?

Generalize:

5. What is different when feeding steers in a feedlot? Why?
6. How are responsibilities different when feeding one or two 4-H steers compared to a pen of feedlot steers?

Apply:

7. Should the purpose of feeding steers in a feedlot and in 4-H be more similar or different in the future? Why or why not?

GOING FURTHER:

1. Tour beef projects in the county to find out what is being fed to each animal and why.
2. Give a short report on what your project is being fed and why.
3. Give illustrated talk or demonstration on feed ingredients and their characteristics.
4. Give illustrated talk on Beef Feeding Management.

REFERENCES:

Author:

This lesson was modified from original material authored by John Kuykendall, County Extension Agent, Texas, with adaptation by:
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Answers to Activity Sheet 10, Beef Ration Ingredient Match

1. I	6. B
2. A	7. G
3. D	8. F
4. E	9. C
5. H	

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FEEDING 4-H SHOW STEERS

BEEF, LEVEL II

Activity Sheet 10, Beef Ration Ingredient Match

Match definitions with common beef ration ingredients.

___1. Oats

___2. Corn or milo

___3. Sweet feeds

___4. Protein supplements

___5. Cottonseed hulls or hay

___6. Vitamin premixes

___7. Salt

___8. Antibiotics

___9. Minerals

A. Grains high in carbohydrates that promote the fattening process.

B. Added to feed to balance the ration, enhance digestibility and promote hair bloom.

C. Elements such as calcium and phosphorus that are required as structural components of the skeleton and often fed free choice.

D. Contains variety of grains mixed with molasses. Highly palatable.

E. Added to rations to increase protein content.

F. Added to feedstuffs to prevent respiratory infections and promote feed consumption.

G. Used free choice to maintain tissue integrity.

H. Adds bulk and fiber to diet and stimulates rumen development.

I. High in carbohydrates as well as protein and fiber but lower in energy than some other grains.

Heifer Nutrition

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Nutritional needs of a heifer
- Steps in formulating a feeding program for a heifer

ABOUT THEMSELVES:

- Importance of good nutrition
- The effect of growth on basic nutrient requirements

Materials Needed:

- Chalkboard or flip chart to show problems in front of group
- Chalk or magic markers
- Calculators (preferably one for each person)
- Paper and pencil for each person
- Activity Sheet 11, Heifer Nutrition Problem
- Handout 9, Sample Heifer Growing Rations

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

Proper nutrition is important for each class of cattle: steers, bulls, cows and replacement heifers. But it is extra important for heifers because they are still growing, in preparation to having a calf. So, not only do they need energy and other nutrients to grow, but they also have to be healthy and ready to be bred.

Hand out paper, pencils and calculators to all members.

Today, we're going to learn the steps in formulating a ration. It's really fairly simple. We have to keep in mind what this heifer is supposed to do . . . grow! First, let's make one ration together. I'll write on the board and you can copy it down on your paper. Use your calculator to figure the numbers as I do. Then you'll have time to try to figure another ration for your heifer.

Step 1. Discuss with your parents what you have available to feed your heifer. Most cattle operations will probably start with hay. In this example, we'll use hay.

Step 2. How much should you feed? In most cases the heifers will be allowed to eat as much as they can and that will actually come close to meeting their requirements. But how much is that? Heifers eat about 2.2 to 2.4 percent of their body weight. But, that sounds complicated. What does that mean in terms of pounds or volume? Simply take 2.2 percent times

Leader Notes

Show the problem on the board and show how to figure percentages (2.2% = .022). Slowly show how to enter the numbers into the calculator.

You could show how much hay 15.4 pounds is. Use a feed scale and measure it.

List the steps and key words on the board. The numbers will be confusing to young members so be sure to go over them slowly.

This is a good opportunity to show what a protein supplement is and how much ¾ to 1½ pounds is.

Explain the process of arriving at this figure.

Have examples of mineral mixes to show. If it is a commercial mix, show the members the phosphorus level on the tag.

the weight of your heifer. Let's say our heifer weighs 700 pounds. So, here's the problem:

$$700 \times .022 = 15.4 \text{ pounds}$$

So, the heifer will eat about 15.4 pounds of hay a day.

Step 3. Now we have formulated a ration, right? No . . . we're going to need some protein, as all young growing animals do.

Remember, the hay contains some protein. Most hays will have about 6 to 8 percent, unless it is alfalfa and then it could have 14 to 17 percent protein. But your heifer will probably need a protein supplement.

Usually around ¾ to 1¼ pounds of a 30 to 40 percent protein supplement will meet the protein requirements of a growing heifer along with grass hay.

Step 4. Now you're all set, right? Well, you are if you are willing to accept an average gain of ¾ to 1 pound a day. But that's really not very good. So, it's time to start figuring out how much you want the heifer to gain. Remember, that at the time you first breed your heifer, you'd like to have her weighing at least 650 to 700 pounds for British breed heifers and as much as 800 to 850 pounds for Continental breed heifers. So, weigh your heifer and figure how many days are left before you want to breed her and how much she has to gain to meet this weight. Then it's easy to figure what her average daily gain should be.

Let's say I want my heifer to calve March 15 next year. So, I should breed her June 3 this year (It takes about 285 days before a heifer calves). Also, let's say today is March 3, so we have 3 months before her breeding date. That's approximately 92 days away. She is an Angus heifer (British breed) and weighs 500 pounds today. So we can figure how much weight she has to gain before we breed her:

$$650 \text{ lbs} - 500 \text{ lbs} = 150 \text{ lbs to gain}$$

$$150 \text{ lbs} \div 92 \text{ days} = 1.63 \text{ lbs per day to gain}$$

Step 5. Now that we know how much weight this heifer needs to gain, we can decide how to feed her to gain properly. But how do we do that? In order to get a heifer to gain more weight, we can add grain (such as corn or milo) to her ration. Every 10 pounds of grain eaten adds about one extra pound of weight.

Step 6. Now we're all set, right? Well, we're getting closer, but we still need some minerals. The important minerals we need to supply are salt (just like you use in recipes), calcium and phosphorus, which you'll probably have to buy or use some of your family's if they have some available for their cows. If you need help, this is a good time to visit with your feed dealer.

Step 7. Now we must be set, right? We're really close because all we need to consider is vitamin A. This can be supplied through either feeding alfalfa, adding vitamin A in the protein, grain or mineral, or giving your heifer a vitamin A injection.

Show the member how to find Vitamin A on the feed tag.

Step 8. Now, everything is done, right? Yes, except, it is important to keep good records so that you can plan ahead and don't run out of feed for your heifer!

Use Activity Sheet 11, Heifer Nutrition Problem, as a review.

Now, let's go over the steps again, and keep your own situation in mind. Think about what you would feed your own heifers.

Pass out Handout 9, Sample Heifer Growing Rations, for members to use as examples for determining a ration for their heifer.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What major feedstuffs did you use in your heifer ration?
2. What was the most difficult part of the ration to formulate? the easiest? Why?

Process:

3. What should you do if the hay available has "some" mold on it?
4. Why are vitamins and minerals important in a heifer ration?
5. What might be the affect on a heifer's breeding performance if she is overweight? Underweight?

Generalize:

6. Why are heifer and steer rations different?
7. What principles of ration formulation are the same or different for other animals?

Apply:

8. How is the use or purpose of an animal reflected in their ration or diet?
9. How will this process be useful in the future?

GOING FURTHER:

1. Visit a feed store and discuss various supplements and see examples.
2. Visit a feedlot and see how heifers are fed compared to steers.
3. Visit a member's place and see how they feed their heifers.

REFERENCES:

Author:
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HEIFER NUTRITION

BEEF, LEVEL II

Activity Sheet 11, Heifer Nutrition Problem

You have a 650-pound heifer of Continental breed. You want to breed her in 120 days.

1. How much hay should you feed her each day?

2. How much protein supplement should she receive?

3. How much weight does she need to gain each day?

4. Do you need to add grain to her feed? If so, how much?

5. What else will you feed your heifer?

6. What else is important that you do other than the regular feedings? (Record keeping)

HEIFER NUTRITION

BEEF, LEVEL II

Handout 9, Sample Heifer Growing Rations

1. Five pounds alfalfa hay
   Grass hay free choice
   One pound grain sorghum for each 100 pounds of body weight

2. Grass hay free choice
   ¾ pound soybean meal or equivalent
   One pound grain sorghum per 100 pounds of body weight

3. Sorghum silage free choice
   1½ pounds soybean meal or equivalent
   One pound grain sorghum per 100 pounds of body weight

4. Corn silage free choice
   One pound soybean meal or equivalent
   One pound grain sorghum per 100 pounds of body weight

Types and Purebreeds of Cattle

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Define the basic types of cattle
- Give the definition for a breed of cattle
- Be aware of breeds of cattle found in the United States
- Name and describe five breeds of cattle common to your area

ABOUT THEMSELVES:

- The effect of breeds on consumer product choices
- How people have modified their environment rather than adapting to it

Materials Needed:

- Video, Breeds of Cattle in the U.S., Kansas Cooperative Extension Service
- Activity Sheet 12, Beef Breeds Crossword Puzzle
- Leader's Key, Activity Sheet 12, Beef Breeds Crossword Puzzle
- Blank paper and pencils for members
- Television with VCR

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Leader Notes

Cattle may be divided into production types according to their body size, muscle design, level of milk production, and genetic group.

A breed is a group of cattle with certain characteristics which are passed from parent to offspring. Cattle of a certain breed usually have the same hair color, body size, and body shape. Another characteristic which can be used to identify a breed is whether the cattle have horns or not.

A breeder is a person who selects certain cattle to mate in hopes of having offspring who are better suited for the environment, or are more productive.

Purebred cattle are the offspring of members of the same breed. The purebred breeder provides cattle to other breeders and bulls to the commercial producer.

BREEDS OF BEEF CATTLE

Now let us examine each breed in detail and learn more of the distinguishing characteristics by use of the video, *Breeds of Beef Cattle in the U.S.*

Discuss each breed with members using video, stopping the video at times to discuss.

Leader Notes

Pass out Activity Sheet 12, Beef Breeds Crossword Puzzle, and have members complete. Check answers with leader's key.

Review and ask questions to see if members achieved the lesson objectives, if not already asked.

SUMMARY

These were only some of the over 600 breeds of beef cattle in the world. Purebred animals are important to the beef cattle industry to provide foundation stock for other beef cattle production. Knowing the various breeds common to Kansas and their important characteristics helps in making selection decisions.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. How many breeds of beef cattle can you name?
2. How many breeds of beef cattle can you recognize?
3. What new breeds did you learn from this lesson?

Process:

4. What problems did you have in identifying different breeds? Why?
5. Why do you think there are so many cattle breeds?
6. What is meant by production types of cattle?
7. What breed characteristics make certain breeds more adaptable to specific environments?

Generalize:

8. What role do breeds of cattle play in the commercial feedlot and meat industries?
9. What impact do breeds have on you as a consumer?

Apply:

10. How will knowledge of beef cattle breeds be useful to you and the consumer in the future?

GOING FURTHER:

1. Members can tour major livestock shows and identify different breeds of cattle, their origin and their characteristics.
2. Members can tour a local purebred cattle ranch.
3. Members can select one breed of cattle and write the breed association for information and report to the group on that breed.
4. Members can give an illustrated talk on one or more breeds of cattle at the next project meeting or club meeting.
5. Attend a breed field day.
6. Attend the county beef committee's field day or tour.
7. Take part in a livestock project tour.
8. Members can give demonstration on how to groom different breeds.
9. Members can prepare an exhibit showing the different breeds of beef cattle.
10. Attend a purebred beef cattle auction.

REFERENCES:

National Breed Associations

Author:

This lesson was modified from original material authored by Steve Hammack, Extension Beef Cattle Specialist, Texas, adapted by Deborah K. Lyons-Blythe, County Extension Agent, Agriculture, Kansas, with further adaptation by:
Brian A. Swisher, County Extension Agent, 4-H, Kansas
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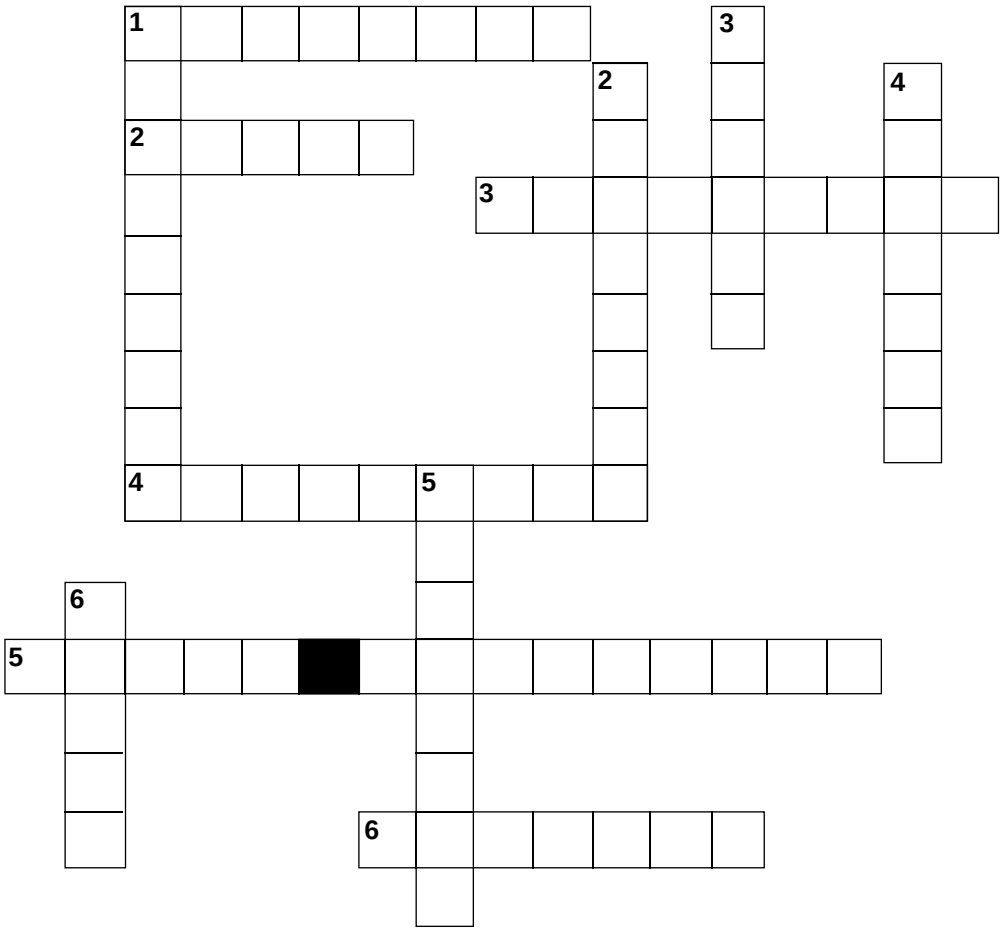
Kansas State University

Cooperative Extension Service
Kansas State University
Manhattan

TYPES AND PUREBREEDS OF CATTLE

BEEF, LEVEL II

Activity Sheet 12, Beef Breeds Crossword Puzzle



Down

1. White or light straw-colored breed from France
2. Mostly horned, rich red-gold shading to straw-colored breed from South Central France
3. Deep cherry red, curly hair coat with white tail switch
4. Breed that is three-eighth's Brahman and five-eighth's Angus
5. Distinctive red body color with white face, crest, dewlap, underline, flanks, switch and lower parts of leg
6. Large red and white breed native to Northwest France (first word of name only)

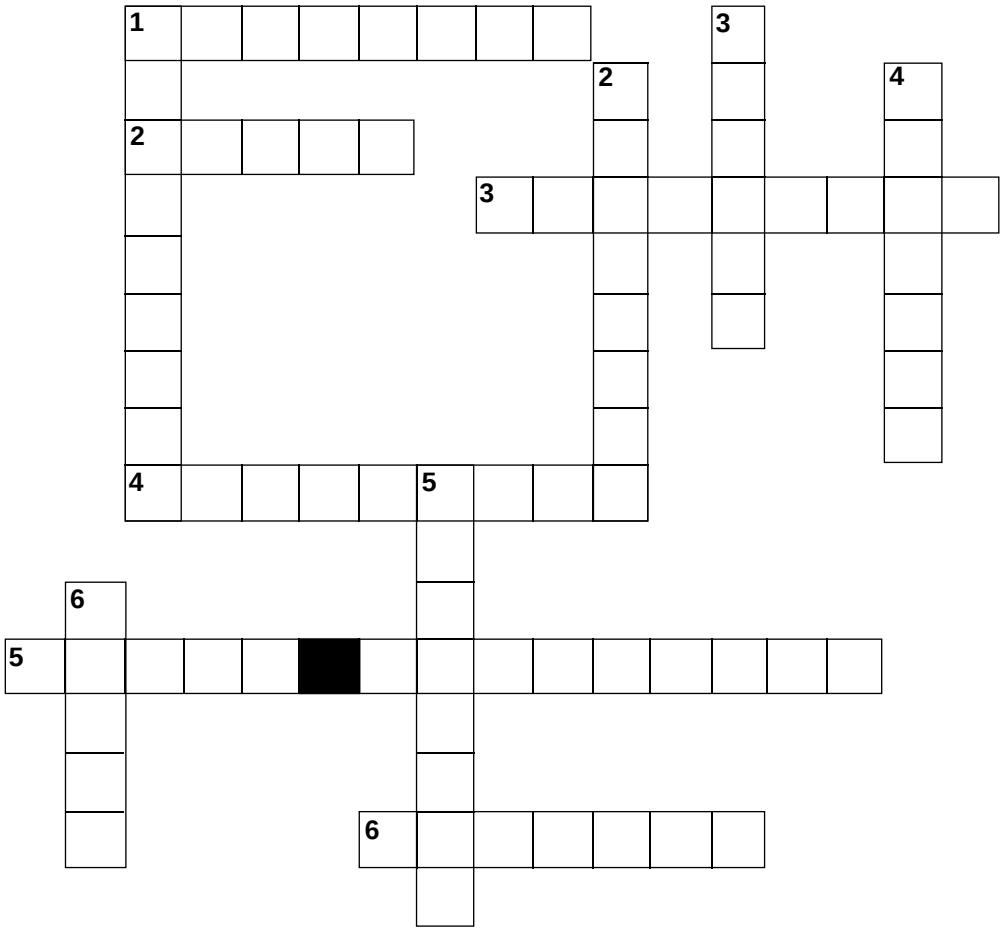
Across

1. Tallest breed of cattle, native to Italy
2. Black breed from Scotland, naturally polled (hornless)
3. White face breed from Switzerland. Most numerous breed in Europe today
4. First beef breed imported into United States in 1783, color is red and white combination
5. Breed developed in Texas on King Ranch; three-eighth's Brahman and five-eighth's Shorthorn
6. Have large hump over shoulders and originally came from India

TYPES AND PUREBREEDS OF CATTLE

BEEF, LEVEL II

Leader's Key, Activity Sheet 12, Beef Breeds Crossword Puzzle



Down

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Across

1. Tallest breed of cattle, native to Italy
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6. Have large hump over shoulders and originally came from India

TYPES AND PUREBREEDS OF CATTLE

BEEF, LEVEL II

Breed Associations

ANGUS
American Angus Association
3201 Frederick Boulevard
St. Joseph, MO 64501
816-233-3101

AMERIFAX
Amerifax Cattle Association
P.O. Box 149
Hastings, NB 68901
402-463-5289

BARZONA
Barzona Breeders Association of America
P.O. Box 631
Prescott, AZ 86302
602-445-5150

BEEFALO
American Beefalo World Registry
116 Executive Park
Louisville, KY 40207
502-897-1650

BEEFMASTER
Beefmaster Breeders Universal
6800 Park Ten Boulevard, Suite 290 West
San Antonio, TX 78216
512-732-3132

BLONDE d'AQUITAINE
American Blonde d'Aquitaine Association
P.O. Box 578
Boling, TX 77420
409-657-3809

BRAHMAN
American Brahman Breeders Association
1313 LaConcha Lane
Houston, TX 77054
713-795-4444

BRANGUS
Neal Orth
P.O. Box 696020
San Antonio, TX 78269-6020
512-696-8231

BRITISH WHITE
British White Cattle Association of America
RR1, Box 94
Scranton, IA 51462
712-652-3922

BUELINGO
Steve Schmidt
Tribune, KS 67879
316-376-4879

FRIESIAN
Beef Friesian Society
25377 Weld County Road 17
Johnstown, CO 80534
303-587-2252

CHAROLAIS
American International Charolais Association
11700 N.W. Plaza Circle, P.O. Box 20247
Kansas City, MO 64195
816-464-5977

CHIANINA
American Chianina Association
P.O. Box 890
Platte City, MO 64079
816-431-2808

BELTED GALLOWAY
Belted Galloway Society
Route 2, Box 90
Leeds, Alabama 35094

TYPES AND PUREBREEDS OF CATTLE

BEEF, LEVEL II

Breed Associations, *continued*

GELBVIEH
American Gelbvieh Association
5001 National Western Drive
Denver, CO 80216
303-296-9257

HEREFORD
American Hereford Association
1501 Wyandotte, P.O. Box 4059
Kansas City, MO 64108
816-842-3757

LIMOUSIN
North American Limousin Foundation
100 Livestock Exchange Building
Denver, CO 80216
303-296-8835

MAINE-ANJOU
American Maine-Anjou Association
528 Livestock Exchange Building
Kansas City, MO 64102
816-474-9555

MARCHIGIANA
Marky Cattle Association
Box 198
Walton, KS 67151
316-837-3303

PINZGAUER
American Pinzgauer Association
21555 State Route 698
Jenera, OH 45841
419-326-8711

POLLED HEREFORD
Polled Hereford Association
11020 NW Ambassador Drive
Kansas City, MO 64153
816-891-8400

RED BRANGUS
American Red Brangus Association
P.O. Box 1326
Austin, TX 78767
512-451-0469

RED POLL
American Red Poll Association
P.O. Box 35519
Louisville, KY 40232
502-635-6540

SALERS
American Salers Association
5600 S. Quebec 220-A
Englewood, CO 80111
303-770-9292

SANTA GERTRUDIS
Santa Gertrudis Breeders International
P.O. Box 1257
Kingsville, TX 78363
512-592-9357

SCOTCH HIGHLAND
American Scotch Highland Breeders Association
Box 81
Remer, MN 56672
218-566-1321

SHORTHORN
American Shorthorn Association
8288 Hascall Street
Omaha, NE 68124
402-393-7200

SIMMENTAL
American Simmental Association
1 Simmental Way, P.O. Box 24
Bozeman, MT 59715
406-587-4531

TYPES AND PUREBREEDS OF CATTLE

BEEF, LEVEL II

Breed Associations, *continued*

SOUTH DEVON
South Devon Association
Box 68
Lynnville, IA 50153
515-527-2437

TARENTAISE
James Spawn
P.O. Box 34705
Kansas City, MO 64116
816-421-1993

TEXAS LONGHORN
Carol Dilly
2315 N. Main, Suite 402
Ft. Worth, TX 76106
817-625-6241

WATUSI
Darol Dickinson
Dickinson Ranch
Rural Route 2
Calhan, CO 80808

WHITE PARK
White Park Cattle Association of America
419 North Water Street
Madrid, IA 50156
515-795-2013

AMERICAN BRAHMOUSIN COUNCIL, INC.
P.O. Box 12363
Kansas City, MO 64116
816-421-1319

RED ANGUS ASSOCIATION OF AMERICA
4201 I-35 North
Denton, TX 76207-3415
817-387-3502

Registration of Purebred Cattle

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- How to fill out an application for registration
- Importance of pedigrees
- Importance of accurate information

ABOUT THEMSELVES:

- Importance of forms of identification
- Impact of computers on identification methods

Materials Needed:

- Sample registration papers from breed associations (See breeds lesson plan for addresses to write for sample papers.)
- Pencils for each member
- Chalkboard or flip chart
- Activity Sheet 13, Your Family Tree

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

Leader Notes

Purebred does not only mean that the animal's parents were both the same breed, but it also means that the animal is eligible for registration with the national breed association. This has some important advantages, the main one being that you can send in the performance information (birth weight, weaning weight, weight per day of age, etc.) you collect on your calf and the association will send you back information that compares your calf with all the other animals of that breed. This information is called Expected Progeny Differences (EPD). Another reason for registering an animal is that most shows require you to have registration papers for the animal.

There are some requirements that must be met before you can register your calf. First, both the sire and dam (father and mother) of the calf must be registered in that breed's herd book. Second, several breeds have an age restriction on how old the calf can be in order to be registered. Usually, the older the calf is, the more it costs to register it. So, it is best to register your calf before it is 6 months old. Next, several breed associations require performance data such as birth weights or weaning weights on the registration form. Last, all breeds require some sort of permanent identification like tattoos or brands.

List registering needs on chalk board or flip chart.

Each breed has its own registration application with its own information to be filled out. Here are some examples from different breeds.

Show the registration applications from the breeds.

Leader Notes

Let's fill one out with some make-believe data. Chris Clover's registered Angus cow was bred to a registered Angus bull and just had a bull calf and Chris wants to register it in his name. Here's the important information. The calf's name is Billy Bob. The dam's registration number is 1122334. The sire's registration number is 5566778. The bull calf was born February 20 of this year and his tattoo is 901 in his right and left ears. Chris is the first owner since the calf was just born and his member code is 012345. Chris lives in Some City, This State.

Some breeds ask that you furnish performance information at this time, as well. Be sure that the information you report is correct. It does you no good to lie about the information because when you are trying to improve your herd, you need an honest record of where you are now instead of an example of what you wish your cattle were like. After you send in the information on the application and pay the required amount, the association for that breed will send back a certificate of registration for your calf with the EPD information on it.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. How easy or difficult is it to register purebred cattle in your favorite breed?
2. What information do or did you need to register a heifer?

Process:

3. At what age should most calves be registered? Why?
4. What are the advantages of registering cattle? Disadvantages?

Generalize:

5. How will understanding registration procedures help you with other projects?
6. What other forms of identification do you use? Why?

Apply:

7. How will your use of identification methods be different in the future? Why?
8. What is the significance of computer applications in registering purebred cattle?

GOING FURTHER:

Hand out Activity Sheet 13, Your Family Tree, for members to do at home. Discuss similarities of cattle and people ancestors and different terminology.

1. Visit a breed association headquarters.
2. Ask a breed association fieldman or regional manager to speak to the group.
3. View the video, *Breeds of Cattle in the U.S.*, available through the Extension office.
4. Write to a breed association for information on registration. (See lesson on Breeds of Cattle)

REFERENCES:

American Angus Association:
Tattooing, How to Make it Work
Star of Your Future
Breeders Reference Guide (rules and bylaws)
Slide show: AHIR, Your Key to Profit
American Hereford Association:
Rules, regulations and Bylaws
American Shorthorn Association:
Growing to Greatness Together

Author:

This lesson was modified from original material authored by Twig Marston, Extension Assistant and Deborah K. Lyons-Blythe, County Extension Agent, Agriculture, Kansas, with adaptation by:
Brian A. Swisher, County Extension Agent, 4-H, Kansas
James P. Adams, Extension Specialist, 4-H Youth Programs,
Kansas State University

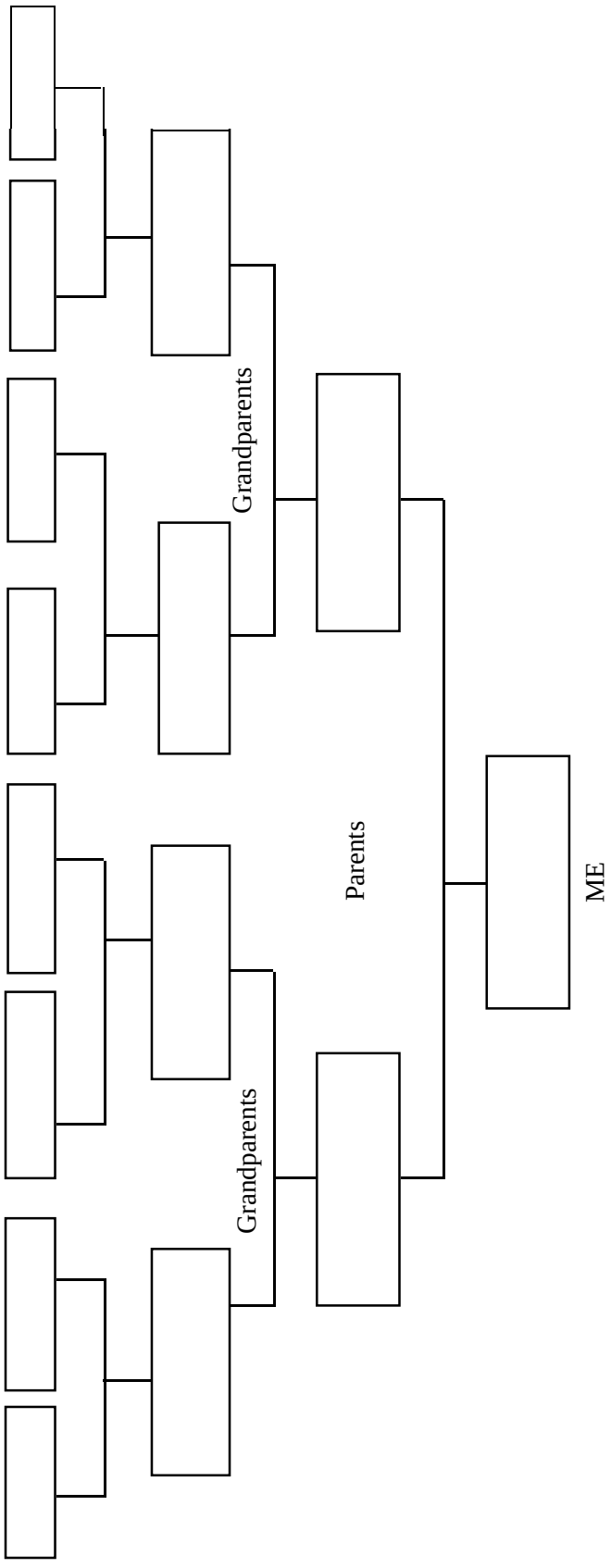
Cooperative Extension Service
Kansas State University
Manhattan

REGISTRATION OF PUREBRED CATTLE

BEEF, LEVEL II

Activity Sheet 13, Your Family Tree

Ask your parents or grandparents to help you fill in names of your ancestors. Your "family tree" is called your geneology.



Anatomy of a Male Bovine Reproductive Tract

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Identify the parts of a male bovine reproductive tract
- Learn how the anatomy is related to its function

ABOUT THEMSELVES:

- The contribution of each part to the success of a whole system

Materials Needed:

- Activity Sheet 14, Male Bovine Reproductive Tract
- Leader's Key, Activity Sheet 14, Male Bovine Reproductive Tract
- One large blank diagram of a male bovine reproductive tract
- Pencils for each member
- Tape
- Small pieces of paper with names of the various parts of the male bovine reproductive tract written on the paper
- Access to a bull would be helpful in order to point out the external anatomy (optional)

ACTIVITY TIME NEEDED: 30 TO 45 MINUTES

ACTIVITY

What is a bull's purpose? Basically, it is to breed cows to have calves! Each organ in a bull's body is specially designed to perform a specific function and the reproductive system is designed to reproduce—or to make calves. As we go along, I'll point out a specific part in the reproductive tract and you can label it on your diagram.

This is the bulls' reproductive tract. It is the same thing that's on your paper.

Some of these labels may be in the wrong place, but we'll start going through them and if they're in the wrong place, we'll change them.

This is the **sheath,** it provides protection for the penis.

This is the **penis,** it is the part of the tract that the bull uses to breed the cow.

This is the **sigmoid flexure.** This muscle keeps the penis inside the bull's body most of the time and allows it to be extended during mating.

Leader Notes

Post an enlarged copy of Activity Sheet 14, Male Bovine Reproductive Tract, on a wall without the names of the parts on it. Give each member a piece of paper with the name of a part on it and have them tape the part onto the diagram in what they believe is the correct location.

Hand out Activity Sheet 14, Male Bovine Reproductive Tract, so that the members can follow along.

Use the large diagram with the papers on it to show the tract.

Leave the papers on the large diagram until you get to the particular part and if it is wrongly identified, remove the paper and set aside and replace it with the correct label.

Leader Notes

Looking at your correctly labeled copy, point to the parts on the large diagram, explain them and allow the members to write them down on their papers.

This is the **retractor penis muscle.** It is responsible for controlling the penis. It pulls the penis back into the bull's body after mating.

This is the **scrotum.** It covers and protects the testicles.

These are the **testicles.** They contain little tubules in which sperm are made. The testicles also contain endocrine cells which produce the male hormone, testosterone. The male hormone testosterone is a chemical produced to signal the body to develop male traits.

This is the **epididymidis.** It is a tube that stores sperm and transports it from the testicles to the penis when a bull is mating.

Those are the important organs in the reproductive tract of the bull. As sperm travels through the tract, it joins with other materials that it needs to live in the cow's body. When it is together with those other materials, it's called semen. One-year-old bulls are usually strong enough and large enough to breed cows, though some may mature earlier. Let's try to correctly identify the parts of the reproductive tract again.

Clear the diagram of all labels and have the members turn over their papers. Have them try again to label the parts of the male bovine reproductive tract. The rest of the group can help.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What male bovine reproductive part was easiest to identify?
2. What was the most difficult male bovine reproductive part to learn? Why?

Process:

3. Trace the route the sperm takes through the bull's reproductive tract from start to finish. Why is knowledge of this route important?
4. What is the purpose of each bull reproductive tract part? List and discuss.
5. How old must a bull be to breed cows?

Generalize:

6. If a bull is infertile (cannot produce normal sperm) what impact or problem would that have on a cow herd?
7. What is the economic impact of an infertile bull?

Apply:

8. How can you select and test bulls to detect infertility and prevent major problems in the future?

REFERENCES:

Author:
This lesson was modified from original material authored by Randy Perry, Extension Assistant, Department of Animal Sciences and Industry, Kansas State University, and Deborah K. Lyons-Blythe, County Extension Agent, Kansas, with adaptation by:
Dr. Guy Kiracofe, Professor of Animal Sciences and Industry,
Kansas State University
James P. Adams, Extension Specialist, 4-H Youth Programs,
Kansas State University

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Kansas State University
Manhattan

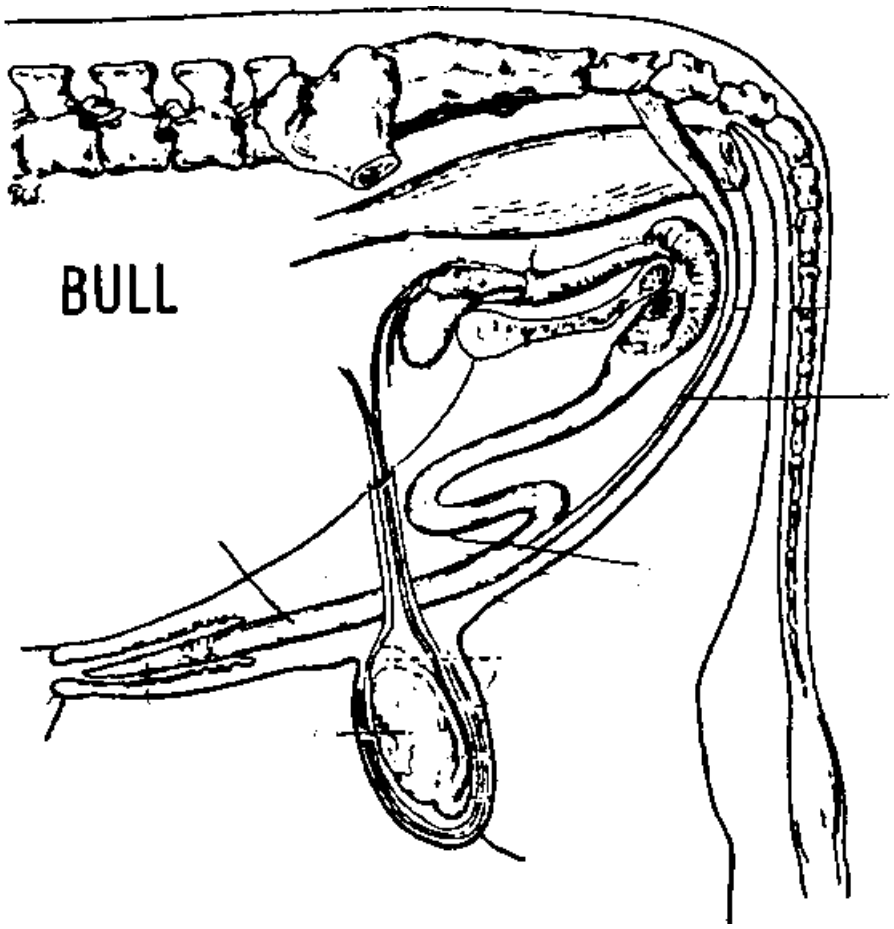
ANATOMY OF A MALE BOVINE REPRODUCTIVE TRACT

BEEF, LEVEL II

Activity Sheet 14, Male Bovine Reproductive Tract

Match listed parts with proper locations.

a = testicle
b = epididymis
c = sheath
d = scrotum
p = penis
q = sigmoid flexure
s = retractor penis muscle



ANATOMY OF A MALE BOVINE REPRODUCTIVE TRACT

BEEF, LEVEL II

Leader's Key, Activity Sheet 14, Male Bovine Reproductive Tract

a = testicle
b = epididymis
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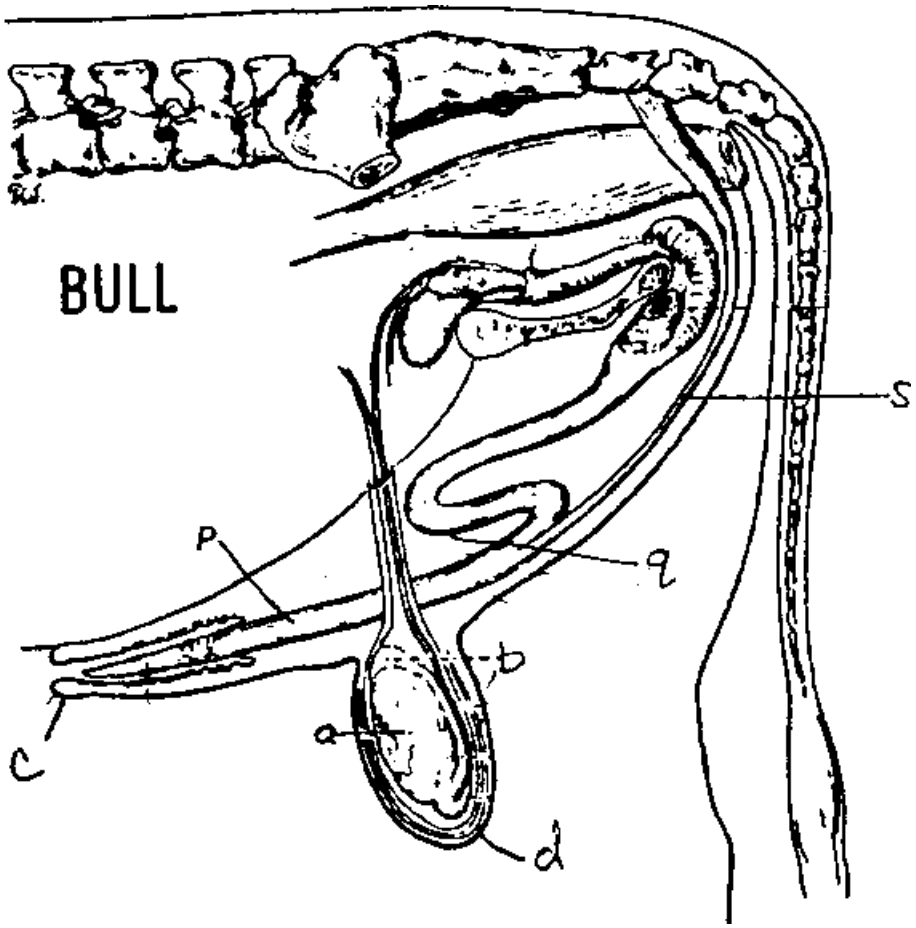

Anatomy of a Female Bovine Reproductive Tract

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Identify the parts of a female bovine reproductive tract
- Learn how the anatomy is related to its function

ABOUT THEMSELVES:

- The contribution of each part to the success of a whole system

Materials Needed:

- If possible, fresh female reproductive organs—may be obtained from slaughter plant
- Activity Sheet 15, Female Bovine Reproductive Tract
- Leader's Key, Female Bovine Reproductive Tract
- One large blank diagram of female bovine reproductive tract
- Pencils for each member
- Tape
- Small pieces of paper with the names of the various parts of the female bovine reproductive tract written on them
- Access to a heifer or cow would be helpful in order to point out the external anatomy (optional)

ACTIVITY TIME NEEDED: 30 TO 45 MINUTES

ACTIVITY

What is a cow's purpose? Basically, it is to have calves! A cow is specially designed to carry a calf. As we go along, I'll point out a specific part and you can label it on your diagram.

These are the different parts of the heifer and cow's reproductive tract. It is the same thing on your paper.

Some of these labels may be in the wrong place, but we'll start going through them and if they're in the wrong place, we'll change them.

This is the **vulva,** it is the external opening to the reproductive tract.

This is the **vagina;** it is the tube that connects the vulva with the uterus.

This is the **cervix.** It provides a barrier that protects the uterus from infection and foreign debris. It also provides a "plug" when the cow is pregnant and is bigger when the cow is ready to mate with a bull.

Leader Notes

Post an enlarged copy of Activity Sheet 15, Female Bovine Reproductive Tract, on a wall without the names of the parts on it. Give each member a piece of paper with the name of a part on it and have them tape the part onto the diagram in what they believe is the correct location.

Hand out Activity Sheet 15, Female Bovine Reproductive Tract, so that the members can follow along.

Use the large diagram with the papers on it to show the tract.

Leave the papers on the large diagram until you get to the particular part and if it is wrongly identified, remove the paper and set it aside and replace it with the correct label.

Leader Notes

Looking at your correctly labeled copy, point to the parts, explain them, and allow the members to write them down on their paper.

This is the **uterus,** where the fetus—or the baby calf—develops during pregnancy. In cattle, the uterus has two horns that curl under. The calf grows in one of the horns and stretches it as it grows. After it is born, the uterus and the horns will go back to nearly normal size.

This is the **broad ligament,** a rough fibrous band of tissue that holds the uterus in place.

This is the **ovary.** The eggs develop here. It is also a source of the female reproductive hormones, estrogen and progesterone. Estrogen is a chemical produced as a signal to the body to develop female traits. At the proper time, the ovary releases the egg and it travels to the oviduct.

This is the **oviduct.** Fertilization takes place here and then the fertilized egg travels down the oviduct to the uterus to develop.

It is a very complex process as the calf develops and these are the important parts of the cow that create, feed, and protect the calf until it is born.

Clear the diagram of all labels and have the members turn over their papers. Have them correctly label the parts of the female bovine reproductive tract. The rest of the group can help.

Heifers may come into heat as early as 5 or 6 months of age, but they are not physically large enough to have a calf and they are still growing. Most producers breed their heifers at about 12 to 15 months of age, sometimes later than that. Thus, the heifer is mature enough to raise a calf nine months later.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What female bovine reproductive tract part was easiest to identify?
2. What was the most difficult female bovine reproductive part to learn? Why?

Process:

3. Trace the route the egg takes from the ovary to fertilization to birth. Why is knowledge of this route important?
4. What is the purpose of each heifer reproductive tract part? List and discuss.
5. At what age are heifers normally bred? Why?

Generalize:

6. What things do you think might affect the ability of cows and heifers to produce normal healthy eggs?
7. What is the economic impact of having heifers or cows that have trouble getting bred or cannot become pregnant?

Apply:

8. How can information in this lesson be useful in preventing future breeding problems?

REFERENCES:

Author:
This lesson was modified from original material authored by Randy Perry, Extension Assistant, Department of Animal Sciences and Industry, Kansas State University and Deborah K. Lyons-Blythe, County Extension Agent, Kansas, with adaptation by:
Dr. Guy Kiracofe, Professor of Animal Sciences and Industry,
Kansas State University
James P. Adams, Extension Specialist, 4-H Programs,
Kansas State University

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Kansas State University
Manhattan

ANATOMY OF A FEMALE BOVINE REPRODUCTIVE TRACT

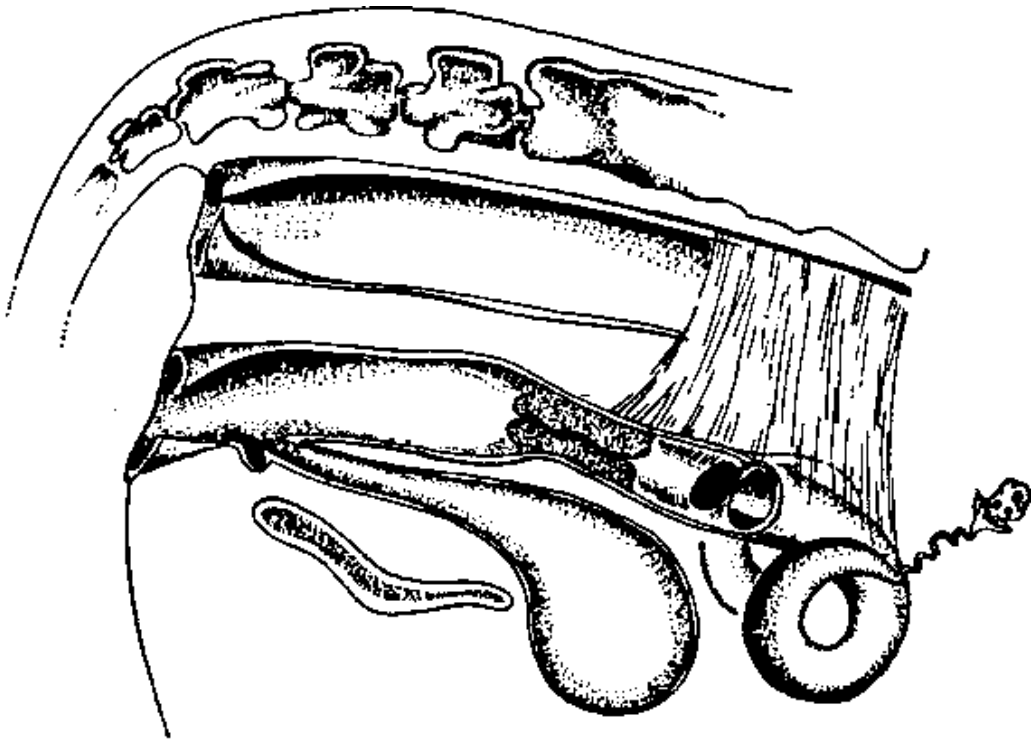
BEEF, LEVEL II

Activity Sheet 15, Female Bovine Reproductive Tract

For Reference and Orientation

v = vulva
va = vagina
c = cervix
u = uterus
o = ovary
f = oviduct
l = broad ligament

p = pelvic bone
r = rectum
vr = vertebrae
b = bladder



ANATOMY OF A FEMALE BOVINE REPRODUCTIVE TRACT

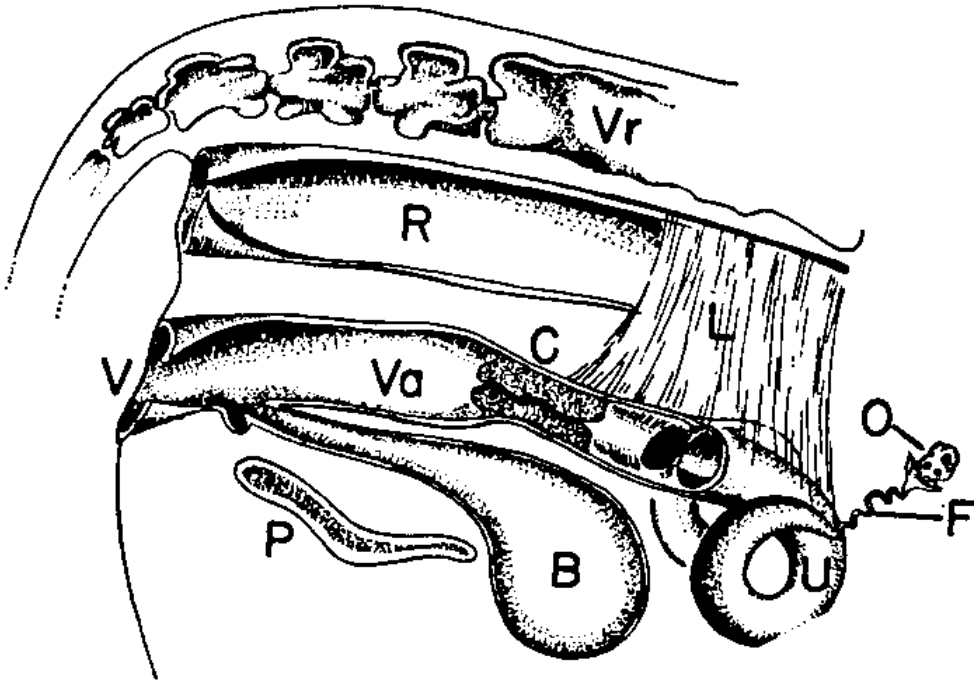
BEEF, LEVEL II

Leader's Key, Female Bovine Reproductive Tract

For Reference and Orientation

v = vulva
va = vagina
c = cervix
u = uterus
o = ovary
f = oviduct
l = broad ligament

p = pelvic bone
r = rectum
vr = vertebrae
b = bladder



Common Cattle Parasites: Lice, Worms and Grubs

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Symptoms of lice, worms and grubs in cattle
- How parasites are spread to other animals
- How to treat or control parasites in beef animals

ABOUT THEMSELVES:

- Importance of parasites
- The significance of each phase of a cycle

Materials Needed:

- Pictures of cattle lice, worms and grubs (from veterinarian or library)
- Pictures of catttle infected with lice, worms or grubs (from veterinarian or library)
- Diagrams of louse and/or grub life cycle (from veterinarian)
- Samples of products used to control lice, worms and grubs
- Flip chart or chalkboard
- Handout 10, Parasite Summary Sheet

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

LICE

Cattle lice are a concern in Kansas, for several reasons. First, the cattle are irritated and they may scratch on fences, posts and other objects and tear up the structures. In addition, lice can cause anemia (loss of blood), loss of hair, weight loss and lower the calf's resistance to diseases. There are two common types of cattle lice: the sucking louse that attaches itself to the skin and sucks blood, and the biting louse that is more active and can be seen moving around if the hair is parted. The biting louse eats the top layer of skin.

Write main points on chalkboard or flip chart for group to use.

Show a picture of the two types of lice.

Lice infestations are worse in the winter and early spring. Lice populations decline in the warmer months. How do you think that lice can affect the health of the animal? First, by sucking the blood, it reduces the animal's ability to ward off diseases. Also, the louse may be a vector of (or transmit) diseases, such as anaplasmosis. Anemia, or loss of blood, may cause abortions and other reproductive problems. In addition, the severe itching and rubbing may cause a secondary bacterial infection

Have the members list various ways anemia can be a health problem. List them on a chalkboard or flip chart in the front of the group.

Show the picture of the life cycle of the louse.

which, if left untreated, may result in severe damage and even death. The adult louse lays eggs on the animal hair which develop into an adult in 3–6 weeks. This is important to remember, because all the eggs do not hatch at the same time. So when treating, several treatments may be necessary as insecticides kill the adults, not the eggs.

Show the pictures of infested cattle, pointing out the areas of infestation.

Lice are spread within a herd by contact. Cattle standing close together may spread the lice. The most common places to find lice on the animal are the head, neck, ear, brisket and the base of the tail. But lice may appear any place on the animal. A heavy infestation may appear like a mud streak especially on the brisket and neck area.

Show examples of control measures. Read some of the labels aloud.

Lice can be controlled by a variety of methods. For example, sprays, dips pour-ons, dusts and back rubbers will control both types of lice. Injections such as Ivermectin will control sucking lice, but not biting lice. Be careful when using these insecticides. Wear protective clothing and read and understand the label before using any control measure. Pay careful attention to a compound that also kills grubs, because if you apply it at the wrong time of the year and kill the grubs, it may also kill the cattle. Always read labels!

WORMS

Show the example of a worm common in cattle.

Worms are a serious problem in Kansas because they are so easily transmitted from cow to cow. If one cow in a herd has worms, it is most likely that the whole herd has worms. Have you ever seen an animal with worms? Have you ever seen an actual worm? Worms are sometimes called the “unseen robbers” because they sometimes go undetected until the animal has a high grade infestation. Worms cause damage in many ways. One is by eating the food that the cow eats so she cannot digest it. Another is by injuring the lining of the intestine so that the cow cannot absorb the nutrients from the food, causing diarrhea. Also, they may cause the blood vessels to open up in the intestine, resulting in blood in the manure.

Have the members list the symptoms they think are associated with “doing poorly.”

Most commonly, we see cattle with a low-grade infestation. The cattle just do poorly and don’t gain like they should. What symptoms do you think you might see?

Some of the symptoms of worms are: weight loss, poor condition and haircoat, diarrhea, may go off feed, coughing or difficulty breathing (especially with lung worms), may see blood in the feces, “bottle jaw” (fluid build-up under the jaw) and low milk production.

If you have a veterinarian near, you could visit and see a sample run.

Those symptoms are common to many illnesses. So, how do we tell that it is worms? The only sure way to tell that our cattle have worms is to have a sample of the manure tested by a veterinarian for the eggs of the worms. You will not see the adult worm in the manure. The only place to see the adult worm is in the body of the animal, usually after it has died.

So, if the adult worm is only in the body of the animal, how are worms spread? Any ideas? Well, the eggs that are in the manure will be deposited in the grass, the ground or in the animal's bedding. After a short time, they hatch into larvae that may be eaten by the animal when it eats the grass or bedding or even drinks the water. The larvae then grow into adult worms. The adults lay eggs that pass out of the animal's body through the manure and the whole cycle starts over again.

Show the picture of the life cycle of the worm.

After worms have been diagnosed in your herd, you must give your cattle a dewormer specifically for the type of worm they have. There are many types of worms and they're not all the same, so a different dewormer must be used for each type. In order to get rid of all the worms, cattle should be dewormed about two to three times a year.

Show different deworming types: boluses, paste, drench, on feed and injectables.

GRUBS

Cattle grub or ox warbles usually appear in Kansas in the late winter or early spring. They make their appearance on the back of cattle and look like marbles under the hide. You can rub your hand over the back of a "grubby" animal and feel the grubs in the tissue. Have you ever seen a grub?

Show the picture of cattle with grubs.

The grub is actually a part of the life cycle of the heel fly. The fly lays its eggs on the lower part of the legs of cattle during warm sunny days of late spring and early summer. After the egg hatches, the larva penetrates the skin and slowly moves up the leg through the tissue just under the skin to the back. This journey takes several months. Once near the skin on the back, the larva makes a hole in the skin to breathe and later it will leave the animal through the same hole. It takes about one year for the life cycle to be completed. The real concern with grubs is that during the fall and early winter the grubs congregate in the calf's body near the throat and the spinal cord. If they are killed by an insecticide at this time, it may cause a severe tissue reaction, possibly killing the animal.

Show the diagram of the life cycle of the grub (heel fly).

When the heel fly is bothering your cattle, the cattle get very excited. They may run wildly and blindly with their tails high in the air. Also, they may look for shade and stand in water holes to escape the heel flies.

Have the members think of ways to control the heel fly.

Grubs cause economic losses by: (1) injuries due to animals running blindly trying to escape the heel fly. (2) Lower value of hide due to the breathing holes of the grub. (3) A severe tissue reaction may result in death if the grubs are killed by an insecticide while they are in the body of cattle. There are some symptoms that you can look for in your cattle. These include difficulty swallowing, drooling, bloat, wobbling gait, stiffness and even paralysis of hind legs.

Give members Handout 10, Parasite Summary Sheet, as a review.

Note: References to brand names are used as an example and do not imply recommendation of particular products.

Leader Notes

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. How can you tell if cattle have lice, worms, or grubs?
2. What was the most interesting aspect of the life cycle of each of these parasites?
3. What ways do you use to control these parasites?

Process:

4. What are the major problems caused by each parasite? Why?
5. Should animals with lice be taken to shows? Why or why not?
6. Why is understanding the life cycle of parasites important to their control or prevention?

Generalize:

7. What types of parasites do you know about in other animals? What is similar or different than the ones studied in this lesson?
8. How else might the word parasites be defined?

Apply:

9. How will your knowledge of parasites be useful in the future?
10. What parasite control measures will you use for improved results?

GOING FUTHER:

1. Ask your veterinarian to demonstrate how to run a fecal sample to identify worm eggs.
2. Have members bring labels from various parasite control products. Read labels for special precautions.
3. Look at a hide from an animal that had grubs.
4. Ask a livestock buyer how much they discount an animal with grubs.
5. View video, *Health of Your Beef Cattle*, from Kansas State University Distribution Center.

REFERENCES:

Managing Insect Problems on Beef Cattle, C-671. Revised by Donald E. Mock, Extension Specialist, Livestock Entomology,
Kansas State University

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COMMON CATTLE PARASITES: LICE, WORMS AND GRUBS

BEEF, LEVEL II

Handout 10, Parasite Summary Sheet

	Worms	Lice	Grubs
Symptoms	Diarrhea blood in urine, feces loss of weight dull hair coat droopy ears poor appetite coughing difficult breathing fluid build-up under jaw low milk production	Scratching or rubbing loss of blood loss of hair weight loss	Back of animal looks like marbles under hide Heel flies cause animal to look for shade or stand in water hole Cattle may run wildly and blindly with tails high in the air Severe symptoms: difficult swallowing drooling bloat wobbling walk stiffness or paralysis of hind legs
How parasite spreads to other animals	Eggs in manure spread to grass or bedding eggs in drinking water	Direct contact with other animals	Heel fly lays eggs on lower legs
Treatment or control measures	Types of dewormers: boluses or pills paste drenches injectables	Sprays, dips, pour-on liquids dusts back rubbers injections (for sucking lice only)	Sprays, dips pour-on liquids injections

Common Cattle Diseases: Ringworm and Warts

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- The basics of ringworm infection and warts in cattle
- How to control ringworm and warts

ABOUT THEMSELVES:

- What it means to have a contagious disease
- Importance of prevention

Materials Needed:

- Picture of calf with ringworm or warts (or live animal)
- Curry comb and brush
- Soapy water
- Tincture of iodine
- Plastic gloves
- Vaccines
- Petroleum jelly
- Castor oil
- Surgical knife
- Cotton balls
- Adhesive bandages
- Tape

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

RINGWORM

Unlike other cattle diseases, ringworm does not affect the performance of cattle, but instead causes unsightly patches on the skin of the animal. In addition, this disease is contagious to humans. Ringworm is a problem on show animals, so it is necessary to treat for this common disease.

Most commonly seen in winter, ringworm is a contagious disease that affects the outer layer of skin. Normally it is seen as round scaly areas nearly devoid of hair on the head, neck and root of the tail of cattle. Ringworm is caused by microscopic molds or fungi and can easily be transmitted to people.

Most ringworm outbreaks are found in areas of the body that are combed. Combs and brushes become the major culprits, picking up the fungus from infected animals and spreading it to the entire show string.

Leader Notes

Show picture of calf infected with ringworm, or show live calf, but be careful that the members are not subjected to infection.

Leader Notes

Show the proper way to treat for ringworm with water, soap and iodine.

Because of the unsightly appearance of the cattle with ringworm, it becomes necessary to treat it. The first step is to remove the scabs on the affected area and clean it well with soap and water. Then thoroughly apply iodine to the area.

Show plastic gloves.

When treating an animal for ringworm, be careful because it is contagious to humans. Use plastic gloves and wash your hands with clean water and soap immediately after treatment.

WARTS

Show pictures of warts or show live animal with warts.

Although they usually don't directly affect performance of cattle, warts do detract from the appearance of show cattle. In severe cases, warts may develop extensive lesions, cause cattle to lose weight and develop secondary bacterial infections.

Warts are skin tumors commonly found on the shoulder, neck or head region of cattle less than two years old. Warts are more often seen in the late winter and early spring. They are thought to be due to the low sterilizing effect of winter sunlight, and lowered natural resistance at this time of the year due to weather stress.

Because they are so contagious, warts can be a real problem on show cattle because they detract from the calf's appearance. If one calf in your show string has warts, you should treat for them soon, before the rest of your show cattle contract warts. There are a few different treatments for warts in cattle. A wart vaccine is usually very effective in removing warts from yearling cattle. Daily application of either castor oil or petroleum jelly will speed up the reabsorption of warts. Warts may also be removed surgically by a veterinarian or someone with experience.

Show materials that can be used for treatment as they are mentioned.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. Have you ever had or been around cattle with ringworm or warts? What did or should you do?
2. What was most difficult to understand about ringworm and warts? Easiest?

Process:

3. What causes ringworm? Warts?
4. How contagious are these two diseases and how do they spread to other animals?
5. When do these diseases occur most? Why?

Generalize:

6. How might these diseases affect other animals?
7. What is the potential for these diseases to affect people? Why?

Apply:

8. How will you act differently the next time you see or discuss ring worm or warts?
9. What can you do differently in the future to prevent these diseases?

GOING FURTHER:

1. Visit a local veterinarian and see how to treat for ringworm and warts.
2. Visit a local feedlot and see and talk about cattle with warts and ringworm. Ask how they treat this problem.
3. Visit a local cattle breeder who actively shows cattle during the winter months, and see how they treat for warts and ringworm.
4. Show video, *Health Care for Club Calves*, Kansas Cooperative Extension Service.
5. Visit a local health care center and see how much of a problem ringworm is in humans and what the treatment is.

REFERENCES:

Kansas Beef Cattle Handbook, Cooperative Extension Service, Kansas State University, Manhattan, Kansas
Beef Cattle, Roscoe R. Snapp and A.L. Neumann, Publisher John Wiley and Sons, Inc., New York
Beef Cattle Science, M.E. Ensminger, The Interstate Printers and Publishers, Inc., Dansville, Illinois

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Making Your Own Adjustable Rope Halter

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- How to make an adjustable rope halter

ABOUT THEMSELVES:

- The value of patience

Materials Needed:

- Ten to 12 feet of nylon or manila 3-strand rope that is ⅜ to ½ inch in diameter
- Some means of whipping the ends of the ropes—a butane torch if nylon rope is used, or wire, friction tape, or hog rings if manila rope is used
- Several sharpened sticks or dowels to help in separating rope strands
- Handout 12, Making a Crown Knot (3 pages)
- Handout 11, Steps to Making an Adjustable Rope Halter

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

For the show ring, you will probably want to have a high-quality show halter to lead your animal around. However, around home, you won't want to use this expensive piece of equipment. A supply of low-cost, easy-to-make adjustable halters is a necessity on farms and ranches where beef cattle are kept.

Ask members to bring a piece of rope to the meeting so that you do not have to purchase it for every child.

Nylon rope is more expensive, but will not shrink if it gets wet.

Adjustable rope halters are used to teach cattle to lead, to routinely handle them in day to day operations, and to restrain them as necessary while you work with them. The halter's low cost allows the beef producer to make extras and to place them around the facilities so that they will be handy when needed.

Ten feet of rope will suffice for a bucket calf halter!

Today, we will learn how you can make your very own adjustable rope halter. You should have brought with you today a length of rope—either 10 or 12 feet depending upon the kind of animal for which you are making this halter.

Show your length of rope.

One end of the rope will need to be permanently "whipped" or finished so that it does not come unravelled. Nylon rope can be burned or dipped, while manila rope must be tied off with wire, string, or friction tape.

Be careful when whipping the ends with heat. It would be a good idea for the leader to do this step for each member.

Leader Notes

Let them help each other when possible, promoting cooperation.

We will temporarily finish the other end of your rope with string or tape. Eventually, we will show you how to tie a crown knot to finish off your halter. Will each of you help one another to temporarily finish off this other end of your rope?

Explain each step, perform it on your rope, then stop to allow members to catch up. Be sure all are ready before going on to the next step.

Mark a point with your hand about 12 to 15 inches from the whipped end of the rope. We will refer to this 12- to 15-inch length of the rope as **the short end.** The remaining length is the long end.

Distribute Handout 11, Steps to Making an Adjustable Rope Halter, for members to use as a guide.

Place the short end to your right, the long end to your left. Grasp the rope at the 12- to 15-inch mark between your thumb and first two fingers of both hands. Separate your right and left hands by about 2 inches. Rotate the rope clockwise with your right hand and counter-clockwise with your left hand. This will open the strands of the rope between your hands (A).

Use your right hand to insert the whipped end of the short end of the rope under this strand opening until the loop formed has an eye opening of about double the rope diameter (B).

Now, position the rope so that the eye loop is in your left hand with the short end pointing toward 3 o'clock and the long end exiting toward 6 o'clock. Grasp the eye loop and the single strand running across the short end of the rope between your left thumb and index finger.

With your right thumb and index finger, grasp the short end of the rope at a point near the eye loop. Twist the eye loop and short end of the rope with your hands until you have isolated two strands between your right thumb and index finger (C).

Use your left hand to insert the long end of the rope from bottom to top under and through these two strands. Pull it completely through until all slack is gone. If done properly, one side of the loop will show three strands lying smoothly side-by-side (D). This is important because they will be positioned against the animal's face.

With the eye loop to your right, grasp the short end of the rope between your left thumb and index finger about 2 inches from the whipped end. Two inches further from the whipped end, grasp it in the same manner with your right hand. Open the strands by twisting clockwise with your right hand and counter-clockwise with your left hand. When the strands are opened wide, push your hands together. This will cause the strands to "buckle" and fold over, forming three loops.

Line these three loops up in order and work them into a sharpened stick that I have given you. (E)

Use your right hand to feed the long end of the rope into the loops, starting at the one closest to the eye loop (F). Remove the stick from one loop at a time as you run the long end of the halter through them.

Run the long end of the rope into and through the eye of the loop. This completes the halter (G).

We will permanently finish the long end of the rope with a crown knot. You should use a crown knot to finish a rope halter because this knot and back splice creates a convenient handle. Do not use a hog ring or other metal piece to finish this end of the rope because it could catch and tear the skin of your hand.

Teaching the crown knot is a separate lesson and can be done at this meeting or at another time. Refer to Handout 12, Making a Crown Knot.

Always place the halter on the animal so that the eye loop is on the left side. Lead your animal from the left side as well. When you pull the halter tight, pressure should be exerted under the calf's nose and **not** behind the ears.

Now, each of you should have an adjustable halter and should be able to demonstrate to someone else how to make a similar halter.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What was the easiest aspect of making a rope halter? The most difficult? Why?
2. How satisfied were you with your halter after it was finished? Why?

Process:

3. What problems did you have while making the halter?
4. Why was it important to assemble the halter in a specific step-by-step process?
5. Why is the halter adjustable?
6. What is the value of making a halter rather than buying one?

Generalize:

7. In what other 4-H activities do you need to follow step-by-step instructions?
8. What did you learn about yourself by doing this activity? (Consider: patience, learning style preference, frustration level, etc.)

Apply:

9. When and where will learning about a step-by-step process be useful to you in the future?
10. What will you do different next time you are asked to make some thing requiring this much effort?

GOING FURTHER:

1. Have members demonstrate how to put a halter on an animal. Pillows work well if models or live animals are not available.
2. Ask members to come to the next meeting ready to demonstrate how to make a rope halter.
3. Encourage members to give a demonstration at their next club meeting or at County 4-H Days on how to make an adjustable rope halter.
4. Demonstrate how to make a crown knot.
5. Take a field trip to a local rope supplier that still sells and cuts rope from parent stock.

REFERENCES:

Handbook of Livestock Management Techniques, R. A. Battaglia and V.B. Mayrose, (Minneapolis, Minnesota, Burgess Publishing Company, 1981)

Author:

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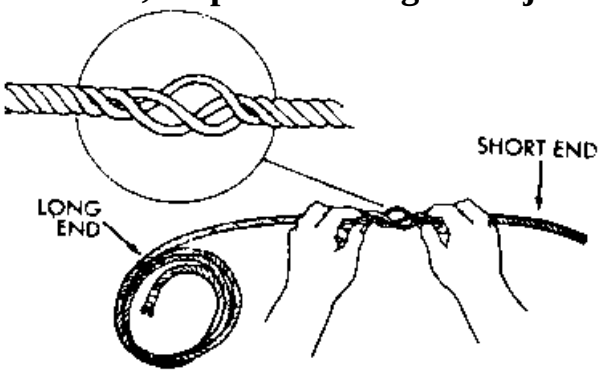
MAKING YOUR OWN ADJUSTABLE ROPE HALTER

BEEF, LEVEL II

Handout 11, Steps to Making an Adjustable Rope Halter

A



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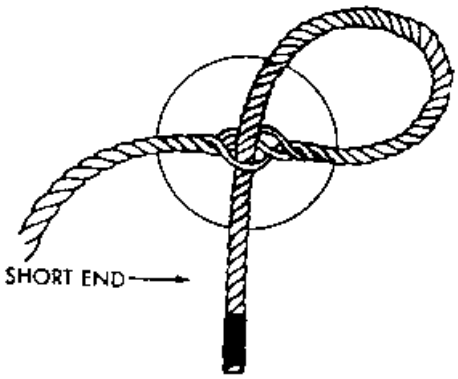

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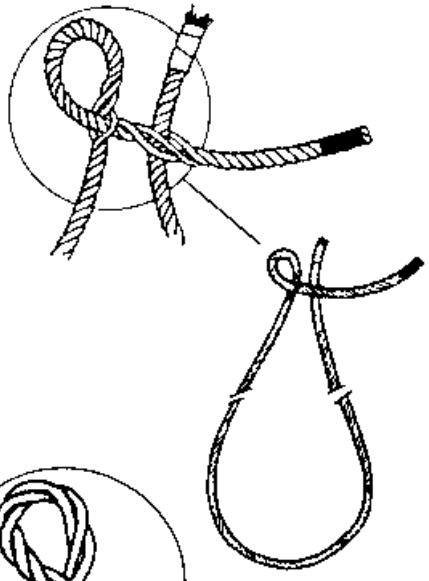

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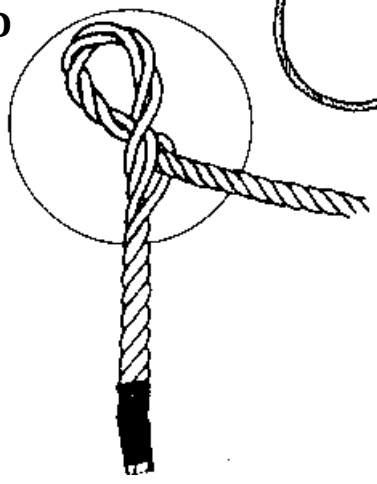

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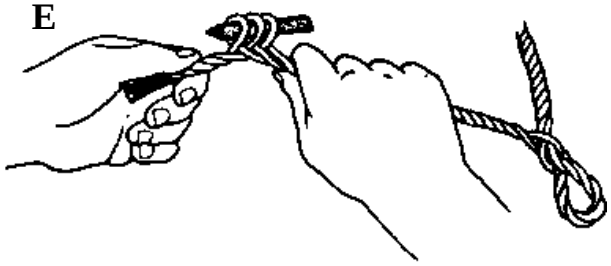

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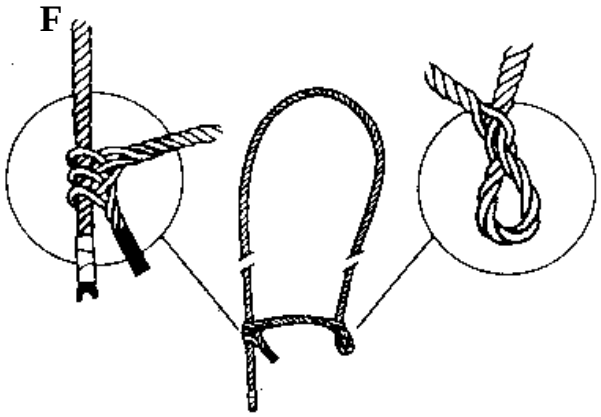

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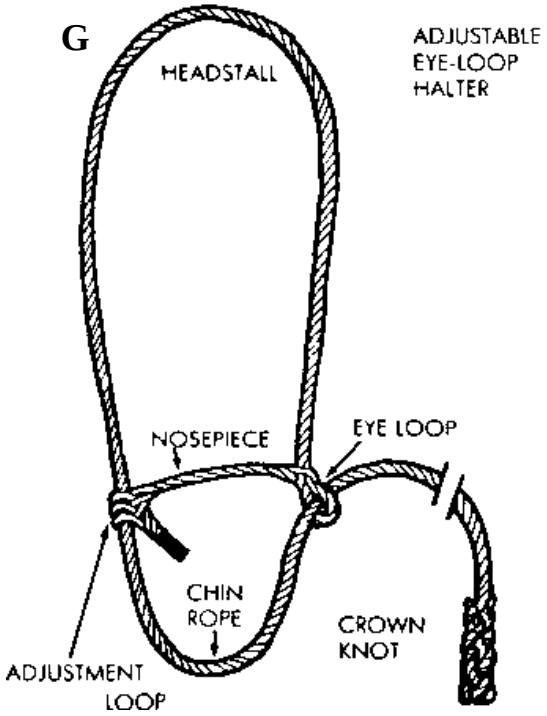


MAKING YOUR OWN ADJUSTABLE ROPE HALTER

BEEF, LEVEL II

Handout 12, Making a Crown Knot

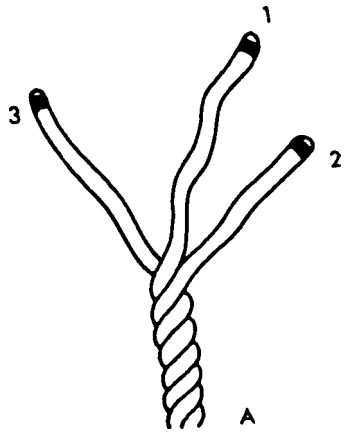
The crown knot produces a bulge that is double the diameter of the parent rope. This bulge provides, a convenient handhold and an alert that the end of the rope has arrived.

Step-by-Step Procedure

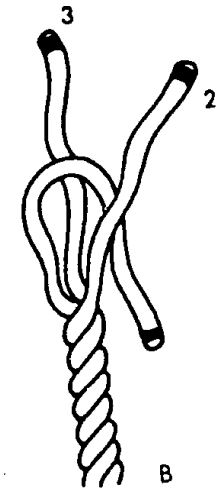
1. Place the working end of the rope to be crowned into your left hand and unwind about 4 inches of it. Before forming the knot and back splicing, the end of each strand of the rope must be "finished" to prevent its unraveling during the splicing. With polypropylene, nylon and dacron ropes, this is most easily done by using heat or flame to fuse the ends together. Cotton, manila, or sisal rope should be wrapped with masking tape.

2. Place your thumb on the front of the rope and your fingers on the rear. Your thumb and index finger should be pinching the rope strands and preventing further unraveling.

3. Arrange the strands so that two of them come across the top of the rope from a lower left to an upper right direction. The third strand appears to come from behind the front two, in a lower right to upper left direction. This arrangement is essential if the crown is to be properly constructed.

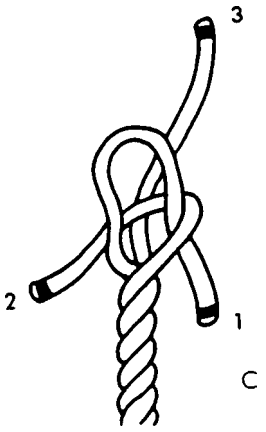


4. With your right hand, take the uppermost of the front strands (strand 1) and bend it over to the right forming a bight. Be certain that the bight goes behind strand 2, the second of the rope strands. Secure the end of strand 1 between the index and middle fingers of your left hand.



5. With your right hand, take strand 2, the remaining strand of the two that orginally came across the "top" of the rope, and bend it around the bight in strand 1 that you are holding in your left hand. The wrap must be taken around the working end of the bight.

6. After making this wrap, place the end of strand 2 between the standing end of the bight in strand 1 and strand 3. Strand 3 is the only strand left untouched at this point.



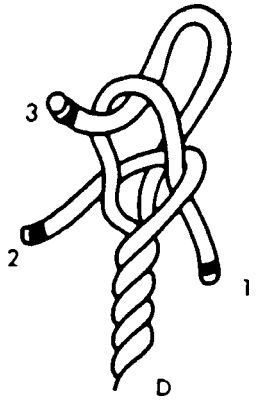
MAKING YOUR OWN ADJUSTABLE ROPE HALTER

BEEF, LEVEL II

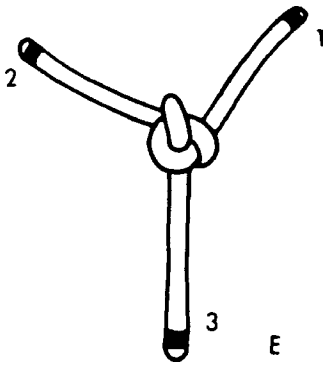
Handout 12, Making a Crown Knot, *continued*

7. Secure the end of strand 2 between the index finger and thumb of your left hand and the rope.

8. With your right hand, take the end of strand 3 and place it under the bight in strand 1 and over all parts of strand 2. Study this arrangement for a moment and you will notice that each strand locks and is in turn locked by another.



9. Release your grip on the strand ends. Start with any of the three strands and tug on it to begin tightening the crown knot. Do not attempt to pull one strand totally tight before beginning another. Take each up alternately, a little at a time, until the crown is tight.



At this point, the crown is complete and the back splicing must be performed to finish the process of "crowning" to prevent unravelling of the rope.

10. Hold the end of the rope with the crown knot in your left hand. Select any of the strands sticking out from the crown and grasp it with your right hand. Notice that it passes under a strand of the crown and then lays on or passes over a strand of the end of the rope being crowned. Study the whole crown and each strand so that you are aware that this "under-over" arrangement is correct for each strand.

11. Select a strand, call it strand 1, sticking out from under the crown knot and begin the backsplicing at that point by placing your right thumb partially under it and at the same time upon the strand that it is passing over or lying upon. Grip the rest of the crown knot with the tips of your index and middle fingers.

12. With your left index finger and thumb, grasp the strand immediately below the one your right thumb is holding. This is the strand directly below the one that the working part of strand 1 passes over.

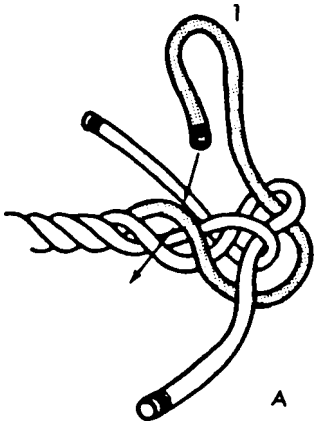
13. With your right hand, twist the crown to the right (clockwise) while twisting the standing end of the rope to the left (counterclockwise) with your left hand. This will open the rope and enable you to isolate the second strand below the point where strand 1 exits from under the crown.

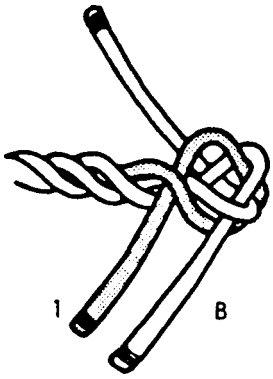
MAKING YOUR OWN ADJUSTABLE ROPE HALTER

BEEF, LEVEL II

Handout 12, Making a Crown Knot, *continued*

14. Keep this strand isolated, and with your right hand place the end of strand 1 under it and pull it through until it is pulling against the crown itself.





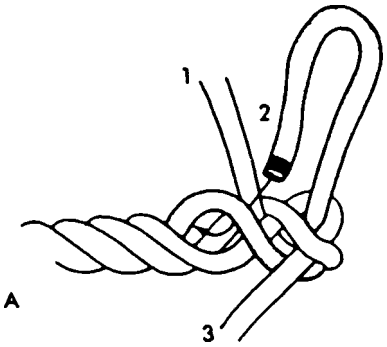
15. Retighten the crown by holding it in your left hand and pulling each crowned strand downward with a clockwise twist.

16. Move to the next strand to be spliced back into the parent rope by twisting the rope approximately one-third turn in either direction until the next strand coming out from under the crown knot is reached. This is strand 2.

17. As with the first over and under, place your right thumb under strand 2 and upon the strand it is passing over. Grip the rest of the crown knot with the tips of your index and middle fingers.

18. Study the crowning at this point and keep in mind the over and under principle. The crowned strand you are now working with, strand 2, is lying upon the strand it will pass over. You must take the strand of the parent rope next in line below this and isolate it between the thumb and index finger of your left hand. This is accomplished by twisting the crown to the right and the standing end of the rope to the left.

19. Keep this strand isolated and with your right hand place the end of strand 2 under it and pull it through until it is pulling against the crown itself.

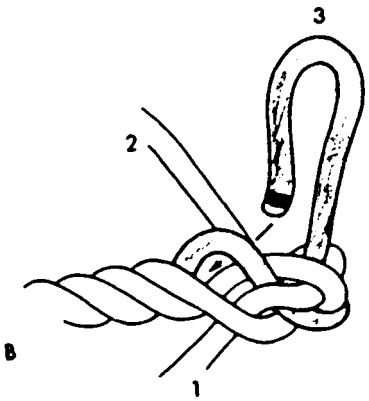


20. Retighten the crown as before by pulling each crowned strand downward with a clockwise twist.

21. There is only one strand, strand 3 remaining, and it too must go through the over and under process. As before, there should be no difficulty in identifying the strand to be passed over, because strand 3 is lying upon it.

22. Grasp the knot in your right hand exactly as you did before for the first and second strands. Now, before you begin twisting. Identify the strand of the standing end of the rope to pass the crowned strand under. Once again, it is the strand immediately below the strand being passed over. Since this is your last strand, the crowning is becoming “crowded” and it is easy to make a mistake. Keep in mind that **only 1 strand is passed over at a time**, that **only the strands of the standing end itself can be the ones**

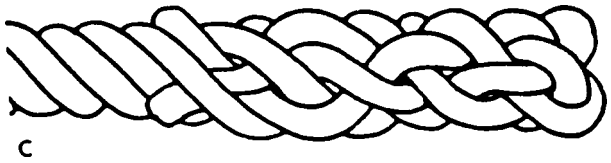
passed over and gone under. With this in mind, grasp the standing end of the rope in your left hand, twist the strands open as before, and insert the last crowned strand.



23. Retighten the crowning as before by pulling each strand downward with a clockwise twist.

24. To continue the crowning or backsplicing, repeat the proceeding steps for as many rounds of splice as you desire. There is no need to repeat the process for more than 3 total rounds (over-under sequences).

25. Finish the crowing or backsplicing with a final retightening and a rolling of the entire crown between the palms of your hands. Cut off the ends of the strand approximately 1/4 inch from the last strand they went under. Taper the ends when cutting so that the crown is less rough on your hands. The crown will not unravel and is now a permament feature of the rope.



Basic Beef Showmanship

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Show a beef animal to its best advantage
- List beef showmanship fundamentals
- Demonstrate proper show ring techniques
- Judge a beef showmanship class

ABOUT THEMSELVES:

- How it feels to win or lose
- Understand that good sportsmanship is as important as good showmanship

Materials Needed:

- Examples of county, regional and/or state livestock show books
- Chalkboard or flip chart, chalk or marker
- Beef animal
- Leather halter
- Show stick
- Scotch comb
- Handout 13, Beef Showmanship Scorecard (2 pages)

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

When preparing to exhibit a beef animal at a show, it is important to consider the show rules. In Kansas, most steers are shown in weight classes and heifers by breed classes. The age of an animal can be determined by looking at their teeth. For some shows, steers with permanent incisor teeth are too old. In addition, validation of exhibitor's ownership dates and the animal's weight and rate of gain requirements are extremely important.

The purpose of showmanship is to present an animal at its best. In some cases, an animal might not place as well as it could in the show ring because it was not shown to look its best in front of a judge.

Good showmanship isn't too difficult, but it takes some patience and effort. The animal must be worked with and trained before show time. The hooves must be trimmed so the animal can stand correctly and the animal must be groomed and fitted. When a beef animal is taken into the show ring, it must be fitted to your satisfaction. The exhibitor should also present a neat, well-groomed appearance. Wear clean clothes appropriate for the occasion. Typical show clothes are neat jeans and shirt. Faded and

Leader Notes

Show examples of county, regional, and major livestock show rule books.

Leader should explain local and major show rules and regulations with special emphasis on ownership and entry deadlines.

Leader or junior leader should bring animal and proper equipment (grooming equipment show stick, halter and scotch comb) and use these to demonstrate.

frayed jeans do not make a neat appearance. Dirty clothes, sneakers, and lack of personal cleanliness also detract from the impression an exhibitor and animal will have on the judge and spectators. Other items for the show ring are a leather halter, a scotch comb and a show stick.

A. APPEARANCE OF CALF

1. Cleanliness
2. Grooming
3. Clipping

Go over Showing Calf section of Handout 13, Beef Showmanship Scorecard.

Have members bring own animals and demonstrate proper showmanship techniques, if possible.

B. SHOWING THE CALF

1. Entering the Ring

Enter the ring promptly when your class is called, so the judge will not be waiting for you. Begin showing as you walk into the ring. Unless you have other instructions, lead your calf clockwise around the circle. This is especially important to remember if you are the first one in the ring. A ring superintendent or judge will usually instruct you where to go with the calf. The ring superintendent may first ask you to line up side by side in a straight line facing away from the judge. Your calf should be well-trained by this time, but if it is likely to kick at people, be sure to tell the ring superintendent when you enter the ring. Tell the judge that your animal might kick when being handled.

Lead your calf into line and set it up as quickly as possible. Leave at least 3 to 4 feet of space between your calf and the next one, unless crowded conditions do not permit. This amount of space enables everyone in the ring to work with their calves much easier. Also, leave at least 5 feet between your calf's head and the edge of the ring. This gives the judge room to move in front of the row of animals. When there is a ringmaster present, follow his/her directions or the judge's directions in locating and moving your calf.

Try to keep yourself in a position to watch your calf and the judge. An alert exhibitor always keeps the animal's legs placed correctly, its head up, and its back level when the judge is nearby.

The judge's purpose in lining up animals head to tail, or side by side, is to get a full picture of the beef animal. The judge wants to make a comparison with others in the ring. If the animal is out of line, and is covering up another animal, the judge cannot make a fair comparison. This is what we call show ring courtesy; courtesy to other exhibitors, the judge, and to your beef animal.

Courtesy and sportsmanship are important in the show ring. Never lead past the front of the other animals, and avoid bumping, crowding or striking another exhibitor's animal. When the animals are lined up, they should be standing in a straight line. Avoid crowding into a line-up if there are other openings available.

2. Parading and Changing Positions
Walk on the left side of the animal with the lead strap in the right hand. (Do not wrap the free end of the lead strap around the hand.) Carry the show stick in a vertical position in the left hand.

Nothing looks worse than to see an exhibitor dragging the lead strap in the dirt with the animal stepping on it. Cut off the lead strap to suit the exhibitor, where the loose end hanging from the hand will only be 6 or 7 inches long. Extra lead strap may be folded neatly and carried in the right hand or it may be held in the left hand with the show stick. The exhibitor should not continually rattle the halter chain.

When leading the calf, give it 18 to 24 inches of lead strap. If you hold it any closer than this, the calf will fight you. If given more than 2 feet of lead, the calf will be hard to control. Your animal should be taught to lead with his head about even with your right hand and shoulder. Hold your calf's head at a natural and attentive level slightly above the height of the wither, or the top of the shoulder. Your hand should be held slightly above the height of the poll. When you lead your calf, walk forward at a brisk pace, not slow.

Exhibitor never leads calf while walking backward.

When the cattle are lined up side-to-side, the judge may want to switch the order.

In moving out of line and moving into another position, there are three general situations which you will encounter. The first of these is when you are pulled in very close to the rail. In this case, you have only one choice. Back your calf out of line and lead it to the new position. The second of these situations is when you are near the center of the line and have plenty of room between your calf's head and the rail. When signaled to move, pull your calf forward toward the rail, circle to the right and move back through the space you just vacated. When you have moved into the center of the ring, you may then move into the position which the judge has indicated. The third situation which you may encounter is that of standing near one end of the line and having ample room between your calf's head and the rail. In this case, when you are signaled to move, simply pull your animal forward toward the rail, circle the end of the line and pull back into the position which the judge has indicated.

When the judge signals the whole line to move, circle in a clockwise direction. Keep your eye on the judge as you are moving in order to stop, and not run up on the calf in front of you. If the calf in front of you stops, tap it gently on the rear until it moves once again. When you stop, set the calf up immediately.

3. Close Inspection
When the judge walks up to inspect your animal, move to the left front of your calf to allow the judge to handle the right side of your animal. Rub the show stick lightly under the stomach as this will tend to quiet your

Go over Posing in Ring section of Handout 13, Beef Showmanship Scorecard.

animal. When the judge moves around in front of the animal, step back to the left side so the judge has a clear front view.

Relax your animal when the judge moves away from you in a big class of calves. Be alert and ready to set up your calf when the judge moves back to your end of the line. If an animal is held in one position for a long period of time, it becomes tired and has a tendency to get unruly.

4. Cooperation with Judge

Go over Cooperation with Judge section of Handout 13, Beef Showmanship Scorecard.

Watch the judge! Obey instructions! The main job for you, as the exhibitor, is to be alert and carry out the instructions of the judge and ring officials. Always keep your eye on the judge and move promptly when signaled.

C. APPEARANCE AND MERITS OF EXHIBITOR

Go over Appearance and Merits of Exhibitor on Handout 13, Beef Showmanship Scorecard.

1. **Appearance**. A properly attired exhibitor should
   a. be neat, clean and well groomed.
   b. wear long, dark-colored jeans or pants.
   c. wear long or short-sleeved dress shirt or blouse any color.
   d. wear hard-soled boots or shoes with closed toes.
   e. carry a grooming comb in a handy pocket for use in the ring.
   f. do not wear commercial advertising on clothing or the equipment in the show ring.

2. **Merits.** A winning exhibitor
   a. brings calf into ring promptly.
   b. recognizes quickly and corrects faults of calf.
   c. responds quickly to judge's and ringmaster's requests.
   d. is not distracted by persons and things outside the ring.
   e. shows calf, not him/herself.
   f. displays a courteous and sportsmanlike attitude.

Remember

When in the show ring, be quiet and deliberate in your movements, and always work with an air of dignity. Do not become excited when you show because the animal can sense this and tends to become excited.

If your calf becomes nervous in the show ring, work quietly with the animal and get it to stand as well as you can. Never lose your temper in the show ring.

Always keep your mind on your work and do not let your animal relax and fall apart. Carry a small brush or comb in your pocket so you can "touch up" your animal when the judge is not inspecting it.

Never stop showing until the judge has made the final decision on the class, given reasons and ribbons have been awarded.

D. JUDGING

When judging a showmanship contest, the following are some of the things that should be observed.

1. Judging should be based on preparation of animals for show, their apparent training, and the appearance and behavior of the participating exhibitor.
2. Body type should not be considered except as it may affect the way that an animal should be fitted and shown.
3. Fine or technical points should not be over-emphasized to the extent that they are given more weight than an effective job of presenting a clean animal, nor should minor infractions result in the disqualification of an exhibitor.
4. Does the exhibitor keep the animal standing with a leg under each corner?
5. Is the head held at a desirable height and is the back straight and level?
6. Does the exhibitor handle the show stick and the lead strap correctly?
7. Does the exhibitor turn and move the animal up or down the line correctly?
8. Is exhibitor able to control the animal, make it obey commands and keep it from crowding or disturbing the other animals?
9. Is the exhibitor neat in his/her appearance.
10. Does the exhibitor observe the judge as well as the animal and have the animal clean and neatly groomed?

SUMMARY

Try your best to have the top beef animal in the show. But if you don't, remember, *good sportsmanship is as important as good showmanship.* After the show is over, congratulate the exhibitors of the champion and reserve. Compliment the judge for a good job. In a showmanship class, ask the judge what you could improve on. Use these tips to become a better showperson.

Have members list fundamental rules of beef showmanship that they have learned or have members practice and demonstrate proper showmanship techniques.

Have members show beef animal and use the Beef Showmanship Scorecard to evaluate members. Give each member their scorecard with scores and comments.

Have members judge others as they show.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What do or did you enjoy the most about showing your calf? The least? Why?
2. What is the most difficult aspect of showing cattle? The least difficult? Why?

Process:

3. What problems do or did you have while showing your calf? Why?
4. Why is being courteous to others important in the show ring?
5. What is the significance of sportsmanship in the show ring?

Generalize:

6. Where and when else is it important to be a good sport?
7. How did you handle the situation the last time you found it hard to be a good sport?

Apply:

8. There will be times when you may feel you have been judged unfairly by a referee at a show or contest. What ways can you react to this situation? Which way of reacting do you think is best? Why?

GOING FURTHER:

1. View educational video, *Showing Beef Cattle*, Kansas Cooperative Extension Service.
2. Attend a local or major livestock show and observe showmanship of exhibitors. List good and bad points observed.
3. Demonstrate proper beef showmanship techniques before 4-H or other group.
4. Conduct beef showmanship clinic and practice with each member bringing their own animal.
5. Participate in local or county beef showmanship contest.
6. Using Beef Showmanship Scorecard, judge a class of beef showpersons.

REFERENCES:

Breed Associations' Publications—See listing of Associations in Beef Breeds Lesson

Author:

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Cooperative Extension Service
Kansas State University
Manhattan

BASIC BEEF SHOWMANSHIP

BEEF, LEVEL II

Handout 13, Beef Showmanship Scorecard

I. Appearance of Calf—40 Points **SCORE**

A. Cleanliness—10 Points _____

1. Hair and switch clean and free of stains.
2. Hide clean and free of dust and dandruff.
3. Legs and feet clean and hooves scraped.
4. Leather halter clean and properly adjusted.

B. Grooming—20 Points _____

1. Hair blocked; appropriately for type of calf.
   Clean, dry haircoat. Coat dressing applied to give the hair a glossy appearance, but not enough used to cause hairs to stick together.
2. Hooves trimmed and shaped enabling animal to walk and stand naturally. Oiled for waxy appearance.
3. Horns (if present) curved, shaped, scraped and polished to give smooth, waxy appearance.
4. Switch brushed out, fluffy and tied up if applicable.

C. Clipping—10 Points

1. Clipping done one week to 10 days before show. _____
2. Head clipped on market calf, leaving a swatch of hair on the poll to be pulled up (for polled cattle). Hair blended from clipped to unclipped part.
3. Head of breeding heifer clipped unless breed custom dictates otherwise.
4. Tail clipped from a point just above the twist upward to the tail head. Tailhead never clipped but long hair trimmed and area from clipped to unclipped parts blended.

II. Showing Calf—40 Points

A. Parading and Changing Positions—10 Points

1. Calf led from left side; lead strap held in the right hand from 1 to 2 feet from the head and at height of calf's head. Extra length held in left hand and left to dangle, without touching the ground. Exhibitor leads calf while walking forward. _____
2. Backward pressure applied with the lead strap to back calf out of line.
3. Calf led in clockwise direction when necessary to parade it or move it to a different position.

BASIC BEEF SHOWMANSHIP

BEEF, LEVEL II

Handout 13, Beef Showmanship Scorecard *(continued)*

B. Posing in Ring—15 Points **SCORE**

1. Calf kept from contact with a competitor or encroachment on space rightfully in possession of another. _____
2. Exhibitor faces calf and holds lead strap in left hand while showing.
3. Calf stands alert with head up, back level and legs placed squarely under the body.
4. Show stick used to place calf's hind feet. Either show stick or exhibitor's foot used to place calf's front feet.
5. Exhibitor keeps whereabouts of judge in mind and calf in position when judge looks at it.
6. Proper to let calf relax and to brush or comb calf when judge is at other end of ring.

C. Cooperation with Judge—15 Points

1. Awareness of judge maintained but not made obvious.
2. Body not permitted to obstruct view of judge. _____
3. Calf maneuvered into improved position for benefit of judge's inspection prior to, but not during inspection.
4. Exhibitor steps aside if judge desires front view inspection.

III. Appearance and Merits of Exhibitor—20 Points

A. Appearance—10 Points

1. Be neat, clean and well groomed.
2. Wear long, dark colored jeans or pants.
3. Wear long or short sleeved dress shirt or blouse any color. _____
4. Wear hard soled boots or shoes with closed toes.
5. Carry a grooming comb in a handy pocket for use in the ring.
6. Does not wear clothing or use equipment in the showring that carries commercial advertising.

B. Merits—10 Points

1. Brings calf into ring promptly.
2. Recognizes quickly and corrects faults of calf.
3. Alert and responsive to judge's and ringmaster's requests. _____
4. Is not distracted by persons and things outside ring.
5. Shows calf, not self.
6. Displays a courteous and sportsmanlike attitude.

Total Beef Showmanship Score _____

Making a Tail for a Show Calf

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Fit a twine tail as if it were a calf's
- Why the tail is fitted for show
- How to make an artificial tail for a calf that has lost its switch

ABOUT THEMSELVES:

- Value of a first impression
- How important is appearance

Materials Needed:

- Tail comb, scotch comb or rice root brush for each group
- Spray adhesive (for tails or hardware) (optional) Spray paint the color of your calf, e.g., black or brown
- Tail ties or pipe cleaners
- Twine tails—one for each group—to make, use natural fiber twine (plastic will *not* work). Tie the ends of 10 to 15 strands and braid together for 3 to 4 inches. Fasten braid with a rubber band or piece of twine leaving about 10 inches loose below the braid. Unravel the twine in the loose strands so that it looks like the hair of a calf's tail.
- Pictures of cattle from the rear showing correctly made tails

ACTIVITY TIME REQUIRED: 30 TO 45 MINUTES

ACTIVITY

All the things we do to fit cattle at cattle shows have a reason. We comb up the leg hair to make the calf look like it has more bone. We comb the hair up on the body to make it look like it has more muscle. But why do you think we rat the tail and tie it up?

The reason we fit a calf's tail is to make it look like it has more muscle. When we rat up the long hair on the tail it makes the muscling in the calf's quarter look fuller. When we tie the tail up higher than it normally hangs, it makes the calf's legs look longer.

Now let's learn how to fit a tail.

STEP 1

Rat the long hair loosely by backcombing with the tail comb, scotch comb or rice root brush to form a large ball of hair. Be sure it is loosely ratted, because once you've used spray adhesive, the ball on the tail can be made smaller but not larger.

Leader Notes

Divide the members into groups of two or three people. Show rear-view pictures of cattle with their tails fitted correctly.

Leader Notes

Hand out a "tail" and equipment to each group. Have one member hold the tail at the top of the braid while another does the action on one step. You may have each of them do one step on the tail or they may confer and have only one person do all the steps for their group.

STEP 2

Bend the artificial tail at the top of the ball you've made and tie the ball to the tail against the body with a tail tie or a pipe cleaner so that the ball is still on the outside of the tail. Glue the knot well with the spray adhesive and hold it until it is nearly dry.

STEP 3

Be sure the tail is fluffed up and **lightly** spray the ball with spray adhesive. Using the open palm of your hand pull the stray hairs toward the bottom of the ball of hair, smoothing the ball into a sort of a cylinder, longer vertically than horizontally, **not** round. Work slowly using small amounts of adhesive. When the tail is the right shape, put a last coat of spray adhesive all over it and hold the tail above the ball until the adhesive is dry so that the calf doesn't switch the tail and tear it out.

STEP 4

Lightly spray the tail with spray paint the same color as your calf. If your calf is Simmental or a similarly colored breed, it is unnecessary to paint the tail and it would be better if you didn't.

SUMMARY

Today, we're pretending that this is a real tail on a calf, but if your calf has lost the switch of his tail where the long hair is, you could use this type of a tail to tie onto your calf's tail. Just be sure that there is nothing in the show rules that prohibits use of fake hair on the tail.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What happened when you fitted your calf's or an artificial tail?
2. Which tail was easiest to fit? most difficult? Why?

Process:

3. What problems occurred when fitting an artificial tail? A real tail? Why? How were they different? Alike?
4. Why do we fit a calf's tail into a cylinder shape?
5. Why do we use fake tails? Why might someone object to this?

Generalize:

6. What other things do we do to fit a calf for show? List and explain why for each?
7. How might these fitting techniques be used in other activities?

Apply:

8. What will you do differently next time? Why?

GOING FURTHER:

1. Attend a cattle show and watch the exhibitors fit their cattle.
2. Use a live calf and let the members fit the tail.
3. Show Kansas Cooperative Extension Service video, *Fitting the Club Calf.*

REFERENCES

Kansas Junior Livestock Show Rulebook
Kansas State Fair Book

Author:

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Cooperative Extension Service
Kansas State University
Manhattan

Care of a Calf at a Cattle Show

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- Fundamentals of reducing stress on the animals while at the show
- How to care for an animal at the county fair or other show

ABOUT THEMSELVES:

- How they react to stress or nervousness
- How they will prepare for selling or disposing of their beef animal

Materials Needed:

- Chalkboard or newsprint with chalk or markers
- Examples (or pictures) of equipment used: straw bales, fans, neck ties, fly repellant, water buckets
- Handout 14, Herdsmanship Scorecard

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

Leader Notes

There is a lot of work to showing your calf. It's not all fun and games and your first priority is to keep your calf comfortable. That means not only providing it with food and water and making a nice stall for it to sleep in, but also keeping it clean and cool. What are some of the ways you can think of to make your calf comfortable?

At a show, cattle get very nervous and controlling their behavior can be a problem. Furthermore, if your animal is to be slaughtered, stress may have an adverse, or damaging, effect on the meat. So remember, reducing stress by making animals comfortable is the number one concern to ensure that they will perform to the best of their abilities. Some ways to reduce stress on your animal are to bring water from home in case the animal won't drink the water at the show grounds; use a radio to soothe it; and talk softly.

Have the members list ways that they can think of to keep their calf comfortable and under the least amount of stress. List them on a large piece of paper, poster or chalkboard at the front of the group. No logical answer is wrong. But some of the more common practices are listed here.

FEED

Keep the cattle on the same feeding schedule that you kept at home. This will greatly reduce the stress of the new environment. At the first feeding, reduce the amount of feed given to approximately two-thirds to three-fourths their normal diet and gradually bring them back to full feed. This will reduce the chances of bloat, commonly a problem at shows.

WATER

Plenty of fresh, clean water should be provided on a regular schedule. Don't leave a water bucket in front of the calf all day—it will only mess

up the stall and it won't drink all of the time anyway. Instead, offer it water two to three times daily, (or more often in hot weather). Do not use "community watering tanks" at the fair. The best method is to have your cattle drink out of your buckets. This reduces the chance of spreading diseases and you can tell exactly how much water your calf is drinking a day. Do not use the 5-gallon straight-sided buckets for your calf to drink, as it cannot get its head into them and will waste the water. Instead, the larger, rimmed water bucket is preferred so that the calf can drink all the water in the bucket.

EXERCISE

Exercise your cattle during the cool part of the day—early morning and evening. The amount of exercise required varies with the condition and muscle tone of your cattle. Be sure to have a good halter on your calf when you're leading it in a strange environment because a calf that is tame at home may get frightened in a strange place. It may be a good idea to have an adult present when you exercise your calf.

ILLNESS

Observe your animals closely for signs of sickness or injuries. Because of the change in environment, animals become more susceptible to digestive ailments and other problems. Watch how much your animal eats and drinks as well as how much it rests. Soon after arrival, check the feet and legs, as injuries can easily occur during transport.

BEDDING

Make your calf a comfortable, clean bed with plenty of straw so that it is not standing or lying on the floor of the barn. Wet the straw down with a hose and then pack the straw into a firm bed with a pitchfork. This will be comfortable to the calf and help keep it cool. Set up fans to blow across the back of your calf and in extremely hot temperatures, wet your calf down periodically during the day

HERDSMANSHIP

Pass out Handout 14, Herdsmanship Scorecard, and discuss each part. Leaders should allow some time to make plans for your club or county display at your county fair or next show.

Each exhibitor has the obligation to the public and other exhibitors to have a clean, safe presentation. Herdsmanship is usually done on a chapter, county, or club basis. Displays are judged each day of the show. Inspections are usually unannounced and unscheduled, but not made while the animals are being shown. Herdsmanship scoring is based on: feeding animals, exhibitor conduct, stall and pen identification, cleanliness of alleys and stalls, appearence of animals, arrangement of exhibits, and educational value. Wild animals should not be brought to the fair. However, certain situations arise that startle and excite animals. Proper restraint should be used to assure safety at all times.

Proper use of neck ties and halters can add to the appearance and safety of an exhibit. The halter should be tied to the left side of the animal's stall and the neck tie to the right side of the stall. This allows the animal to eat, stand and lie down without becoming tangled. The neck tie also adds insurance that an animal does not escape if it should rub off its halter.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What did or will you do to keep your calf comfortable and calm at a show or fair? Why?
2. What is the most difficult aspect of caring for a calf at a show? Why?

Process:

3. What problems occur with calves at shows? List and give a solution for each.
4. What are some ways to reduce stress to a calf at a show? Why is this important?

Generalize:

5. Do you talk to your calf? Why or why not?
6. How do you think you will act when you sell your calf? Is it okay to feel sad? Why or why not?

Apply:

7. How will the techniques learned in this lesson be useful in the future?
8. How can you take good care of an animal, yet not treat it like a pet? (Remind members that they are producing food animals, not pets.)

GOING FURTHER:

1. Talk about stress and its relationship to dark cutter meat.
2. Visit a state or national show to see how cattle shows are used for merchandising livestock.

REFERENCES:

Author:

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CARE OF A CALF AT A CATTLE SHOW
Beef, Level II
Handout 14, Herdsmanship Scorecard

1. Feeding Animals–10 points
   Feed animals as a group.
   Animals taken out for excercise.
   Feed pans not left in stalls.

2. Exhibitor conduct–10 points
   Attitude and conduct in and around barns.
   Be polite and no foul language.
   No tobacco or alcohol in or around barns.

3. Stalls and Pens Identification–15 points
   County and chapter identified.
   Individuals identified.
   Exhibits identified.
   Placings labeled.
   All exhibits use official Exhibitor's Identification Card

.

4. Cleanliness of Alleys and Stalls–20 points
   Clean, bright bedding.
   Members do the work; all members share in cleaning.
   Animals removed from stalls to ensure bedding cleaned thoroughly.
   Stalls free of manure or objectionable odor.

5. Appearence of Animals–20 points
   Clean animals in stalls.
   No adhesive, etc., left in hair of the animals.
   No straw and/or manure, etc., adhering to the animals.
   Animals properly tied and use of neck ropes to prevent runaways.

6. Arrangement of Exhibits and Educational Value–25 points
   Educational information for general public as it relates to species being displayed.
   Keep to a minimum–not too extravagant.
   Be practical with arrrangement.
   Be neat and balanced.
   (Ex. If one person displays ribbons, all members should.)

Your Beef Animal is More Than Just Steak

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- What happens to the other parts of a beef animal that are not used for meat
- Industries dependent on beef by-products
- At least five important beef by-products

ABOUT THEMSELVES:

- Importance of by-products in their life
- Value of solid-waste reduction

Materials Needed:

- Chalkboard or flip chart
- Chalk or large felt tip markers
- Activity Sheet 16, Cattle City
- Handout 15, Beef Animal By-Products
- Examples of beef by-products
- Leader's Key, Activity Sheet 16, Cattle City

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

When beef animals are sold for meat, we often hear the term "yield" used to describe that portion of the animal that is used for meat. Beef by-products are the useful parts of the animal that are not used for meat. Beef by-products make up 16 to 20 percent of the beef animal's weight when it is alive. This percentage is divided into edible and inedible products. Edible products are the liver, brains, sweetbreads, tongue, calf fries and ox tail. Inedible products are the hide, glands, grease, blood, horns, hooves and bones.

Long ago, when people hunted wild animals for meat, they learned very early that other parts of the animals could supply a number of important products for their lifestyle. Hides were used for clothing, the bones for tools or weapons, and the various organs were used for a number of items to make their lives easier. And so the by-product's industry of the meat packing business got its start.

Until 1882, a lot of meat animal material was wasted. It was buried in trenches or dumped into rivers or streams. Getting rid of animal by-products was a nuisance. Eventually, the meat packing industry developed a system of using every part of the animal. Some experimental laboratories were established, and bacteriologists, chemists, and other scientists were employed to find new uses and markets for by-products.

Leader Notes

Begin your meeting by challenging your members to think about what becomes of the animal after it is sold for meat. After asking this question, you will want to list some of the group's responses on the chalkboard or flip chart.

Or begin by displaying a variety of products derived from beef by-products. Have the members speculate about why you have gathered these objects and what they have in common.

Leader Notes

Today, scientists and chemists feel they have only scratched the surface in the development of useful things from the meat animal other than food. If it were not for being able to use waste materials, the price of meat would be much higher.

Since the early days when prehistoric peoples learned how to make use of nearly all parts of the animal, we have expanded the by-products industry to one that provides many useful products for modern life.

You may need to prod your members a little bit here. Encourage them to think about what kinds of things we depend upon the beef industry to provide.

What are some examples of beef by-products that you can think of that we obtain from animals other than the meat?

List any examples they come up with on the chalkboard or flip chart.

(Examples are leather—for shoes, belts, clothing; hair—for brushes; blood—for shoe polish and stock feeds.

The value of a hide has climbed from $20 per head in the 1960s to over $80 per head in recent years. In 1988, by-product value accounted for 12.3 percent of the total price received for slaughter cattle. The hide alone was worth approximately 8.5 percent of each animal's value. This means if the animal was worth only $100, the by-products would have been worth $12.30. The hide would have been worth $8.50 of that.

The value of by-products is determined by many things, including how many cattle are slaughtered, how much demand there is for hides, and market levels for beef.

Now, let's consider an example of how by-products play an important role in beef production.The profits of meat packers today depend almost entirely on the value of the by-products. The carcass of an animal will bring the packers only about what they paid for it. Therefore, the profit comes from whatever they sell the by-products for. By-products definitely do make a difference.

Pass out Handout 15, Beef Animal By-Products. Go through each item to help member understand what we gain from our beef animals. The major point to emphasize here is that cattle are not all steaks.

Here is a handout of some of the major by-products that we obtain from our beef animals. Let's look at each of these for a few minutes. As I go through them, be sure to ask any questions that you may have about these items.

As you can see, cattle are not all steak. Hopefully, you have been enlightened to the all-around value of this animal to the health and well-being of the world! Without these products, the cost of beef would be much higher.

Hand out Activity Sheet 16, Cattle City, to take home or do at the meeting.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. How many beef by-products did you know before this lesson?
2. What new by-products did you learn about?

3. Which by-product did you find most interesting? Why?
4. What beef by-products do you use? Why?

Process:

5. Why are beef by-products important to the beef industry?
6. How would non-meat portions of a beef carcass be disposed of if it were not used in by-products? How would this impact the environment?

Generalize:

7. What did you learn about how important beef by-products are to your life?

Apply:

8. How will you act differently in the future as a result of this lesson?
9. How will the knowledge of the by-product industry be useful to you in the future?

GOING FURTHER:

1. Search and list products at various stores containing animal by-products.
2. Invite someone to visit your group to talk about animal welfare versus animal rights.

REFERENCES:

Author:

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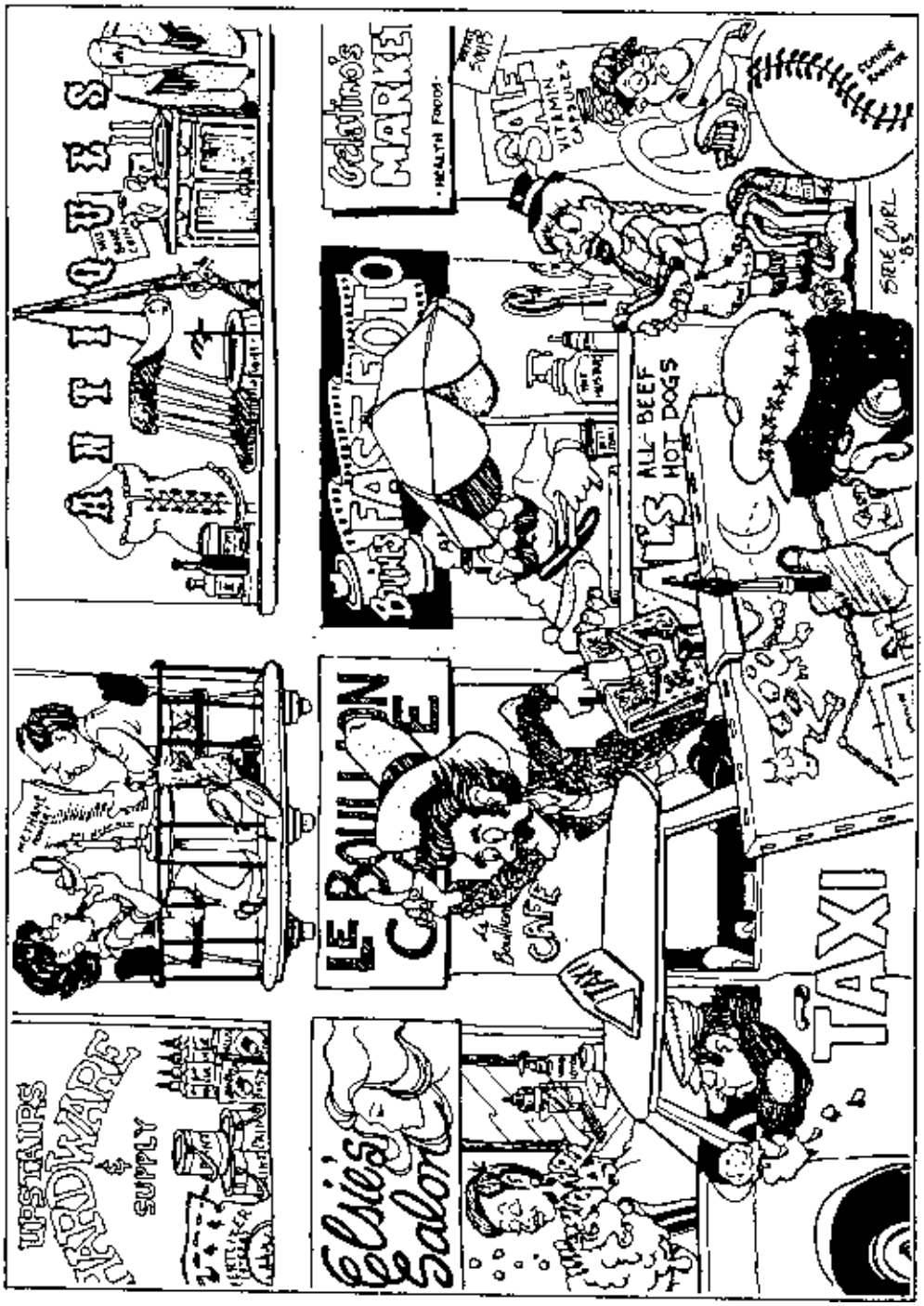
YOUR BEEF ANIMAL IS MORE THAN JUST STEAK

BEEF, LEVEL II

Activity Sheet 16, Cattle City



Circle each item in "Cattle City" that is, or represents, a cattle product. You receive one point for each item incorrectly circled.

YOUR BEEF ANIMAL IS MORE THAN JUST STEAK

BEEF, LEVEL II

Handout 15, Beef Animal By-Products

If 54 percent of the live weight of cattle is beef, what happens to the other 46 percent? Here are some of the important products manufactured from our market beef animals:

Bone—for bone china, crochet needles, dice, teething rings, glue, case hardening steel, refining sugar, bone meal, gelatin, feed and fertilizer.

Horn and bone—buttons and carving-set handles.

Hides—the most valuable of all by-products. Hides provide leather, fats and oils, and valuable chemicals for use in a variety of products. There are three kinds of leather: latigo, suede, and tooling. Leather is used for clothes, baseball mitts, purses, belts and shoes, and for covering furniture.

Rennet—is the lining extract obtained from the membrane lining the fourth stomach of a calf. This is added to an infant's diet to aid in milk digestion. Rennet is also used to curdle milk—an important process in cheese-making.

Gelatin—is a nearly transparent substance obtained by boiling animal tissue in water. Used for making marshmallows, photographic film, cigarette paper and printers' rollers.

Stearin—for making chewing gum and candies.

Glycerin—for making explosives, cosmetics, and medicines.

Hair—for artist's brushes (often called camel's hair, it comes from the hair in the inner ear of cattle). Also used as a binder in asphalt paving, binders in plaster, felt upholstery, insulation material, textiles, and regular paint brushes.

Bone charcoal—for high-grade steel such as ball bearings. It is also used in refining sugar.

Special glues—for marine plywood, paper matches, window shades and china.

Chemicals—for detergents, pesticides, flotation agents and plasticizer. Also, the foam for use at airport runways, industrial oils, drum heads, lubrication, for tires, to keep them running cool.

Fats—are the next in value to hides. Products rendered from fats are used in the manufacture of margarine, soaps, animal feeds, lubricants, leather dressings and preservatives, candles, fertilizer, tallow for tanning leathers and even antifreeze, paint, cosmetics and explosives..

Blood—is used in making blood sausage, stock feeds, shoe polish, fire retardant chemical, and blood from an unborn calf is used in cancer research.

Glands—are used in the manufacture of numerous pharmaceutical preparations, such as insulin, vitamins, thyroid tablets, hormones, and bone marrow concentrates used in the treatment of various blood disorders. It takes pancreas glands from 60,000 cattle to make one pound of pure dry insulin, or 1,500 pancreas glands to make one precious ounce of insulin. There are **no** synthetics for insulin; therefore, the pancreas gland is the only source. Without insulin, diabetics could not survive.

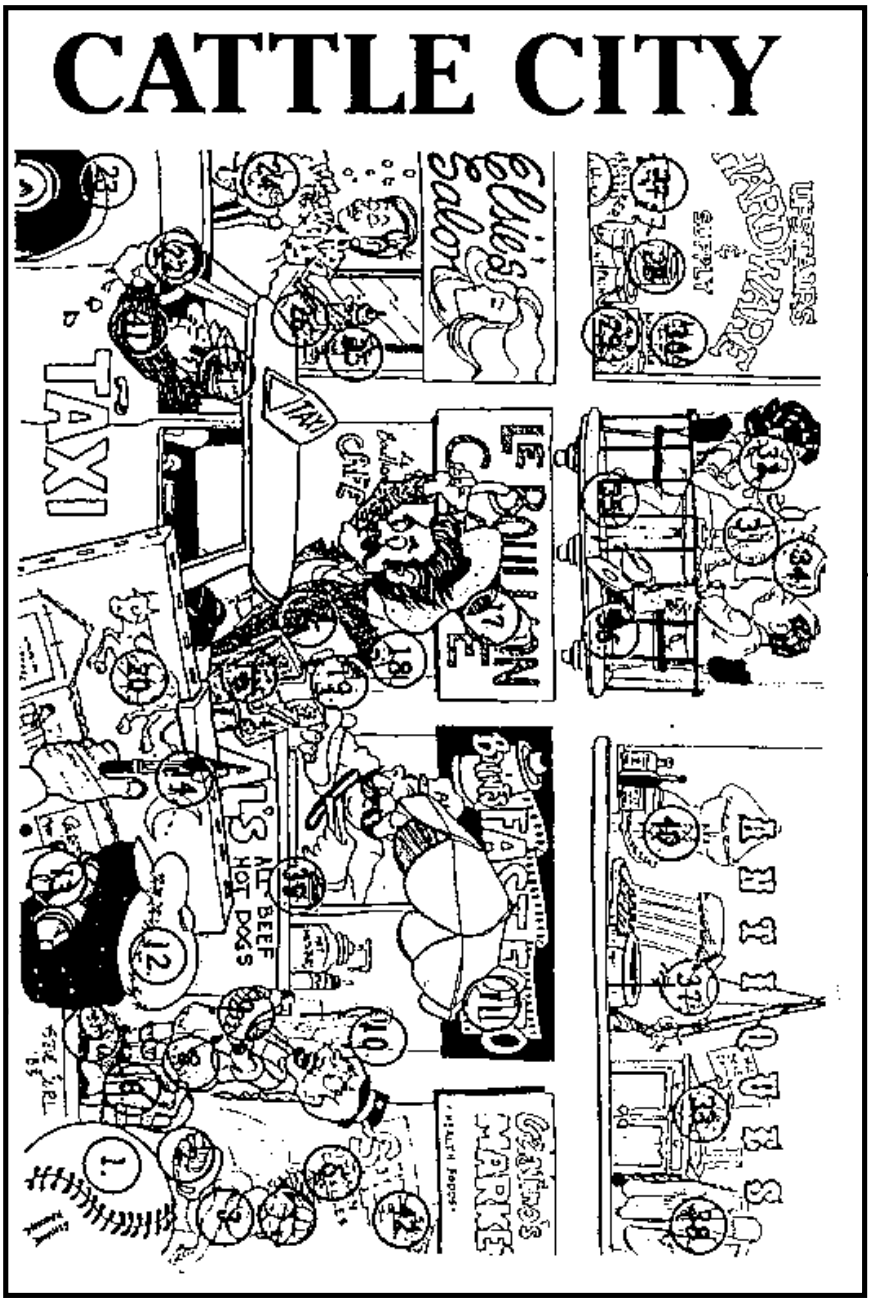
YOUR BEEF ANIMAL IS MORE THAN JUST STEAK

BEEF, LEVEL II

Leader's Key, Activity Sheet 16, Cattle City

Cattle City Answers

1. rawhide softball
2. baseball glove
3. chewing gum
4. felt cap (baseball player)
5. vitamin capsules
6. leather backpack
7. leather boots
8. leather bota
9. beef hot dogs (2)
10. movie film
11. photographic film
12. leather cap (artist)
13. crayon
14. camel's hair brush (really cattle hair)
15. eyeglass case
16. tooled leather briefcase
17. stetson
18. sleeve patches
19. watchbands
20. cow over the moon
21. leather cap (on cabbie)
22. ice cream
23. tires
24. shampoo
25. hand lotion
26. soap
27. fertilizer
28. paint
29. wallpaper paste
30. glue
31. candle
32. lipstick
33. bone china
34. methane (can be made from manure)
35. shoes
36. shoes
37. powder horn
38. leather jacket
39. jerky
40. bone stays
41. leather patch (cab driver)
42. oxtail soup



Making Your Own Beef Jerky

Beef, Level II

What Members Will Learn . . .

ABOUT THE PROJECT:

- How to make beef jerky
- Understand why "jerked" beef stays well-preserved

ABOUT THEMSELVES:

- The value and purpose of preserving various foods
- Other items that one treats or prepares to keep for long periods

Materials Needed:

- Thinly sliced pieces of beef (sirloin, top round, brisket)
- Copy of marinade recipe for each member (recipe in lesson)
- Plastic ziplock-style bags for each member
- Oven
- Bowls and pans
- Beef jerky you have made ahead of time for sampling

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

"Jerked" meat has been popular for several centuries. Although the origin of the name is not clear, "jerked" or sun-dried meat was an important staple for mountain men, hunters, and other travellers. Dried meat would not rot and provided a nutritious and flavorful alternative to normally bland diets.

It is believed that American Indians first showed white trappers how to "jerk" venison and other wild game meats. Before the development of refrigeration techniques or canning, salting and drying meat was a common method of preserving meat for travel into remote areas.

Today, beef jerky is quite popular as a snack food and comes in a variety of styles and flavors. Many brands of so-called "jerky," however, are simply reconstituted meat parts shaped into strips or chunks and then dried. Real "jerked" beef is less common and normally more expensive than the imitation types of beef jerky.

However, you can easily make your own beef jerky at home at a reasonable cost and without much trouble. In fact, much of the "jerking" can be done in an oven during the night while you sleep. When you wake up in the morning, your beef jerky will be ready to enjoy or store for later use.

Leader Notes

Note: Much of the actual curing will probably need to be done at home by the members. However, you can get the meat prepared for them at this meeting and show each of the steps in the process of "jerking" beef.

Leader Notes

As the leader, you should have some thinly sliced pieces of beef already prepared for your group.

Before making your own jerky, you will want to ask someone else to cut the meat into thin slices for you. Cutting meat thinly requires a very sharp knife and you could easily cut yourself. It will be helpful to remember that slicing meat works best if it is partially frozen.

As you get more experienced at making your own beef jerky, you may want to experiment with your own marinade recipe. It will always be important, though, to dry the meat thoroughly so that it won't spoil from too much moisture left in the meat.

Allow members to work together to combine these ingredients and make the marinade. Or, you should probably put this recipe on index cards and give to each member.

After preparing the thin slices of meat that will be your beef jerky, they must be marinaded for about a day in a flavorful liquid. Here's a popular recipe:

Explain the abbreviations and show the measuring instruments needed.

½ tsp. seasoned salt
½ tsp. garlic powder
½ tsp. pepper
1 tsp. salt
⅛ tsp. cayenne pepper
1 tsp. onion powder
¼ c. soy sauce
⅓ c. Worcestershire sauce
2 Tbsp. liquid smoke

Mix all these ingredients together. Place marinade and thinly sliced strips of meat in a covered bowl or container and put in the refrigerator. Let soak for 24 hours (or at least overnight.)

I have already mixed some of the marinade for you. We'll pour some in each ziplock bag for you to take home with your meat slices after today's meeting.

Once the meat has been soaked in the marinade for 12–24 hours, remove the strips of meat and place on a rack in a shallow pan (an old cookie rack works nicely) in an oven preheated to 150°–200°F. A broiler pan works well, too. It is important to elevate the meat so the marinade and meat juices can drip away from the meat for proper drying. A toaster oven works extremely well for drying a small amount of meat overnight.

You will need to let the meat dry in the oven overnight (8–12 hours) until it is dry and chewy. Let the jerky cool, and then place in a dry ziplock bag. Now you've got your own beef jerky—ready to enjoy.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What happened when you made beef jerky?
2. How well did it taste compared to what you purchase?
3. What was the most difficult part of making jerky? The easiest? Why?

Process:

4. What is the significance of drying or dehydrating food for preservation?
5. How are price and nutritional value affected by drying?

Generalize:

6. What other dehydrated foods do we eat? When? Where?
7. What other things do you preserve or alter to keep for long periods of time? (Consider pictures, laminating, video and audio tapes, scrapbooks, etc.)

Apply:

8. How will the issues raised by this lesson be useful in the future?
9. How might your reaction to preserving things be different as a result of this lesson?

GOING FURTHER:

1. Try to dry other types of meats. How do they compare to beef jerky?
2. How does the thickness of the beef strips affect the final product?
3. Why is salt often used as a preservative?
4. Try other dehydrated foods

REFERENCES:

Author:

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Kansas 4-H Beef Leader Notebook

Level III

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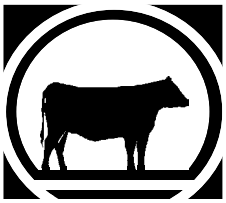

4-H Beef Cattle Project Financing

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- Methods of financing a beef project
- Identify and locate local sources of funding 4-H projects
- To understand financial statements used in obtaining loans
- The investment and costs of interest for the project

ABOUT THEMSELVES:

- Their resources for investment
- Financial decision making

Materials Needed:

- Paper for preparation of projected income statement (profit and loss statement)
- Pencils
- Activity Sheet 1, Net Worth Statement
- Activity Sheet 2, Projected Income Statement
- Handout 1, Example Income Statement
- Handout 2, Projected Cash Flow Income
- Handout 3, Projected Cash Flow Expenses
- Handout 4, Projected Cash Flow Summary

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Leader Notes

Finding sources for funds to finance 4-H beef cattle projects can be challenging. The amount of money needed to buy the animals, feed, supplies and equipment is substantial. In many family situations, borrowing the operating funds can be a good incentive for keeping better records and learning more about financial management.

After deciding on the type and number of animals for the project, it is necessary to estimate the total amount of money that will be needed. This information is important whether funds will be borrowed or not.

Methods of Financing Projects:

1. Savings or earnings of member.
2. Parents or other family members finance projects, not charging interest until the project is completed.
3. Members borrow money from banks, savings and loan commercial lending businesses, or interested individuals.

4. In some cases feed stores extend credit for the duration of the project and feed and supplies only have to be paid for after the project is sold.

Pass out Activity Sheet 1, Net Worth Statement.

Pass out Activity Sheet 2, Projected Income Statement, or plain paper, and have members complete a projected income statement or have total group prepare a projected income statement by writing information on chalkboard, newsprint, posterboard, etc.

Use Handout 1, Projected Income Statement, or fill in with own figures. Preparing projected income statements becomes easier after several years' experience.

Pass out Cash Flow Statements:
Handout 2, Projected Income
Handout 3, Projected Expenses
Handout 4, Projected Summary

Have members name local or area institutions that lend money.

Have members make a list of possible sources of funds for their project.

FINANCIAL STATEMENTS USEFUL IN OBTAINING LOANS

1. **Net Worth Statement—**This statement lists things you own (assets) and amounts you owe (liabilities). The difference is your net worth (owner equity). Usually it is easier to get a loan when you have at least some net worth.

Many parents co-sign loans because beginning members many times do not have enough assets. (Sometimes parents have to present net worth statements).

2. **Projected Income Statement—**This is sometimes called a profit and loss statement. This statement shows all projected expenses and income. The difference in income and expense figures show the money made or lost on the project for the year.

Income—Sales of animals, cash premiums won and other money earned with the project.

Expenses—All purchases of feed, supplies, entry fees, health care and interest on borrowed funds.

3. **Cash Flow Statement—**The purpose of this statement is to estimate the cash situation for the year. It tells how much cash is needed and what months will have either a surplus or deficit. This information helps the lendor to determine how much credit to extend and when to expect repayment.

Without the statements mentioned above, lendors will be unable to make good business judgments and may turn down a loan application. Learning how to prepare and use the financial statements provides the member with invaluable training in money management techniques.

PLACES THAT LEND MONEY

Commercial banks, credit bureaus, production credit associations and individuals are potential sources for loans. The key to obtaining a loan is to show them a well-planned project, a detailed estimate of cash-flow requirements, have a plan for repayment, and be honest and accurate.

COST OF BORROWING

The major expense in borrowing money is the interest. Interest is what lenders charge for the use of their money. Interest rates are influenced by the amount of funds available for lending. They also vary according to the amount of risk. If a lender has reason to think there will be some problems with a loan, the interest rate will increase. This may be viewed as a form of insurance premium. Most lenders prefer safe loans that will benefit the borrower (cheaper interest rates) as well.

Leader Notes

Most 4-H project loans use simple interest calculations. This is the least expensive method of calculating interest. When the loan is made, the member receives all of the money borrowed. At the end of the loan period, the full amount of the principal and interest are paid.

The formula for simple interest:

Interest = Principal × Rate × Time

(I = P × R × T)

The time and method of repayment of the principal is determined at the time the loan is made. Most loans are secured by a promissory note executed by the borrower. In the case of 4-H members, often the lender will require a co-signer. The assets of the borrower are pledged as security. These assets will be assigned to the lender if the loan is not repaid. Loans can be renewed if repayment cannot be made as originally planned. It is the borrower's duty to keep the lender informed of the financial standing of the project.

SUMMARY

Learning how to finance a project can be as educational as learning how to care for animals. Money management is a process that can be used throughout life.

Regardless of how 4-H beef projects are financed, some profit should be the goal.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. Were you satisfied with your net worth? Why or why not?
2. What lending agencies are available to you?

Process:

3. What problems did you have in projecting your cash flow?
4. What are your assets that you can use as security for a loan? If you have no assets, what are your alternatives?

Generalize:

5. What did you learn about money management through this activity?
6. Why is honesty important when using financial statements and projections?

Apply:

7. Ask a bank or lending agency to review your financial statements. In which area of financial review might you need further help?
8. How will these projected cash flow statements help you borrow for future purchases?

Let the 4-H'ers figure interest on a few problems. Work them together.

Write formula for group to see. Give group interest problems: "A member borrowed $1,500 for one year at 10 percent interest. How much will the 4-H member have to pay the bank at the end of one year?"

"A member borrowed $1,200 for 12 months at 15 percent interest. How much will the member have to pay the bank at the end of one year?"

GOING FURTHER:

1. Tour a bank or lending agency.
2. Prepare projected income statement for personal beef cattle project.
3. Keep financial records on your project to determine profit or loss.
4. Present an illustrated talk on How to Prepare a Projected Income Statement.

REFERENCES:

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4-H BEEF CATTLE FINANCING

BEEF, LEVEL III

Activity Sheet 1, Net Worth Statement (Balance Sheet)

LIST YOUR ASSETS

CURRENT

Cash on hand	$ _____		
Cash in checking account	_____		
Saving accounts	_____		
Cash value of insurance	_____		
Accounts receivable	_____		

INTERMEDIATE

Stocks	$ _____		
Bonds	_____		
Livestock	_____		
Feed on hand	_____		

FIXED

Real Estate	$ _____		
Equipment	_____		
Vehicles	_____		

TOTAL ASSETS	$ _____	$ _____	(A)

LIST YOUR LIABILITIES

Bank debt	$ _____		
Debts to individuals	_____		
Accounts payable	_____		
Charge accounts	_____		

TOTAL LIABILITIES	$ _____	$ _____	(B)

NET WORTH		$ _____	(A - B)

4-H BEEF CATTLE PROJECT FINANCING

BEEF, LEVEL III

Activity Sheet 2, (Projected) Income Statement

Name _____ For 12 months ending _____ , 19 ___

REVENUE

LIVESTOCK:				
Cash Sales	$ _____			
Inventory change	(+/-) _____	$ _____		
PRIZES AND AWARDS:				
Cash	_____			
Certificates	_____	_____		
OTHER INCOME:				
Cash Sales	_____	_____		
ACCOUNTS RECEIVABLE (adjusted)	_____	_____		
VALUE OF PROJECT PRODUCTION (INCOME)			(+/-) $ _____	(A)

EXPENSES

Cash operating expense (from Cash Flow Statement)			$ _____	
Purchased Animals	$ _____			
Interest	_____			
Feed	_____			
Medicine, Veterinarian	_____			
Entry Fees	_____			
Expense Adjustment (unused feed and supplies)			(+/-) _____	
Expense Adjustment (unpaid items)			(+/-) _____	
Depreciation			_____	
TOTAL OPERATING EXPENSES			(-) $ _____	(B)
INCOME MINUS EXPENSES			$ _____	(A - B)
Gain or loss on capital assets			(+/-) _____	
NET INCOME (before income taxes)			$ _____	

4-H BEEF CATTLE PROJECT FINANCING

BEEF, LEVEL III

Handout 1, Example (Projected) Income Statement

Name: Ben Beefherd For 12 months ending August 31, 19 89

REVENUE					
LIVESTOCK:					
Cash Sales		$ 2,500			
Inventory change	(+/-)			$ 2,500	
PRIZES AND AWARDS:					
Cash		$ 100			
Certificates		-0-		$ 100	
OTHER INCOME:					
Cash Sales		$ -0-			
Accounts Receivable (adjusted)		-0-		$ -0-	
VALUE OF PROJECT PRODUCTION				(+/-)	**$ 2,600**
EXPENSES					
Cash operating expenses (from Cash Flow Statement)					
Purchased Animals		$ 750			
Interest		120			
Feed		675			
Medicine, Veterinarian		50			
Entry Fees		50		$ 1,645	
Expense Adjustment (unused feed and supplies)			(+/-)		
Expense Adjustment (unpaid items)			(+/-)		
Depreciation					
TOTAL OPERATING EXPENSES				(-)	**$ 1,645**
INCOME MINUS EXPENSES					**$ 955**
Gain or loss on capital assets				(+/-)	
NET INCOME (before income taxes)					**$ 955**

4-H BEEF CATTLE PROJECT FINANCING

BEEF, LEVEL III

Handout 2, Projected Cash Flow Income

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
CATTLE													
CALVES													
SHEEP													
LAMBS													
GOATS													
WOOL/MOHAIR													
TURKEYS/BOILERS													
SWINE													
RABBITS													
PRIZES/CERTIFICATES													
WAGES													
RENTALS													
INTEREST ON SAVINGS													
GIFTS													
TOTAL INCOME EXPECTED													

4-H BEEF CATTLE PROJECT FINANCING

BEEF, LEVEL III

Handout 3, Projected Cash Flow Expenses

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HIRED LABOR													
REPAIRS													
INTEREST													
RENT/LEASE													
FEED													
SUPPLIES													
ENTRY FEES													
CHEMICALS													
VET. MEDICINE													
TAXES													
UTILITIES													
TRAVEL													
INTEREST													
PURCHASED ANIMALS													
TOTAL EXPENSE OUTLAY													

4-H BEEF CATTLE PROJECT FINANCING

BEEF, LEVEL III

Handout 4, Projected Cash Flow Summary

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TOTAL INCOME													
TOTAL EXPENSES													
DIFFERENCES													
SURPLUS													
WILL/NEED TO BORROW													

Understanding Frame Scores

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- Understand the importance of birth date and hip height in animal selection
- Calculate a frame score for an animal
- Calculate the approximate amount of feed needed for a particular sized animal and its approximate cost

ABOUT THEMSELVES:

- Decision-making skills
- The value of predictions or projections
- Planning for the future is an inexact science

Materials Needed:

- Handout 5, Frame Score Table
- Handout 6, Frame Score Types and Weights
- Overhead projector, chalkboard, or flip chart
- Gentle calf, if available
- Tape measure
- Level

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

Proper selection of a market animal can be improved by an understanding of how to use frame scores. Frame scores help to figure the final weight of the market animal and how much the animal will have to gain on a daily average.

When you go to select your beef project you need to consider the following factors: how much you can afford to spend, whether you have adequate facilities, how much feed you will need, and how much water your animal will require.

If you've decided that you can adequately house and feed your beef calf, then the most important decision you make is selecting the right animal. **Frame Scores** can be a very useful tool in helping to select an animal that will grow to the right weight by sale time and will be able to gain enough weight each day to make show weight.

The first step when purchasing a calf is to find its height at the hip (in inches) and its age. It's best if you know the animal's birth date, but

List in front of the group:

1. Height
2. Age

Have group practice measuring the calf or show pictures and discuss the measurement

estimating a date within a couple of weeks of the actual birth date will work. Insist that the seller give you the information. You may have to measure the calf's shoulder height yourself. The hip height measurement is taken at a point level with center of the back; opposite the hook (or hip) bone, to the ground. Let's practice taking this measurement on the calf.

Distribute Handout 5, Frame Score Table
Have members look up information and come up with answer.

Next, you can use frame score charts to help you determine the animal's final weight before you purchase it. Use the Frame Score Table to help determine the animal's frame score. For example, let's pretend that we are thinking of buying a calf from our neighbor. This calf is 7 months old and measures 40 inches at the hip. If we look at Handout 5, we find its age—7 months—in the left hand column. Then, we look across the row until we find its height—40 inches. We can see that this number falls into the column for an animal with a Frame Score of 3. What does this mean?

Pass out Handout 6, Frame Score Types and Weights.

If we look at Handout 6, Frame Score Types and Weights, we see that seven frame score types are pictured. A frame score 3 can be expected to finish somewhere between 951 and 1050 pounds. Now, let's say that you are looking at this calf and it is 140 days until the fair. Figuring that an average beef animal can gain about 2.6 pounds per day, your calf could put on 365 pounds in that time.

Use a chalkboard or flip chart to show calculations.

$$140 \text{ days} \times 2.6 \text{ pounds per day} = 365 \text{ pounds}$$

Thus, your calf should have a starting weight of 635 pounds when you buy it in order to finish close to the expected finished weight of 1,000 pounds. (1,000 pounds – 365 pounds = 635 pounds)

(365 × 7 = 2,555)

With an average feed efficiency (conversion of a pound of feed to a pound of meat) of 7 to 1, this means you will need to count on feeding 2,555 pounds of feed to get a 365-pound gain. Knowing the average cost of a pound of feed, you can then determine how much you will have to spend over the next 140 days to feed your animal.

Let's try another example. Let's say that you are looking at an animal that is 6 months old and measures 43 inches at the hip. Looking again at your handout, what is this animal's frame score? (Frame score is 5).

Let's also say you are purchasing this calf in late November and will be feeding it for about 240 days (8 months) for the county fair in July.

A frame score 5 steer should finish at about what weight? (Between 1150 and 1250 pounds). If your calf can gain an average of 2.5 pounds per day, it should gain 600 pounds in 240 days.

$$2.5 \text{ pounds per day} \times 240 \text{ days} = 600 \text{ pounds}$$

Therefore, how much should this calf weigh on the day you are considering buying it? (This calf must weigh at least 600 pounds on the day that you purchase it.)

With the average feed efficiency of 7 to 1, how much feed will this calf need to consume by fair day? (4,200 pounds)

At an average cost of 12 cents per pound of feed, this member can expect to spend $504 on feed for this time period.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What was the most difficult part of measuring hip height? Why?
2. Why is it significant to know the projected market weight, pounds of gain, cost of gain and pounds of feed needed to produce your steer?

Process:

3. If you did not use frame score, how did you estimate these needs?
4. What projections are most useful and accurate? Why?

Generalize:

6. What are some predictions that you make in your life? School? Career?
7. What information will you need to make these future decisions?

Apply:

8. How can you plan or estimate future needs?
9. What will you do differently next year as a result of this experience?

GOING FURTHER:

1. Attend your county Beef weigh-in, measure hip heights and project finish weights.
2. Spend a day with a cattle buyer in your area. What frame type is preferred?

REFERENCES:

Author:
This lesson was modified from original material authored by Kirk A. Astroth, Extension Specialist, 4-H Youth Programs, with adaptation by:
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UNDERSTANDING FRAME SCORES

BEEF, LEVEL III

Handout 5, Frame Score Table

Frame type

Number 1 steers are the smallest feeders available in the U.S. cattle population, and Number 7 steers are the largest. They are expected to weigh within the limits indicated in the drawings at 14½ to 15 months of age. Eighty percent or more are expected to grade Choice under the feeding system used by the commercial feedlots (140 to 200 days on feed).

FRAME SCORE TABLE

Measure height at hip or hooks.
Point of measurement is at hook bones (hip) and level with center of back.

	Hip Height in Inches						
Age in Months	Frame Score 1	Frame Score 2	Frame Score 3	Frame Score 4	Frame Score 5	Frame Score 6	Frame Score 7
5	34	36	38	40	42	44	46
6	35	37	39	41	43	45	47
7	36	38	40	42	44	46	48
8	37	39	41	43	45	47	49
9	38	40	42	44	46	48	50
10	39	41	43	45	47	49	51
11	40	42	44	46	48	50	52
12	41	43	45	47	49	51	53
13	41.50	43.50	45.50	47.50	49.50	51.50	53.50
14	42.00	44.00	46.00	48.00	50.00	52.00	54.00
15	42.50	44.50	46.50	48.50	50.50	52.50	54.50
16	43.00	45.00	47.00	49.00	51.00	53.00	55.00
17	43.50	45.50	47.50	49.50	51.50	53.50	55.50
18	44.00	46.00	48.00	50.00	52.00	54.00	56.00

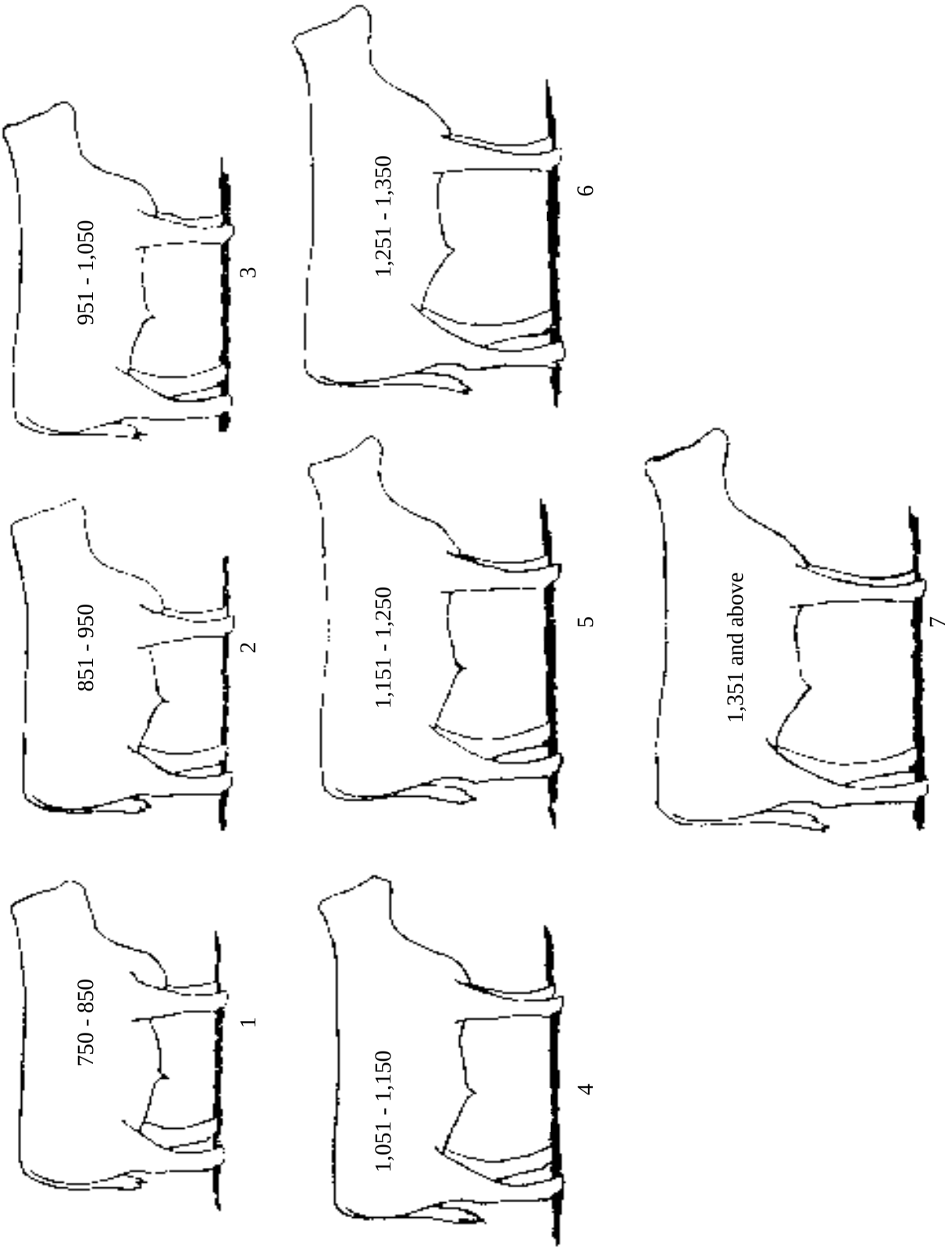
The base point is 45 inches hip height at 12 months of age for a frame score of 3. Allow 2 inches for each frame score at the same age. Allow 1 inch per month from 5 to 12 months of age, 0.50 inch per month from 12 to 18 months, and 0.25 inch up to 2 years.

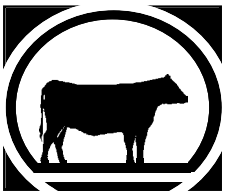
UNDERSTANDING FRAME SCORES

BEEF, LEVEL III

Handout 6, Frame Score Types and Weights

Frame Score Types and Weights
(At 14 ½ to 15 months of age)





How Much Water?

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- How much water beef animals require per day
- How to calculate water capacity for various stock tanks
- To determine if personal stock tanks are adequate for their own animals

ABOUT THEMSELVES:

- To understand the importance of water
- To become more efficient in math computation skills

Materials Needed:

- Handout 7, Stock Tank Capacities
- Calculators (optional)
- At least one real stock tank for a practice exercise
- Tape measure
- Paper and pencils

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

All animals require water for healthy lives. Knowing how much clean drinking water an animal requires each day will help members determine if stock tanks are adequate to meet animal water requirements.

Often, we overlook the importance that water plays in livestock production. A little effort on the part of beef producers in making water freely available is bound to increase production and, therefore, income.

Water is the basis of all life and is the most important part of an animal's diet. A beef animal can go without food a lot longer than it can go without water.

The average person uses about 5 gallons of water per day. How much water do you think the average beef animal consumes each day? Is it more than what humans require? Or less?

The answer depends on the size of the animal, but as you can imagine, livestock require much more water than people primarily because they are so much bigger. For example:

- A 350-pound calf needs between 1 and 5 gallons of drinking water a day. In this case, hauling a 5-gallon bucket of water out to your young

Leader Notes

Ask members to list when and where they use water. Refer to handout from Water lesson in Level I, to review ideas.

Leader Notes

These are rule-of-thumb estimates based on research.

animal twice a day might be okay, depending of course on the weather.

- A 500-pound calf needs between 2 and 6 gallons of drinking water a day.
- A 750-pound steer needs 10 to 15 gallons per day of clean drinking water. At this level, you can easily see that hauling one bucket of water twice a day won't quite give the animal what it needs to be healthy.
- A steer weighing 1,000 pounds or more needs 20 gallons or more a day of cool, clean drinking water.

How much water will five 1,000-pound steers need per day? (more than 100 gallons).

Pass out Handout 7, Stock Tank Capacities sheet.

Obviously, if your operation depends on stock tanks for providing water to your beef animals, you need to know if you have tanks large enough to hold an adaquate water supply for them. Let's look at the handout on stock tank capacities.

Use each of the diagrams as samples. Give imaginary dimensions and have members practice calculating water capacity.

Look at the way to calculate the water holding capacity of each of the shapes: round, rectangular, curved bottom, slanted side, and "V" sided troughs.

Just for practice, let's assume you have a round stock tank at home that is 8 feet in diameter and 2 feet high. What is the gallon capacity of this tank? ($8 \times 2 \times 5.86$ = about 94 gallons)

Take your group outside. Be sure to bring along the tape measures, calculators, and paper and pencils. Let the members work together to figure the capacity of several stock tanks on your ranch or farm.

Now, let's go outside to figure the gallon capacity of some stock tanks on this place.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. How many different shapes of water tanks do you have?
2. Which shape was easiest to figure capacity? Hardest? Why?

Process:

3. What problems did you have in measuring different shapes of tanks?
4. Which shape seems to hold the most water? Why?
5. What are advantages and disadvantages of various shapes of water tanks?
6. Which shape of water tank do you think would conserve or waste the least amount of water? Why?
7. If you do not have an automatic water tank, how often do you have to fill the tank to keep fresh, clean water for your calf?

Generalize:

8. How do you keep water from freezing in various water tanks?
9. What water consumption differences do you expect between hot and cold weather? Why?

Apply:

10. How can you apply what you learned in this lesson to your water needs?
11. How can you use the math formulas in this lesson in other areas of your life?

GOING FURTHER:

1. Estimate the total number of animals that can be watered just by the gallon capacity of the stock tanks (do not consider ponds at this time).

2. Go home and do the same computations on the stock tanks you have at home. See if you are providing enough readily available water for your animals. If not, what size and how many tanks might you need? What will the cost be of purchasing these stock tanks?

REFERENCES:

Author:
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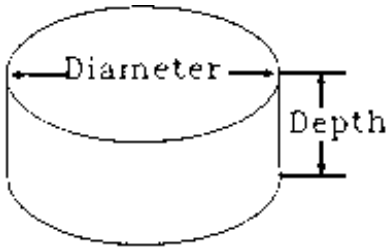
Manhattan

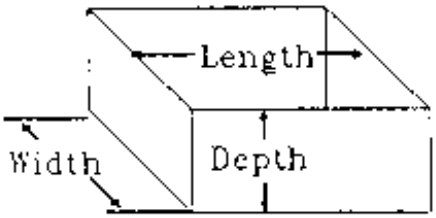
HOW MUCH WATER?

BEEF, LEVEL III

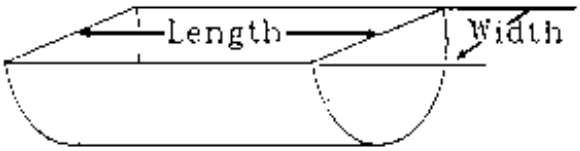
Handout 7, Stock Tank Capacities



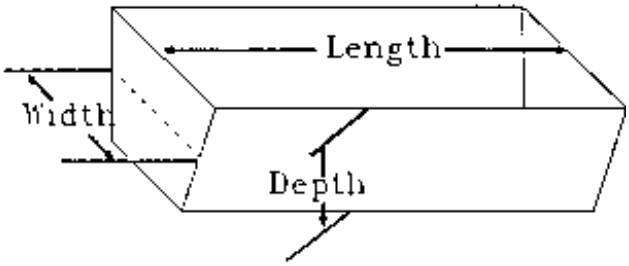
Round or Circular Tank
To find gallon capacity:
diameter × depth × 5.86 = gallons



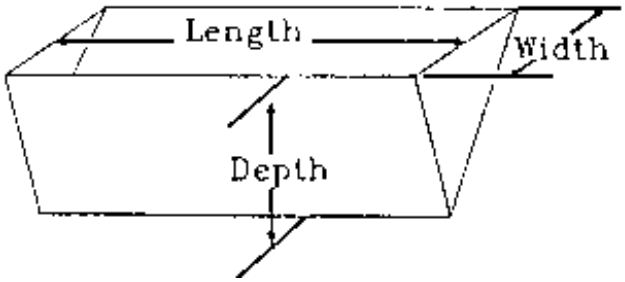
Rectangular Tank or Trough
To find gallon capacity:
width × depth × length × 7.46 = gallons



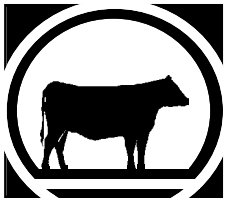
Curved Bottom Trough
To find gallon capacity:
width × length × 2.93 = gallons



Slanting Sides Trough
To find gallon capacity:
width (measure at ½ of depth)
× length × 7.46 = gallons



V-Sides Trough
To find gallon capacity:
width × depth × length × 3.73 = gallons



Feed Identification and Classification

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- The difference between concentrates and roughages
- To identify and classify major feedstuffs
- To list and understand the six major nutrients that should be included in all rations

ABOUT THEMSELVES:

- The value of each nutrient in a diet
- Relationship of fiber and digestible nutrients

Materials Needed:

- Samples of feedstuffs: corn, oats, grain sorghum, soybean meal, hay, etc.
- Activity Sheet 3, Feed Classification Word Scramble
- Sack of feed or have individuals bring in a 2-pound sample of their project animal's feed
- Six paper plates plus one plate per individual or group
- Felt-tip markers
- Posterboard
- Chalkboard and chalk (optional)
- Leader's Key, Activity Sheet 3, Feed Classification Word Scramble

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Feed can be classified several ways. One method that is used is based on the fiber and Total Digestible Nutrient (TDN) content of feed. Using the amount of fiber and amount of TDN as measurements, feed may be classified as concentrates or roughages.

1. Concentrates are feeds that have a high percentage of easily digested carbohydrates (high in TDN) and are low in fiber.

2. Roughages, like pasture, hay and silage, are bulky feeds that are high in fiber but low in TDN. Beef cattle can use roughages in rations because they are ruminants, which means they have four compartments to their stomach to help them digest fiberous feeds. Roughages are an inexpensive source of carbohydrates for beef cattle.

CONCENTRATES

Feeds within the concentrate category can be classified. The system of classification is based upon similarities in nutrient composition and

Leader Notes

Pass out Activity Sheet 3, Food Classification Word Scramble. Have members unscramble words. Refer to Leader's Key to check answers as various feedstuffs are named and described. Have small groups discuss each group of words and share with total group.

List these on posterboard or chalkboard.

feeding value. These categories are grains, processing by-products, animal proteins, plant proteins, and liquid supplements.

Grains are the concentrates that are most familiar to us. They include corn, grain sorghum (milo), oats, barley and wheat.

Show feedstuff samples and list usual cost of that grain locally (or range price).

Show corn samples.

1. **Corn** is high in energy and total digestible nutrients (TDN). It is the most widely used feed grain. Corn promotes good solid fleshing. Corn should be cracked or coursely ground when fed to beef cattle to increase digestibility.

Show grain sorghum samples.

2. **Grain sorghum** (milo) is considered to be about 90 to 95 percent the value of corn. Grain sorghum is similar to corn, but it contains more protein and less fat. Since grain sorghum seeds are hard, it needs to be processed throughly (cracked, rolled, crimped, ground) to increase digestibility.

Show oats samples.

3. **Oats** are considered an excellent feed for growing animals because of its high protein and fiber levels, but is usually quite expensive. Its energy (TDN) content varies due to the amount of hulls. Oats are usually crimped, ground, or rolled when included in a ration.

Show wheat samples.

4. **Wheat** has limited use with livestock because of its great demand for human consumption. Wheat is comparable to corn in feeding value and can be substituted for corn when it is economical. However, best results are obtained when only a part of the grain in a ration is wheat. Wheat should be coursely ground or cracked.

Show feedstuff samples.

The most common types of **processing by-products** are wheat bran and animal fat.

1. **Bran** is produced in the manufacturing of wheat into flour. It is an excellent source of bulk and is a mild laxative.

2. **Animal fat** is a by-product of animal processing. It may be used to a limited extent in rations (2 to 5 percent) as a source of energy and to reduce dustiness.

Animal proteins may be used to improve the protein and mineral level of rations. The common animal proteins include: 1) meat meal, 2) tankage, 3) fish meal, and 4) blood meal. Animal protein levels in beef rations vary, and generally, usage is minimal.

Plant proteins are the most common supplements in beef rations. These supplements include soybean meal, cottonseed meal and linseed meal.

Show soybean meal.

1. **Soybean meal** is the most widely used plant protein feed. Most soybean meal contains 44 percent protein.

2. **Cottonseed meal** is an important protein supplement in the cotton production areas. It usually contains 41 percent protein.

Leader Notes

3. **Linseed meal** is extracted from flax seed. It contains about 35 percent protein.

Show cottonseed meal.
Show linseed meal.

Liquid supplements have been used in tanks where beef cattle have free-choice usage. Usually a molasses-based liquid is used to improve animal acceptance. **Molasses** is used regularly in rations to increase palatability and improve the consistency of rations. A liquid supplement usually contains molasses and urea (synthetic protein) as a protein source, along with minerals and vitamins.

ROUGHAGES

1. Dry roughages—**Hay** is the most common type of dry roughage. Alfalfa hay is high in protein, making it a higher quality roughage. Prairie hay is also popular. **Hulls** are another type of dry roughage. Cottonseed hulls are used in rations to provide bulk. **Straw** is a dry roughage source but needs supplementation with protein, minerals and vitamins.

2. Green roughages are grasses and legumes that are either pastured or green-chopped daily and fed to beef animals in dry lot. The easiest and cheapest method of harvesting these roughages is to graze them.

3. Silage is made from green forages and grain crops, mainly corn, sorghum and grasses, that are cut and stored in silos. While in storage, silage goes through a fermentation process which preserves it and makes it highly palatable.

Other feedstuffs are also used in cattle rations. This lesson only included some of the major ones.

The value of feeds depends on the amount of Total Digestible Nutrients (TDN). Since grains have a higher TDN, they are priced higher than roughages.

Review six nutrients required by beef cattle:

- Protein
- Carbohydrates
- Fats and oils
- Minerals
- Vitamins
- Water

Have group name/list the six nutrients. Label six paper plates with these names.

Review nutrients and identification of feedstuffs by having members analyze their own feed— identify feedstuff and place in proper nutrient class plates.

Feedstuffs contain these nutrients in different amounts. The important thing to remember is that these six nutrients are required and may come from a combination of different feedstuffs.

SUMMARY

Being able to identify various feedstuffs and knowing their nutrient value and TDN content is necessary in making decisions concerning the correct rations for various types of beef animals.

Leader Notes

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What were the similarities and differences of the concentrates? Roughages?
2. What physical properties were common in the protein sources?

Process:

3. What problems did you have in matching feedstuffs with their nutrient value?
4. What is the purpose of each nutrient in the ration for your steer or heifer?
5. What is the significance of total digestible nutrients (TDN) and the relationship to fiber content of feedstuffs?

Generalize:

6. How might seasonal weather issues effect nutritional needs of beef?
7. What questions should you ask the livestock feed salesperson the next time you purchase feed?

Apply:

8. How will the knowledge of nutrients be useful in the future?
9. Why is it important to be able to recognize and identify specific feedstuffs?

GOING FURTHER:

1. Select one concentrate feed, research its properties, advantages and disadvantages for beef cattle.
2. Tour a feed mill and observe different feedstuffs being used in feed.
3. Identify different feedstuffs in mixed feed.
4. Prepare an exhibit with samples of different feedstuffs.
5. Tour county and identify various feeds as they are being produced in the field.
6. Research other feedstuffs not covered in this lesson.

REFERENCES:

Author:
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Jimmy L. Rodgers, County Extension Agent, Texas, with adaptation by:
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Kansas State University

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Kansas State University
Manhattan

FEED IDENTIFICATION AND CLASSIFICATION

BEEF, LEVEL III

Activity Sheet 3, Feed Classification Word Scramble

Concentrates

1. Grains:

EAYLRB _____. TSOA _____.

ROCN _____. HTAWE _____.

2. Processing By-Products:

AWTEH NBRA _____. LMAAIN ATF _____.

3. Animal Proteins:

ATEM LEMA _____. DOLOB MELA _____.

4. Plant Proteins:

NBYOSAE LAME _____. DESNILE LEAM_____.

DETOCONTES ALME _____.

5. Liquid Supplements:

SASESOML _____. AERU _____.

Roughages

1. Dry Roughages:

YHA _____. ARWTS _____.

LSLUH _____.

2. Green Roughages:

ESASRSG _____. EUSMGEL _____.

3. Silage:

NROC _____. ASRSG _____.

MHGUROS _____.

FEED IDENTIFICATION AND CLASSIFICATION

BEEF, LEVEL III

Leader's Key, Feed Classification Word Scramble

Concentrates

1. Grains:

EAYLRB Barley. TSOA Oats.

ROCN Corn. HTAWE Wheat.

2. Processing By-Products:

AWTEH NBRA Wheat Bran. LMAAIN ATF Animal Fat.

3. Animal Proteins:

ATEM LEMA Meat Meal. DOLOB MELA Blood Meal.

4. Plant Proteins:

NBYOSAE LAME Soybean Meal. DESNILE LEAM Linseed Meal.

DETOCONTES ALME Cottonseed Meal.

5. Liquid Supplements:

SASESOML Molasses. AERU Urea.

Roughages

1. Dry Roughages:

YHA Hay. ARWTS Straw.

LSLUH Hulls.

2. Green Roughages:

ESASRSG Grasses. EUSMGEL Legumes.

3. Silage:

NROC Corn. ASRSG Grass.

MHGUROS Sorghum.

Feed Nutrients and Their Uses

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- The six nutrients required by beef animals
- The function and importance of these six nutrients
- To name and recognize feeds as a source of these nutrients

ABOUT THEMSELVES:

- The relationship of nutrients in their own diet

Materials Needed:

- One empty paper feed sack
- Six 4-inch by 10-inch poster cards (nutrient cards—labeled as Water, Carbohydrates, Fats, Proteins, Minerals, Vitamins)
- One felt-tip marker
- Activity Sheet 4, Nutrient Puzzle
- Pencils
- Leader's Key, Activity Sheet 4, Nutrient Puzzle

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Man has long been aware of the importance of the proper kinds of food for survival for himself and his animals. The 4-H beef project member must have a knowledge of the nutrients required by animals for maintenance, growth and reproduction, since good nutrition is the basis of efficient livestock production.

What is a nutrient: A nutrient is defined as, "a chemical element or compound that aids in the support of life." Any food or group of foods that support animal life contains nutrients. There are six (6) basic nutrients for beef cattle. Some nutrients are needed in large amounts while others are needed in only small amounts. Each nutrient is used to do different jobs in the body.

These nutrients must be included in a beef animal's ration to have a balanced ration.

Nutrients are what we feed our cattle, so let's see what is in the "Magic Feed Sack."

Since this is a magic feed sack, I can use my magic skills and fill it with nutrients needed by beef cattle.

Now it is full of the nutrients that beef animals need.

Leader Notes

Have members list as a group the six basic nutrients for beef. Check those listed against the definition.

"The Magic Feed Sack"

Preparation— Before the meeting, place the six 4-inch by 10-inch nutrient cards (Water, Proteins, Carbohydrates, Fats, Minerals, Vitamins) between the inner layers of the empty feed sack prior to lesson time. Lesson: Show "empty" feed sack to the group. Let individuals see that the inside is empty.

Tap side of sack with hand or pencil.

Pull out nutrient cards as they are discussed. Discuss basic function or importance of each nutrient and sources.

Leader Notes

Protein Card

1. **Proteins** are considered the building blocks of the body and are required for muscle growth in young animals, for maintenance of body tissues, and for milk production in lactating animals. Protein can also serve as a source of energy, but protein is usually too costly to be the only source of energy, therefore, only enough protein is fed to adequately satisfy the animals needs.

Protein is formed from amino acids which are composed of nitrogen, carbon, hydrogen, oxygen, and a small amount of sulfur.

Beef cattle and other ruminants can synthesize all of the amino acids needed. Some of the common protein supplements are plant proteins such as soybean meal and cottonseed meal, and animal proteins such as tankage (meat scraps), meat and bone meal, fish meal and dried skim milk.

During digestion, protein is broken down into amino acids (23 kinds of amino acids have been identified), which are carried to all parts of the body in the blood. Protein requirements are actually requirements for amino acids.

Carbohydrate Card

2. **Carbohydrates** provide an animal with its major source of energy. Energy is necessary for maintaining body temperature and for activity or work. Excess carbohydrates are stored in the body as fat.

The word carbohydrate is applied to organic chemical compounds which are made up of carbon, hydrogen and oxygen. The group of chemicals classified as carbohydrates are sugars, starches and crude fiber.

Carbohydrates are found in roughages and concentrates. In forages, the carbohydrates are a complex type called cellulose. Feed concentrates contain the simple carbohydrates known as starches and sugars. These are found in grains and their by-products, such as corn, oats, barley, wheat and bran.

Fat Card

3. **Fat** acts as an energy source for animals but is only needed in small amounts. In fact, fat can provide 2¼ times as much energy as carbohydrates because they are glycerides or fatty acids and are concentrated forms of energy. Fats may be stored in an animal for later energy needs. Stored fat provides protection to the animal's organs.

Fats are rather unstable, and if not handled properly, can become rancid and spoil quickly. Most animals' requirements for fat are less than 3 percent so fat content is usually not considered in computing rations.

Mineral Card

4. **Minerals** are needed in small amounts. They are necessary for bone and teeth (skeleton) growth and maintenance. They are used in the animal's body in the chemical reactions that are necessary for many life processes. The following minerals have been found to be essential or affect livestock feeding in some manner—calcium, phosphorus, sodium, chlorine, potassium, sulphur, magnesium, iron, iodine, copper, cobalt,

zinc, manganese, molybdenum, fluorine, arsenic and selenium.

5. **Vitamins** are another class of essential nutrients. They are involved in body functions such as vision, blood clotting and bone development. Vitamins are necessary in small amounts to assist in metabolic processes in the animal's body.

Vitamin Card

Vitamins are classified as to their solubility—fat soluble and water soluble. Fat soluble vitamins dissolve in the presence of fat and are not affected by water. Water soluble vitamins dissolve in the presence of water.

There is one more essential nutrient that is often neglected. Can you name this vital nutrient?

6. **Water** is found in the feed sack as moisture but an additional supply of fresh water must be provided to ensure proper performance. Water is the food nutrient required in the greatest amount. Water acts as a body cleanser and a regulator of body temperature. It carries other nutrients through the body and carries wastes out of the body. It is an active participant in enzymatic reactions. On an average, an adult beef animal can drink 8 to 20 gallons of water per day, more if it is dry and hot. It is important and essential that fresh water be provided for all animals.

Water Card

Check knowledge about the beef animal nutrients with the crossword puzzle.

Pass out Activity Sheet 4, Nutrient Puzzle.

SUMMARY:

The six nutrients, Protein, Carbohydrates, Fats, Minerals, Vitamins, and Water are essential for beef cattle. Other additives may be added to feed rations to improve or stimulate growth, but are not essential. Understanding the importance and function of these nutrients will help in planning rations and feeding properly. A major point to remember is that although a nutritious diet is provided, an inadequate, inconvenient, or poor quality supply will reduce livestock performance.

Group may also explore practical application of nutrient information to feedings and ration formulation.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. Which nutrient is the most difficult to provide for your animal? Why?
2. What happens when animals are fed too much of a given nutrient?

Process:

3. Why can cattle use complex carbohydrates containing cellulose?
4. What do proteins in the diet contribute to beef animals?
5. What is an amino acid?

Activity to reinforce the information given:
Play "What if."
Ask members to brainstorm what would happen if . . ., i.e., water was missing from the diet. They should come up with a lot of ideas with the major one being death of the animal.
Continue with each of the five remaining nutrients.

Generalize:

6. What basic knowledge about nutrients did you have before participating in this lesson?
7. How has what you learned in this lesson helped you learn about yourself?

Apply:

8. Would you change your beef animal's ration now based on what you've learned? Why or why not?

GOING FURTHER:

1. Research beef nutrition and prepare an illustrated talk.
2. Learn protein requirements for varying ages and kinds of beef cattle.
3. Visit feed stores and compare nutrients available in different feeds.
4. Conduct research project with animals by feeding one group more nutrients than the other.
5. Give illustrated talk on basic nutrients to members with other animal projects.
6. Analyze feeds being used for nutrient content.

REFERENCES:

Feeds and Feeding, Ninth Edition, Frank B. Morrison, Morrison Publishing Company, Ithaca, New York, 1958

Kansas Beef Cattle Handbook, Cooperative Extension Service, Department of Animal Sciences and Industry, Kansas State University

Author:

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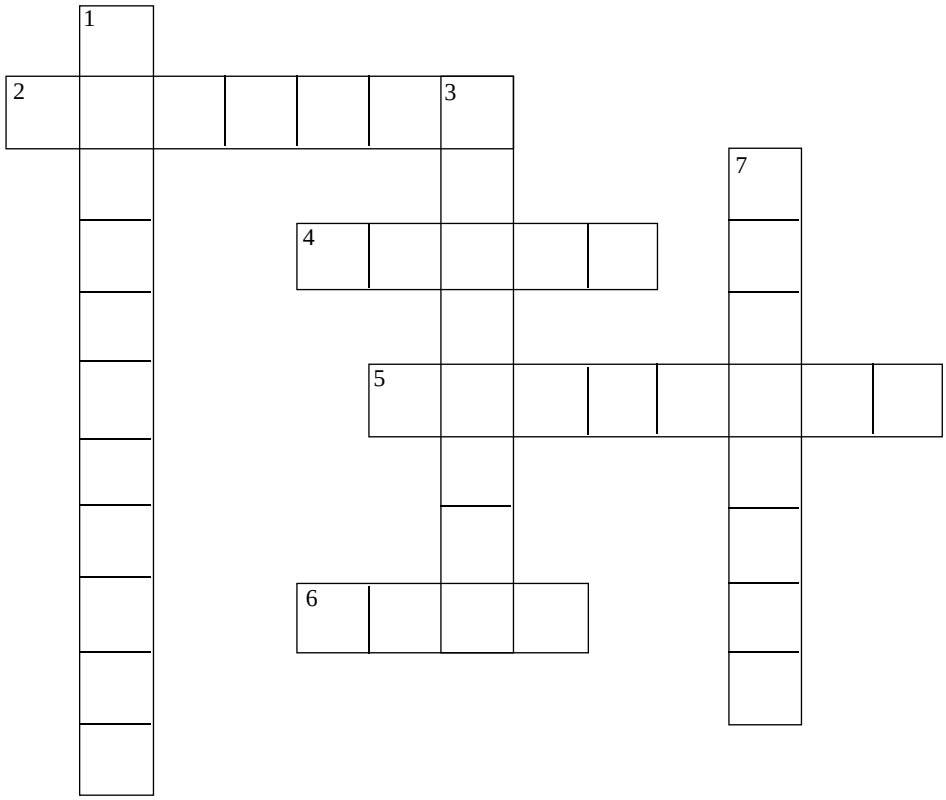
FEED NUTRIENTS AND THEIR USES
Beef, Level III
Activity Sheet 4, Nutrient Puzzle

Across:

2. Nutrient required for muscle growth
4. Nutrient required in the greatest amount
5. Examples are calcium, phosphorus and iron
6. An energy source only needed in small amounts

Down:

1. The major energy source nutrient
3. A compound that aids in the support of life
7. Only minute amounts are required



FEED NUTRIENTS AND THEIR USES
Beef, Level III
Leader's Key, Activity Sheet 4, Nutrient Puzzle

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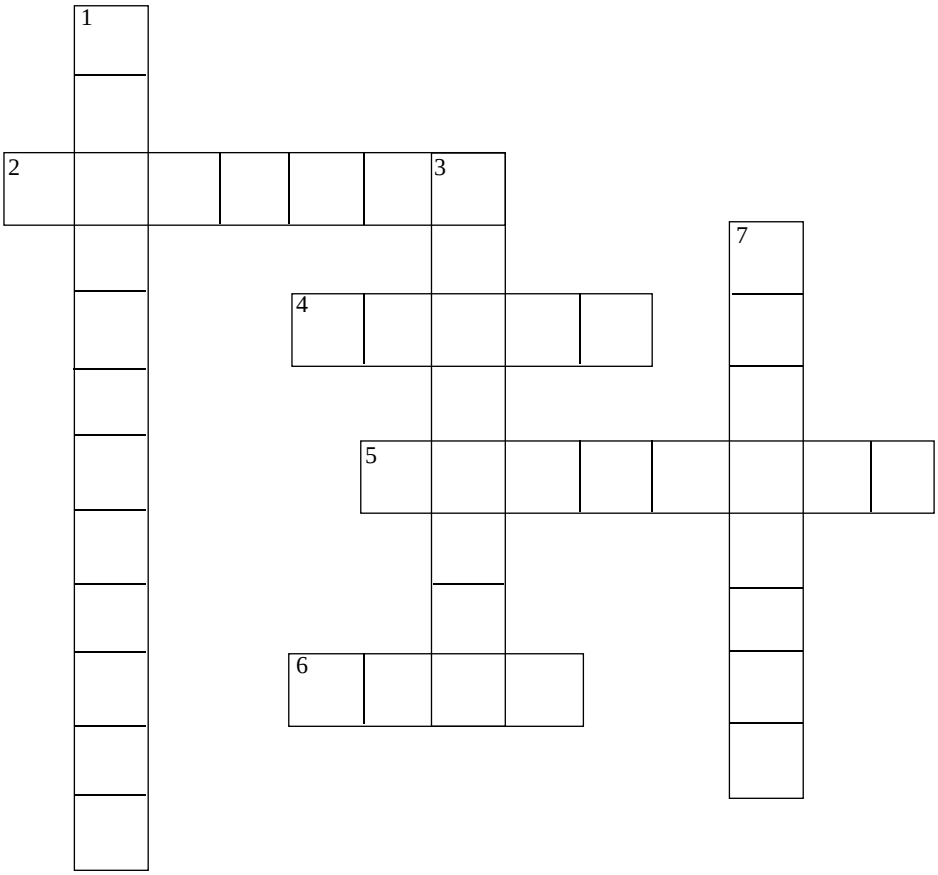

Ruminant Digestive System

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- Examples of ruminants and non-ruminants
- The four compartments of the ruminant stomach
- The basic parts and functions of the ruminant digestive system

ABOUT THEMSELVES:

- The process of digestion
- The differences between monogastric and ruminant digestion

Materials Needed:

- Handout 8, Ruminant and Monogastric Digestive Tracts
- Handout 9, Parts of the Ruminant Stomach
- Chalkboard and chalk (optional)
- Masking tape and notecards for digestion game

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Something amazing happens when you feed a beef animal—the roughage or concentrates turn into beef! The method by which this takes place is through the beef animal's digestive system. Its main purpose is to convert food into energy.

Farm animals have two distinct types of digestive systems.

1. Ruminant
2. Simple or Monogastric

Cud-chewing animals such as cattle, sheep, and goats have a ruminant system. Ruminant animals have a stomach with four compartments.

Non-ruminants have simple stomachs and include man, horses, swine, dogs, cats and poultry.

The ruminant digestive system has several advantages over the non-ruminant digestive system. Ruminants have larger digestive systems, which allow them to eat greater amounts of roughages (hay, grass, silage). The ruminant digestive tract is more efficient in utilizing crude fiber.

Let's take a look at the ruminant digestive system.

Leader Notes

Have members name or explain the two systems.

Have members name animals with each system.

1. Ruminant (cud chewing): Cattle (Beef, Dairy), Sheep and Goats

2. Non-Ruminant: Horses, Swine, Dogs and Cats

Give students Handout 8, Ruminant and Monogastric Digestive Tracts.

Leader Notes

Have members name and/or discuss these functions.

The digestive system performs five major functions:

1. food intake
2. storage
3. digestion
4. absorption
5. elimination of waste

These functions take place in a special system called the digestive **tract**. This can be visualized as a hollow, tube-like assembly line, but instead of building something, this factory system takes it apart. Each feedstuff is broken apart into smaller and smaller units so it can be used or eliminated. This digestion process prepares food for absorption and use by the beef animal's body. This is accomplished by enzyme action which breaks the food down into simple compounds.

The organs that make up the digestive system may be grouped into two categories:

Point to parts of the canal or have members name them.

1. **Alimentary canal—**The canal is the tube-like assembly line that extends from the lips to the anus. Digestive processes take place in the alimentary canal. The walls of the canal are covered with involuntary muscles which mix the food with digestive juices and move the food along the digestive tract. The parts of the canal are the mouth, pharynx, esophagus, stomach, small intestine, cecum, large intestine and anus.

2. **Accessory organs—**These are the organs that aid the digestive tract with the receiving and digesting of food. Included in this category are the teeth, tongue, salivary glands, liver and pancreas.

Can describe each part or divide group into teams and alternate asking questions.

Let's look at how each of these parts function in the digestive system.

ALIMENTARY CANAL

1. What is the first part of the alimentary canal to function? (mouth)

Mouth—The mouth is the first part of the alimentary canal to function. It is used by animals for the intake of food and mastication (chewing). Saliva is secreted to begin digestion and moisten feed before it is swallowed.

2. What does the pharynx do?

Pharynx—The pharynx is a muscle membrane that functions in both the digestive and respiratory systems. It serves as a passage gate for food going from the mouth to the esophagus and air going to the lungs.

3. Describe the esophagus.

Esophagus—The esophagus is a long muscular tube which allows the food to pass from the pharynx to the stomach.

Stomach—Cattle have a compound stomach with four compartments. These four "stomachs" can utilize large amounts of feed, both concentrates and roughages.

Pass out Handout 9, Parts of the Ruminant Stomach.

The first compartment is the rumen or paunch. It is the largest compartment and serves as storage for large amounts of feed. Feed stored in the rumen is regurgitated in a cud and rechewed.

Next is the reticulum or honeycomb. The adult cow can hold 40 to 60 gallons of feed material in these two compartments where food is agitated, fermented and digested.

The third compartment of the ruminant stomach is the omasum or manyplies. One of its roles is to grind and squeeze the liquid out of the feed.

The fourth compartment is abomasum or true stomach. This is the only place in the stomach where digestive juices are produced. It is similar to our human stomach.

Small Intestine—The food passes from the true stomach to the small intestine where the food is further digested and absorbed by the blood. The liver secretes bile into the small intestine to help neutralize the acidity of the feed and allow enzyme action to occur. The pancreas provides pancreatic juices to the small intestine to aid digestion.

Large Intestine—The non-absorbed material passes from the small intestine into the large intestine where digestion and absorption continues.

Anus—All non-usable feed nutrients and excess materials are eliminated from the canal through the anus.

ACCESSORY ORGANS

During the digestive process the accessory organs carry out numerous functions. Teeth aid in the grinding of feed while the tongue turns and rolls the feed as it is chewed. The salivary glands secrete saliva into the mouth to begin digestion and moisten feed before it is swallowed. The liver secretes bile and the pancreas secretes pancreatic juices into the small intestine to neutralize the acidity of the feed after it leaves the stomach.

Normally, about four days are required for feed to pass through the digestive tract of ruminants. The usual amount of time feed is in each part of the tract is:

Rumen/reticulum	61 hours
Omasum	8 hours
Abomasum	3 hours
Small Intestine	7 hours
Large Intestine	8 hours

The amount of feed left in the digestive tract affects the beef animal's appetite. Beef animals fed easily digested feed, such as grain, have better appetites than cattle fed harder-to-digest feeds, such as hay.

SUMMARY

All of the feed eaten by animals is not absorbed and used for growth, body maintenance, or production. Only the nutrients that **pass through the walls** of the digestive tract is absorbed and used by the body. Some of the

4. Name the four compartments of the beef animal stomach.

5. What happens to food in the paunch and reticulum?

6. What is the name of the third compartment of the ruminant stomach?

7. The last compartment is the only place where digestive juices are produced. What is its name?

8. What is the function of the small intestine?

9. What is the function of the large intestine?

10. What is the last part of the alimentary canal?

11. How long do you think it takes for feed to pass through the digestive tract of ruminants?

Write the name of alimentary tract parts and number of hours on poster or chalkboard.

feed leaves the body undigested. Composition of feed, feed intake, and differences among animals affect digestibility.

Remember, farm animals have two distinct types of digestive systems: Ruminant and Non-ruminant (simple or monogastric). The digestive system parts perform five basic functions:

1. food intake—mouth
2. storage—stomach
3. digestion—stomach, small intestine
4. absorption—small and large intestine
5. elimination—large intestine, anus

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What was the easiest and most difficult part of the digestive system to understand? Why?

Process:

2. Discuss the five functions of the digestive system. What problems would occur if each function was omitted one at a time?
3. What are the advantages/disadvantages of the ruminant digestive system?

Generalize:

4. What conclusions can be made about a monogastric digestive system? (Efficiency? Capacity? Problems?)
5. How does understanding the digestive system assist you in maintaining efficiency in your livestock projects?

Apply:

6. How important is it to understand the digestive system if you are deciding to feed cattle in a feedlot or on pasture?

GOING FURTHER:

1. Make a drawing of the ruminant stomach
2. Describe the alimentary canal of ruminants to other members.
3. Give an illustrated talk on the ruminant digestive system.
4. Visit a research area and observe the digestive tract in action.
5. Study which feeds are more digestible than others.
6. Visit a feed mill and ask about digestibility of feeds.

REFERENCES:

Author:
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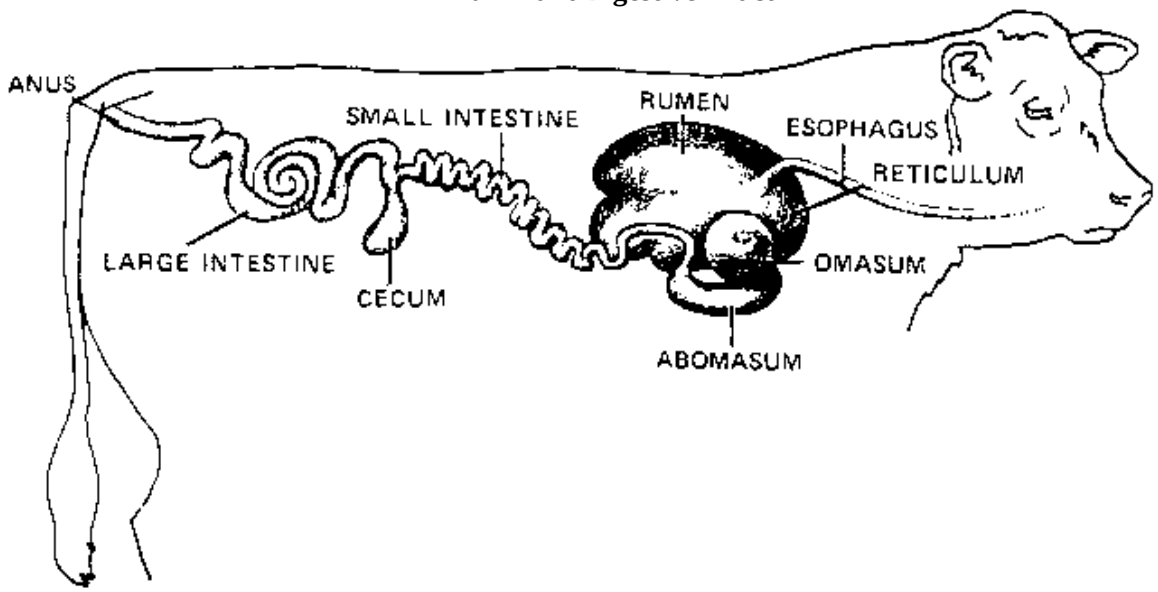
RUMINANT DIGESTIVE SYSTEM

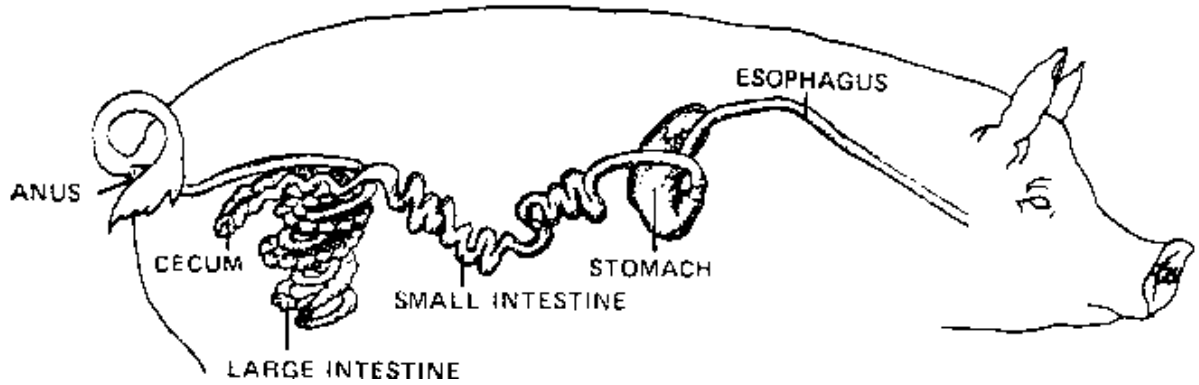
BEEF, LEVEL III

Handout 8, Ruminant and Monogastric Digestive Tracts

Ruminant Digestive Tract



Monogastric Digestive Tract

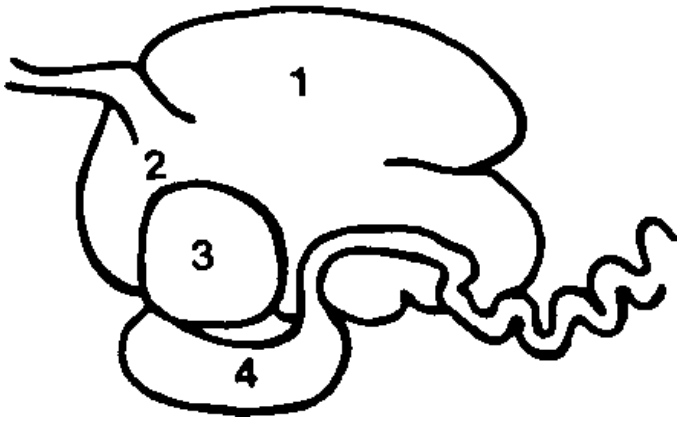


RUMINANT DIGESTIVE SYSTEM

BEEF, LEVEL III

Handout 9, Parts of the Ruminant Stomach

1. Rumen
2. Reticulum
3. Omasum
4. Abomasum



1. Rumen

- Functions as a storage area for food
- Aids in the breakdown of coarse particles through bacterial action

2. Reticulum (honeycomb)

- Honeycomb-like walls retain foreign materials that could injure the digestive system
- Also called the hardware stomach
- Functions are similar to the rumen

3. Omasum

- Liquid is removed from the feed by muscle contractions
- Breaks up coarse particles in feed

4. Abomasum (true stomach)

- Digestive juices that are needed to break down food are secreted
  These include: hydrochloric acid, pepsin, renin and lipase

Restraining Beef Cattle

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- Safety procedures for handling animals while training for shows
- Restraint measures for routine management skills such as castration, dehorning, vaccination and clipping

ABOUT THEMSELVES:

- Emotional self control
- Physical self control
- A sense of personal safety

Materials Needed:

- Handout 10, Squeeze Chute
- Rope
- Rope halter
- Nose tongs
- Hobbles
- Foot trimming rack or pictures of rack
- Handout 11, Methods of Casting
- Gentle beef animal, if possible

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

Leader Notes

Restraints

It is sometimes necessary to apply a restraint to an animal. It is important to use the most practical means of restraint. The following factors should be considered in determining the method of restraint: age of animal, kinds of equipment available, availability of labor, time needed to perform the operation and personal preference.

Show Squeeze Chute, Handout 10.

In most instances a squeeze chute with head gate would be the most practical method. Head gates and squeeze chutes can be the scene of excessive animal excitement. Makeshift latches and levers can fly open causing serious injuries. Commercially designed and manufactured equipment at these key points can improve both efficiency and safety.

Sometimes when head gates and squeeze chutes are unavailable other methods of restraint will have to be used.

Nose Leads

Nose leads can be useful in restraining the animal's head to allow injections in the jugular vein, blood collection, or dehorning. Another method similar to this is grasping the nostrils firmly between the thumb and

Show a pair of nose leads and/or demonstrate grasping the nostrils.

forefinger. This may be sufficient to control the animal depending on size and disposition of the animal.

Demonstrate tail restraint.

Tail Restraint
The tail restraint can be used to divert the animal's attention by grasping the tail near its base and applying pressure in an upward and forward manner. Make sure you don't pull the tail around to the side.

This restraint temporarily blocks nerves and prevents an animal from kicking. This method can be used when giving an injection into rear quarters, giving an udder injection, castrating a bull while standing, or other treatments.

Show hobbles and/or front leg hobble method on beef animal.

Hobbles
Hobbles can be used to prevent kicking. Hobbles secure the hind legs together to prevent the animal from kicking.

A front leg hobble can be used to raise a front leg off the ground for examination or treatment. The front leg hobble is made by a rope with an eye in one end being looped around the pastern. The loose end is passed over the animal's withers where it can be held by someone from the opposite side.

Show where squeeze restraint would be put on body of beef animal.

Squeeze Restraint with a Rope
A method of restraint to keep an animal from kicking is to form a loop around the cow's body in front of the udder. When the rope is pulled tight, it squeezes the animal and will generally cause it to stand still if the head is secured.

Show pictures or actual foot trimming rack.

Foot Trimming Rack
There are two kinds of foot trimming racks. The older types have bands or slings that are secured around the animal to support their weight as they stand in the rack. The feet are then secured.

The newer types of racks secure the animal against a wall-like structure. The wall is then turned so that the animal lays on its side. The feet are secured with ropes or straps.

Casting or "Throwing"
Casting or "throwing" is laying an animal on the ground. This is sometimes necessary so that certain functions, such as surgery, can be performed.

There are several methods of casting animals with ropes. Two of these are the rope method and the Burley method.

Show Methods of Casting, Handout 11.

The rope method begins by placing a loop around the animal's horn or neck. Two half hitches are made around the animal's body behind the shoulder and in front of the hip bone. Pull the end of the rope. When enough pressure is applied the animal will fall and its feet can be secured. Keep enough pressure on the animal to prevent it from getting up, but not enough to cut off its wind.

The Burley method of casting requires a rope approximately 40 feet long. The ends of the rope are passed under the front legs and crossed with an

end being carried up each side of the animal's body. Following this, the two ends are again crossed over the back. Each rope end is then passed down between the rear legs. As pressure is applied to the ends, the animal will fall. The operator can determine which side the animal will fall on by pulling the ropes.

A basic knowledge of restraining beef animals can make the job easier and less costly because of injuries and bruises to cattle. Also, using safety practices may prevent injury to YOU!

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. If you tried the casting methods of restraint, explain how it worked or any problems you had.
2. What treatments might be best suited for a squeeze chute?
3. What restraint method was easiest and most difficult? Why?

Process:

4. What experiences have you had restraining animals?
5. What are the major safety factors for both animals and humans to consider when using a restraining method?

Generalize:

6. Why do you think only physical restraint is used in procedures such as dehorning, castrating, etc., rather than chemical restraint (anaesthesia)? Discuss.

Apply:

7. If you practice any of these restraint procedures, what would you do differently next time?

GOING FURTHER:

1. Use proper safety and restraint of animals when working with your project.
2. Observe different restraints of beef animals. Give report to projected group on when and how restraints were used.
3. Demonstrate a restraint method to project group.
4. Demonstrate how to tie a beef animal correctly and safely.

Set up a skillathon situation and have members cover the following points:

- List as many safety guidelines as they can remember.
- Name three types of restraints.
- Describe casting and what operations it would be used with.
- Explain how an animal might injure itself if not properly restrained.

Leader Notes

REFRENCES:

The Stockman's Handbook, Ensminger, M.D., Fourth Edition, The Interstate Printers and Publishers, Inc., Danville, Illinois, 1970

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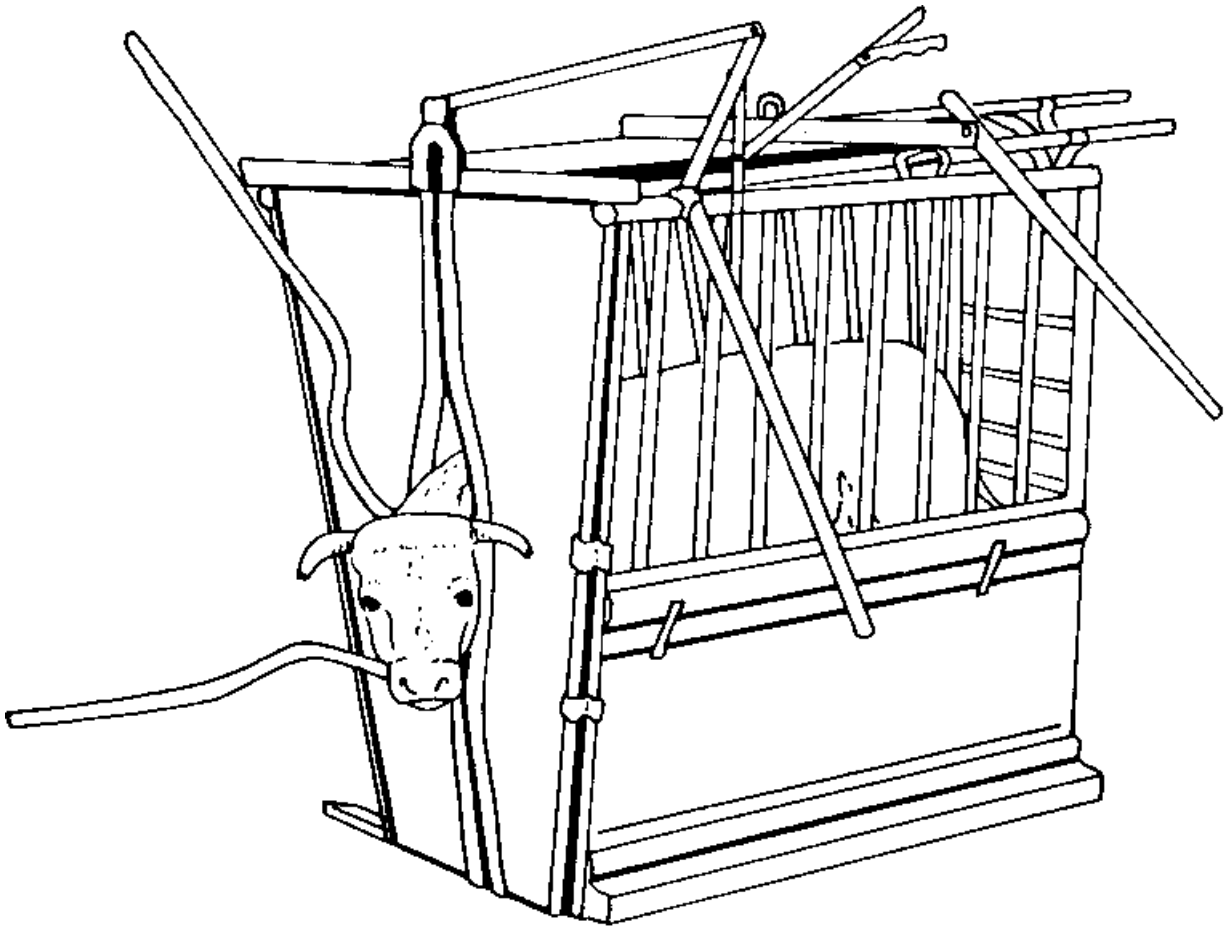
RESTRAINING BEEF CATTLE

BEEF, LEVEL III

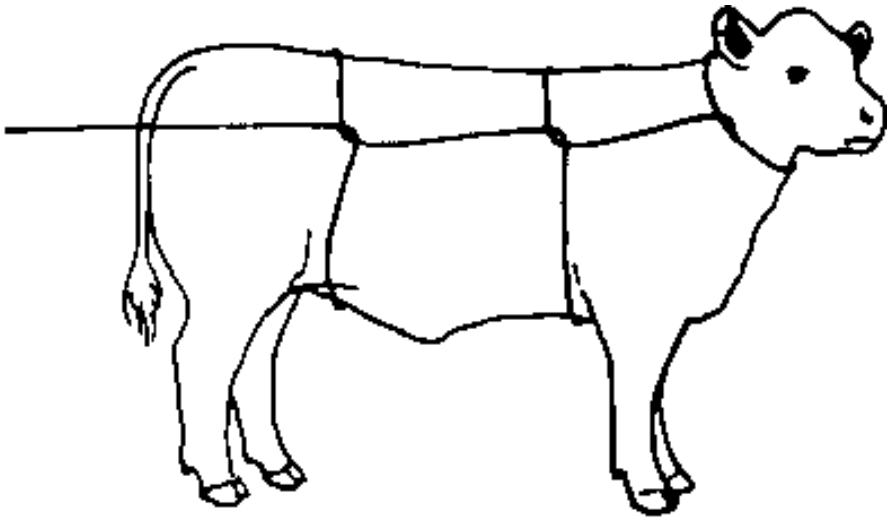
Handout 10, Squeeze Chute with Head Gate



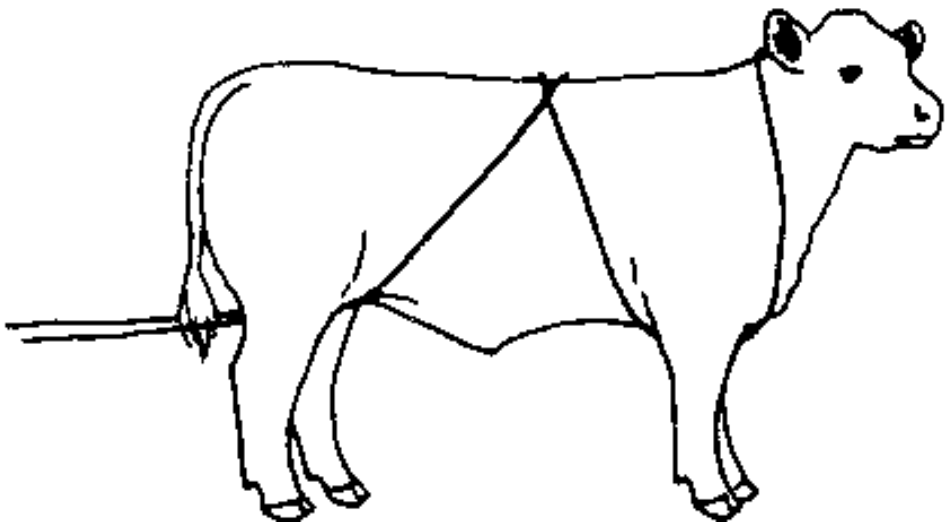
RESTRAINING BEEF CATTLE

BEEF, LEVEL III

Handout 11, Methods of Casting



Rope Method of Casting



Burley Method of Casting

Dehorning Cattle

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- Why horns are taken off cattle
- To identify dehorning equipment
- Five different methods of dehorning

ABOUT THEMSELVES:

- The importance of safety in decision making

Materials Needed:

- Caustic paste or stick for chemical dehorning
- Dehorning irons
- Spoon and tube dehorners
- Barnes-type dehorner
- Dehorning saw
- Dehorning or Keystone Clippers
- Forceps
- Petroleum jelly
- Disinfectant solution
- Blood stopper samples
- Activity Sheet 5, Dehorning Quiz Bowl Questions
- Flipchart or chalkboard

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Leader Notes

Beef cattle producers lose thousands of dollars annually because they do not dehorn calves, or do not get them done on time. Why should calves be dehorned? When and how should it be done? This lesson answers these important questions.

Ask members to name as many ways as they can to dehorn an animal.

Horns are of no use to commercial beef cattle. Some breeds of cattle grow horns, and some are polled (without horns). Horned cattle can be dehorned. Dehorning can be done by surgery, heat or chemicals.

Ask members to explain what they know about the dehorning techniques named. Have them mention, while someone lists in front of the group, major reasons for dehorning.

Reasons for dehorning cattle are that dehorned or polled commercial beef cattle:

1. Sell for a higher price
2. Are safer to handle
3. Fight less and injure other cattle less
4. Require less feed bunk and barn space

Some producers or breeders believe that dehorning enhances the appearance of the animal.

Calves should be dehorned early in life (preferably before 2 months of age) to lessen stress and setback in growth. As cattle get older, the procedure becomes more difficult to do and more dangerous to the animals. Dehorning older cattle causes more stress to the animals because when the horns are mature the blood vessels have grown up into the horns and this results in excessive bleeding when the horns are removed. The sinuses are also opened to irritation and infection in older cattle.

METHODS OF DEHORNING

The age of the animal usually determines the method of dehorning used. Other factors to consider are the size of the horns and the equipment and labor available. Methods of dehorning are classified as chemical or surgical.

Chemical Dehorning

Show chemical dehorning materials, clippers and petroleum jelly.

A caustic paste or stick can be used to dehorn calves up to 6 or 8 weeks of age, where only a button can be felt. It is usually most successful before calves are 10 days old.

Demonstrate on a calf, if possible. Let members see and feel horn buttons.

To prepare a calf for chemical dehorning, clip the hair from around the base of the buttons or small horns. To prevent severe burning, apply petroleum jelly around the base of the horn and above the eye area.

Next, apply the caustic material in either a stick or paste. IF A STICK IS USED, MOISTEN either the button or the end of the stick. Observe caution not to get the caustic material on the dehorner's skin or in the animal's eyes.

Keep the calf by itself a few hours until the treated area is hardened and dry.

This method is not commonly used in large beef herds, but is used in small, intensively managed herds. Care should be taken to prevent injury to the dehorner and excessive burning of the animal.

Surgical Dehorning

The type of dehorner used will determine how the cattle are handled. If a squeeze chute is used, the operation is simpler because the animals don't have to be held by hand or thrown down.

Hot Iron Dehorning

Show hot iron dehorner. Demonstrate, if possible.

The hot iron method is bloodless and considered a good way to dehorn calves up to about 3 months old that have passed the button stage.

Electrically-heated irons should maintain a proper temperature.
Fire-heated irons should be heated only to a dull red. Always wear leather gloves when using a hot iron.

Take the hot dehorner and place it over the horn. Hold the iron firmly against the head for 15 seconds or just long enough to brand the hide around the base of the horn to the color of new leather. This should be long enough to kill the horn growth cells at the base of the horn. The horn should slough off within six weeks.

Spoon and Tube Dehorners

Show spoon and tube dehorners.

Horn buttons or small horns can be removed with a spoon or tube dehorner—usually up to about 3 months of age. The horns on calves this age are still skin appendages and can be scooped out easily. Dehorning tubes vary in size and can be bought in sets of four. The tube must be large enough to fit over the base of the horn and include about ⅛ inch of skin around the horn. This will include some hair and ensure that regrowth does not occur.

When dehorning, the cutting edge of the tube dehorner should be placed straight down over the horn. The operator should push down and twist the tube until the skin has been cut through.

Next the operator should use the cutting edge of the tube to cut under the horn button and to remove it.

Apply an antiseptic and insect repellant, if needed.

The spoon is used to scoop out the horns on young calves. Experienced producers can do a fast, efficient job of dehorning with the spoon.

Barnes-type Dehorners

Show Barnes-type dehorner.

Another common dehorner is the Barnes-type dehorners, which is available in two sizes. The smaller size is used on calves 4 to 8 months of age. The larger size is used on yearling cattle. It is important when using this type of dehorner that the animal be restrained enough for pressure to be applied properly.

To dehorn, close the handles and fit the knives over the horn. Position the knives so that a ring of skin is removed with the horn. Quickly spread the handles apart and twist, applying considerable pressure against the head. This motion closes the knives and removes the horn.

Dehorning Clippers

Show keystone dehorner.

Dehorning clippers or Keystone dehorners are used the most by producers. They are fast, easy to use, and leave a smooth cut. It is important to remember when using the clipper to place the open blade so that it removes ½ inch of skin with the horn. The deep cut destroys the modified skin cells from which the horns grow.

Once the clippers are in position, quickly close the handles and remove the horn.

Leader Notes

Show dehorning saw.

Dehorning Saws
Either hand or electric saws can be used to remove horns. As in all dehorning, remember to remove a ring of skin to prevent later regrowth of abnormal horns. A local anesthetic can be given to eliminate pain caused by the saw.

Control of Bleeding

Show forceps.

When dehorning using surgical methods, bleeding should be controlled. Bleeding can be minimized by using forceps to pull the arteries. Since arteries are elastic they stretch and break below the surface and slip back into the soft tissue. A torn artery clots much faster than one that is cut as in the dehorning process. Use the following procedure to control bleeding.

Show samples of antiseptic and fly repellant.

After dehorning, pull the major exposed arteries with forceps. The major source of bleeding is usually a large artery in the lower part of the cut on the side nearest the ear. Other arteries needing to be pulled are located near the top and bottom of the cut. Apply a non-irritating antiseptic and a fly repellent.

Show samples of blood stoppers.

In severe cases, gauze or tissue paper and a commercial blood stopper are used. The blood stopper is applied, then several layers of the pad (gauze or tissue paper) are placed over the wound.

Sanitation
It is important to keep equipment clean so that infection is not spread from one animal to another. The dehorning equipment should be soaked in a disinfecting solution. This solution can be made by mixing four ounces of cresol in a gallon of water. In the past, screwworms have been a serious problem in wounds caused by dehorning. Select a cool day with sunshine to reduce stress and help prevent screwworms.

Care after Dehorning
It is important to apply insect repellent on the wounds. Keep animals in a large pen or small pasture for a few days after dehorning. Inspections can be made for infection and to ensure the animals have started to heal. Feeding a small amount of feed each day will help gentle animals following dehorning.

Dehorning wounds in large cattle heal slowly and care must be taken to prevent sinus infection.

Cosmetic dehorning can be done by veterinarians. Horns are removed and the wounds closed to improve the appearance of the poll.

Leader Notes

SUMMARY
Most commercial producers prefer that cattle be dehorned. Becoming knowledgeable about dehorning procedures is necessary to a modern producer.

Conduct a Quiz Bowl using the review questions on Quiz Bowl Activity Sheet 5. Divide group into two teams and award points for correct answers.

DISCUSSION QUESTIONS:
These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.
Share:

1. Which method of dehorning have you observed the most?
2. Which method of dehorning is the easiest? Most difficult?

Process:

3. What are the major problems when dehorning cattle?
4. How can you avoid having to dehorn cattle?
5. What problems do horns cause in feedlot cattle? Why?
6. What are the most important reasons to dehorn cattle? Why?
7. Why might some producers choose not to dehorn?

Generalize:

8. What did you learn about yourself from this activity?
9. How important are sanitation measures and control of bleeding when you scratch or cut yourself?

Apply:

10. How important are safety issues in your daily decision making? Why?

GOING FURTHER:

1. Visit a local ranch and observe dehorning practices.
2. Observe a veterinarian performing a cosmetic dehorning or a regular dehorning.
3. Practice and learn to dehorn a calf using one of the dehorning procedures.
4. Give a demonstration on how to dehorn a beef animal.
5. Observe an animal(s) for several days after dehorning.
6. Assist in dehorning animals.

Leader Notes

REFERENCES:

Dehorning, Castrating, Branding, and Marketing, USDA FB-2141
The Stockman's Handbook, Ensminger, M.E., Fourth Edition, The Interstate Printers and Publishers, Inc., Danville, Illinois, 1970

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DEHORNING CATTLE

BEEF, LEVEL III

Activity Sheet 5, Dehorning Quiz Bowl Questions

Q: Why should horns be removed?
A: Horns can cause damage and injury to both animals and people. Animals with horns are more difficult to handle. Sometimes horns that are allowed to grow and not trained properly may grow into the head or into an odd-shaped angle which will tend to cause excessive damage.

Q: What equipment might be used to remove horns?
A: Caustic paste, hot irons, spoon and tube dehorners, Barnes dehorner, saw or clippers

Q: What equipment is recommended to dehorn a newborn calf?
A: The equipment recommended would be a caustic stick, tube calf dehorner or heat dehorning iron.

Q: When is the best time to dehorn a calf?
A: The best time is when the horns are in their least developed stage because it will cause less stress to the calf. In general, the earlier the better. Calves can be dehorned right after birth, and before 3 months of age.

Q: What problems might occur if the horns are not removed when the animal is young?
A: When dehorning is delayed until the animal is mature and the horns are mature the blood vessels have grown up into the horns, resulting in excessive bleeding when the horns are removed. This causes a great deal of additional stress to the animal.

Q: How do you use the caustic stick on the newborn calf?
A: Use hand clippers or scissors to snip the hair around the horn button. Spread a ring of petroleum jelly outside or around the ring of the horn button so the caustic compound won't burn the skin. Apply the paste or caustic stick to the horn button by rubbing vigorously in a circular motion.

Q: How would you use the hot iron method?
A: After heating the iron either electrically or in a fire, place it over the horn button or the horn and apply pressure until a deep copper-colored ring appears around the horn.

Q: How long will it take for the horn to slough-off after using the hot iron?
A: Four to six weeks

Q: What is one of the advantages of the hot iron?
A: The heat stops the bleeding and cauterizes the wound.

Q: How would you use the dehorning tube?
A: Put the tube over the horn, push down and twist until the tube cuts the skin around the horn. Apply pressure and twisting motion until the horn is gauged out.

Q: How would you use the Barnes-type dehorner?
A: Push the dehorner firmly against the skin around the horn, spread the handles apart. This closes the knives and removes the skin.

Q: If a saw was needed for larger horns how would you use it?
A: Cut from underneath the horn so that the angle of the skull may be followed. Do not cut from the top, as it is easy to cut into the skull this way.

Q: What precautions can you use to prevent infection?
A: Have a disinfectant solution to dip the tools in prior to, and between, each use.

Q: If you have excessive bleeding, what would you do to stop this?
A: Use a forceps or thin needlenosed pliers to grasp the blood vessel, pull it out. This will tend to break the blood vessel at a lower point which will increase the pressure on it and allow clotting to occur.

Q: Is there a less painful way to eliminate horns from your herd?
A: The use of cattle that are naturally polled will eliminate the problem.

Implanting Beef Cattle

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- What an implant is
- How to implant beef cattle

ABOUT THEMSELVES

- Decision-making skills
- Their abilty to learn a specific skill

Materials Needed:

- Implanting tool
- Sharpening stone
- Disinfectant
- Beef ear model or live calves
- Flipchart or chalkboard

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

Leader Notes

Twenty-five years of research and industry experience have shown no management tool that returns more dollars per dollar invested than implanting.

Show various implants. Actually remove an implant from a package and show its structure.

Implants are compressed pellets or slow-release devices that are placed under the skin of the ear. Each implant contains a growth stimulant that is slowly released into the blood stream. As with any management tool, these products should be used only as approved on the label. Abuse of these products may result in negative side effects. Read and follow labels closely. Implanting is easy, but must be done properly.

Now, demonstrate how to implant. Use a fake ear made from fabric or paper or plastic. Emphasize the area of the ear where implants work best.

Here are a few basic points:

1. Use a sharp needle
2. Select the proper implant site
3. The proper angle of needle insertion is under the skin and above the cartilage
4. Back the needle off slightly before pulling the trigger
5. Keep the trigger depressed as you remove the needle from the ear
6. Implanting near the tip of the ear in the cartilage or in the blood vessels will alter absorption and reduce potential gains.

List steps in implanting on flip chart or chalkboard before having members practice.

SUMMARY

Implanting is a fast, easy procedure that can be that slight edge in total cattle management. Thousands of tests have shown the benefit implanting

can have on rate of gain and feed efficiency in suckling beef calves, grazing and wintering yearlings and feedlot steers and heifers. Implanting can produce that extra gain that can mean the difference in beef cattle profitability. However, it will not replace other good management practices. Implanting is easy, but it must be done properly.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. Why do beef producers use implants?
2. If you have tried to implant an animal, what was most difficult? Easiest?

Process:

3. What problems can occur when implanting?
4. How can you decide if your calf would benefit from an implant?
5. When would implants not be recommended?

Generalize:

6. What is the significance of implants in the beef industry?
7. Why is it important to use recommended dozes of antibiotics or other prescribed drugs?

Apply:

8. In what other ways have we used growth stimulants? What have been the results?
9. If you have not used implants in the past, would you in the future? If you have used implants in the past, would you continue? Why?

REFERENCES:

Beef 4-H Project Meeting Guides, University of Minnesota
The 1980s—A New Era in Cattle Management, Kansas State University
Implanting Beef Cattle, GTE-1603, *Great Plains Beef Cattle Handbook*

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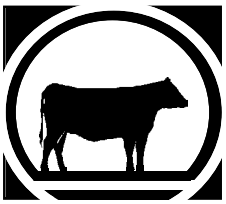

The Comfort Zone: Knowing Your Animal's Normal Temperature

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- To identify the healthy temperature of a beef animal and what internal and external factors affect it
- To list the healthy temperatures of five other animals, including people
- How to take the temperature of a beef animal

ABOUT THEMSELVES:

- Body functions that help adjust to different environmental temperatures

Materials Needed:

- Thermometers (glass or digital)
- Paper towels or clean rags
- Petroleum jelly or similar lubricant
- Paper and pencils
- Model animal of a calf (patterns may be purchased)
- Handout 12, Vital Signs
- Live calves (optional)

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

All animals can be classed as either cold-blooded or warm-blooded. The body temperature of cold-blooded animals changes with the temperature of the air or the environment they live in. Many of these animals go into hibernation during cold weather and move quite slowly when the outside temperature is cold. As the temperature increases, these animals move faster. Snakes are an example of a cold-blooded animal. Can you think of others? (lizards, frogs, toads, reptiles or amphibians)

The body temperature of warm-blooded animals, on the other hand, is maintained at a uniform temperature that is unique to each type of animal. Obviously, then, the body temperature of warm-blooded animals may be much higher than that of the air during cold periods and somewhat below that of the air when the weather is hot. Humans are warm-blooded. What are other examples? (cattle, sheep, pigs, dogs, chickens)

Since all farm animals are warm-blooded animals, we are going to be learning more about this class of animals and how to determine the temperature of your beef animal.

Leader Notes

Now have a Fun Quiz. Have cards with various animals on them (correct answer on back) and have members guess or answer whether warm- or cold-blooded.

Leader Notes

The body temperature of warm-blooded animals tends to vary from about 98°F to 105°F. Death occurs if environmental temperatures should become extremely high or low for any appreciable time unless the animal can get out of the extreme temperatures. People can put on coats to keep warm when it is cold, or wear light-colored, light weight clothing when it is hot. Animals, of course, don't have this luxury and depend on us to help them maintain their body temperature.

Most farm animals, like beef cattle, produce a great amount of heat just through normal body functions like walking, digestion, breathing, and other activities. Thus, most mature animals are concerned with staying cool rather than with keeping warm, except during periods of extreme cold. Animals on full feed, like those in feedlots have difficulty staying cool unless the environmental temperature is 40°F or more **below** body temperature.

Very young animals, though, are easily chilled. And their body temperature does not increase until they obtain food and generate heat through the work of digestion. Very young animals may be chilled and die when the temperature is cold because they are wet when they are born and evaporation of the moisture from them increases the cooling effect of the temperature. If born in cold weather, the young should be wiped dry and encouraged to nurse almost immediately; it may also be necessary to provide some kind of heat for the newborn animal.

The comfort zone for most farm animals is between 60° to 65°F. In this range, heat production and heat loss by animals are about the same. When the temperature is between 0°F and 50°F, animals increase their feed intake, exercise more, increase their heartbeat rate, and reduce blood flow to the surface of their skin and to their outer limbs. Animals may shiver, which is a form of exercise that generates heat. Some animals get close together when they are cold so each can make use of heat from others. Getting close together can lead to "piling up" and death if it is carried to an extreme.

Again, use cards to indicate a behavior (panting, shivering) and have members answer if animal is cold, hot or comfortable.

Between 65°F and 80°F, animals become slightly uncomfortable. Their blood vessels dilate near the skin and in their limbs so that the surface of their bodies becomes warm, water consumption increases, breathing becomes rapid, and, in animals that can sweat, perspiration increases (pigs don't sweat). When and where do you observe some of these signs on your body or friends' bodies?

Above 85°F, animals that have the ability to sweat keep their bodies wet with sweat so that evaporation can cool them. Nonsweating animals breathe rapidly (called panting) and are cooled by evaporation in the lung tissues. What are examples? (Hogs and dogs)

When the temperature exceeds 90°F, animals suffer. Hogs may die from such heat. All animals tend to become less active, and they usually lie down in the shade. Reduced activity decreases the amount of heat that is generated and lying in the shade reduces the heat from the sun. Water

consumption and urine excretion increase, and if the water consumed is cooler than the temperature of the animal, considerable cooling and relief can occur.

When the body temperature of an animal exceeds normal because the animal cannot dissipate its heat, a condition known as fever results. Fevers often are most severe when temperatures are extremely high or extremely low. How should fever be treated? (Keep animal as comfortable as possible while medication is given.)

Have members discuss or list treatments to help reduce fever for animals and people. Compare the list.

An animal can't tell you when it is sick. You have to be able to tell. The best method is to take the temperature of your animals if you are not certain.

Let's look at Handout 12, Vital Signs, to see what the normal temperature of most farm animals is. We can see that most beef cattle run about 101.5°F. But, you should then begin looking for other signs like those we listed before.

Pass out Handout 12, Vital Signs to each member.

According to this list, what other animal has about the same temperature as a cow? (dog) What kinds of animals tend to have relatively high temperatures? (poultry—chickens at 107°F and turkeys at 105°F.)

Now, how can you take the temperature of your beef calf? The best method is the use of a rectal thermometer. Why do think you wouldn't want to use a human thermometer for your beef calf? (You will need to be sure to buy one that is made for farm animals, not one for humans since their temperature, remember, is much lower than most farm animals.) There are a variety of thermometers available, from the traditional glass mercury thermometer to the fancy digital thermometer. The newer digital thermometers are the most accurate and easy to use, but they are the most expensive and only cost-effective for very large herds.

Thermometers can be difficult to read. It may help to take a glass of water and have the member check the water temperature to learn to read the thermometer.

Let me demonstrate how to use a normal glass thermometer for you and then we'll have you practice on some animals. First, you will need to restrain the animal in some fashion. A squeeze chute is best, but if your animal is young enough and used to having you around, tying up might be sufficient. Gently lift the tail, and insert the thermometer into the anus about two inches. You will need to leave it there for about a minute to get an accurate reading. Hold it there and remain calm—don't move around a lot or you will cause your animal to get anxious.

After about a minute, remove the thermometer and wipe it off quickly with a paper towel or clean rag. Then, read the temperature. Record it on a piece of paper so you don't forget it. Now, compare it to what you know about the normal temperature range of a beef animal.
Let's practice on some calves now.

Leader Notes

Let the members practice taking a calf's temperature on either the live calf or the model. Use care with live calves to avoid kicks or other injuries. Be sure everyone has a chance to try it if they want.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What did you learn about warm and cold-blooded animals?
2. If you took the temperature of a live calf, explain how you did it? What was difficult? Easy?

Process:

3. What are the indicators that animals are cold/hot?
4. What experiences have you had in treating animals with a fever? What did you do?

Generalize:

5. Because farm animals are warm-blooded, what can they do that cold-blooded animals cannot?
6. What role do wet and/or windy conditions play in maintenance of body temperature?

Apply:

7. What procedures can you use to help animals adapt to temperature extremes?

GOING FURTHER:

1. Find out the normal temperature of an elephant (or other animal). How does an elephant keep cool?
2. Find out why some Brahma-cross cattle are often preferred in southwestern states like Texas and Arizona.
3. Give a demonstration at your next club meeting on taking the temperature of an animal.
4. Survey your facilities. Do you have places for animals to get out of the sun and heat during the summer? How can your facilities be improved economically?
5. Visit a veterinarian, ask how body temperature is used in diagnosis and treatment.

REFERENCES:

Author:
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THE COMFORT ZONE: KNOWING YOUR ANIMAL'S NORMAL TEMPERATURE

BEEF, LEVEL III

Handout 12, Vital Signs

Animal	Rectal Temperature°F (temperature range)	Respiration Rate (per minute)	Heart Rate (per minute)
Human	98.6	16 (14–20)	70 (60–100)
Cattle	101.5 (101.4–102.8)	30 (10–30)	50 (40–70)
Goat	102.3 (101.3–103.5)	15 (12–20)	90 (20–135)
Sheep	102.4 (100.9–103.8)	19 (12–20)	75 (60–120)
Horse	100.0 (99.1–100.8)	12 (8–16)	45 (35–70)
Swine	102.5 (101.6–103.6)	16 (8–18)	60 (55–85)
Chicken	107.1 (105.0–109.4)	12–36	275 (250–300)
Turkey	105.0	28–49	165 (160–175)
Dog	101.5 (99.5–102.2)	10–30	70–120
Cat	102.0 (100.4–103.1)	20–30	110–130

Where Does it Hurt?
Introduction to Common Cattle Diseases

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- The names and causes of some common diseases
- The organs affected by each disease
- To understand the role of vaccines and prevention

ABOUT THEMSELVES:

- To develop an understanding about the importance of prevention
- To develop responsible behaviors and responsibility for self

Materials Needed:

- Large picture or slide of a steer showing the respiratory and gastro-intestinal systems (from library or veterinarian)
- Vaccines and/or vaccine containers
- Play money (approximately $1,000 for each member)
- Sheets of cardboard, 3 × 5-inch cards or pieces of paper

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

It is very important that your beef animal remain healthy. When it is sick, it won't eat and drink and will lose weight. This is bad because we sell most beef cattle based on how much they weigh. So, if they lose weight, we lose money. But you can't ask an animal if it feels well today or where it hurts? So we have to be able to recognize when our animals are sick. The first step in doing that is becoming familiar with the names of various diseases.

This picture shows the animal's lungs and throat as well as its intestines. Can you pick out all these parts?

Leader Notes

Write the names of the various diseases to be studied on one side of the card. Some of the more prevalent diseases in your area may be written on two or three cards in the stack, while less prevalent ones may only be written on one card. Leave some cards blank. Shuffle the cards and leave them face down so no one can see what's on them. This stack of cards is the "Disease" stack.

Write the names of various vaccines or diseases they prevent on one side of a group of cards. Make sure there are enough cards so that each member can have one of each vaccine. This stack of cards is the "Vaccine" stack.

Show the picture of the steer.

Leader Notes

Show the lungs and trachea (windpipe). Show the "Disease" cards labeled with these diseases.

These organs make up the respiratory system — or breathing center. Just like humans get pneumonia, so do cattle, but it can be caused by other diseases like: IBR, BVD, PI-3, BRSV, *pasteurellosis* and *haemophilus*. Those are probably strange names to you, but they are bad for your animals and must be prevented if there is a chance that they can get them.

This is the intestinal system. This system must be working properly in your calf for it to eat and be able to digest its food. If it can't do that, it won't gain weight. There are some diseases that affect the intestinal system and cause severe diarrhea—BVD and *coccidiosis*.

Show the "Disease" cards for these diseases. Point to the eye and show the pinkeye card.

Another common problem is pinkeye. It is actually an irritation or infection in the eye and if it gets bad enough, the calf may go blind.

Point to the muscle of the neck and hindquarter. Show the cards for these diseases.

The calf is made up of muscle which is what we eat when we eat a steak or hamburger, so it needs to be in good shape. If a calf gets a muscular disease, not only will it not feel well, but it may lose a lot of muscle and possibly die. Two diseases that affect muscle are *blackleg* and *malignant edema.*

Point to the kidneys, bladder, etc. Show the card for this desease.

One disease that may affect many organs is *leptospirosis.* It mainly affects the urinary system, but every organ is important to the health of your calf.

Show the cards for these diseases and place them in a pile labeled "Viruses."

Each disease must have a cause and there are three common causes for diseases. The first is **viruses.** This is the smallest of the three. Viruses may cause IBR, BVD, PI-3, and BRSV.

Show the cards for these diseases and stack them labeled "Bacteria."

The next cause of diseases that we will study is **bacteria.** These are a little larger in size than viruses. Bacteria may cause *blackleg, malignant edema*, *pasteurellosis, haemophilus, leptospirosis* and *pinkeye*.

Show card for this disease and label it "Protazoa."

One more common cause of disease is **protazoa.** Although you must look through a microscope to see all these, the protazoa are the largest in size. Coccidiosis is caused by a specific protazoan.

Pass around the bottles or packages for different vaccines.

Because we don't want our cattle to be sick, we need to protect them in some way. Vaccines are substances that mimic a certain disease. The vaccine causes the body to fight the disease, building up an immunity to it. If the calf is later exposed to the disease, its immune system (disease resistance) will lessen the damage of the disease. By vaccinating our cattle for certain diseases, we can protect them from damage. One vaccine doesn't protect the calf from all diseases. Each disease has different causes and, therefore, different vaccines.

SUMMARY

All of these diseases cause the animal to be sick. A sick animal doesn't eat normally so it doesn't gain much weight. It might even lose weight, which means a loss of profit or possibly no profit. Vaccines are like an insurance policy, they decrease the amount of damage a disease will cause.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What did you think was the most serious cattle disease? Why?
2. What are the risk and protective factors of a health management program?

Process:

3. Which of the common causes for disease seem to be best prevented by vaccines?
4. What vaccinations has your calf had?
5. What vaccinations are different for heifers versus steers?
6. What is significant about the cost of prevention compared to the cost of getting the disease?

Generalize:

7. What else do you know about vaccines in general and their significance?
8. What are the potentials for epidemics without vaccinations?

Apply:

9. Before vaccines, contagious diseases were handled by quarantine or isolation. When might these methods be used today?
10. Can vaccinations be a requirement for interstate or international travel? Discuss why or why not?

GOING FURTHER

1. Have a veterinarian as a guest at your meeting to answer questions.
2. Visit a feedlot. Look at healthy cattle first and then the sick pens.
3. Design a vaccination schedule for your project. Compare it to that recommended by a veterinarian.

REFERENCES

Current Veterinary Therapy–2, J.L. Howard, 1986
Merck Veterinary Manual, 6th edition, 1985

Author:

This lesson was modified from original material authored by Calvin Binns, D.V.M., and Deborah K. Lyons-Blythe, County Extension Agent, Agriculture, Kansas, with adaptation by:
Larry R. Corah, Extension State Leader, Animal Sciences and Industry, Kansas State University
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Vaccine—Disease Game

Using play money, give each player $600. Each person buys a calf for $400 and feed at $190. That leaves each with $10 to purchase vaccines for their calf. The leader should set the prices for each vaccine. They may vary from game to game, but the **total** cost for all vaccines should be $20 so that the players cannot buy all the vaccines for their calf. (For example $2 per vaccine.)

The leader should hold the extra money and act as the "Bank." Also, the leader should hold the extra "Vaccine" cards and be sure each player has had a chance to pay for the vaccines wanted. Players do not have to buy vaccines, they can take their chances.

Stack the "Disease" cards face down in the middle of the group. After each player has bought the vaccines desired, each person draws two cards from the stack of "Disease" cards. The sale price for a healthy calf is $750. If a player draws a blank card, there is no discount in the sale price of the calf. If a card is drawn with the name of a disease for which the vaccine was bought, again there is no discount. But if a card is drawn with the name of a disease for which that player did **not** buy the vaccine, the sale price for that player's calf is discounted (decreases) by $100.

Cooperative Extension Service
Kansas State University
Manhattan

Common Cattle Diseases: Bloat and Acidosis/Founder

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- How to identify a bloated calf and a foundered calf
- How to prevent bloat and acidosis in cattle
- How to treat bloat and acidosis

ABOUT THEMSELVES:

- The effect environment and community has on your diet
- How the amount and kind of food affects your body

Materials Needed:

BLOAT:

- Picture of bloated calf and normal calf (or live animals)
- Sample of coarse long-stemmed hay and coarsely ground grain
- Sample of finely ground hay and finely ground grain
- Sample of block containing poloxalene (Bloat Guard)
- Bottle of poloxalene (Therabloat)
- A 6-foot long rubber hose, 1/2 to 5/8 inch in diameter
- Trocar or cannula to puncture the rumen in cattle

FOUNDER:

- Picture of a calf with long hooves as a result of founder (or live animal)
- Sample of a high-roughage ration and a high-concentrate ration
- Sample of sodium bicarbonate
- Chalkboard or flip chart

ACTIVITY TIME NEEDED: 30 TO 60 MINUTES

ACTIVITY

Leader Notes

BLOAT

A common problem in market cattle is bloat. In severe cases it can cause death, but if caught early, is easily treated. Here is what a normal calf should look like. Bloat affects the rumen, or the calf's stomach, so an affected calf will have a swollen stomach and will look like this. The calf will have a swelling on the left side of its body, because that is where the rumen is located.

Note: See observations from Level I "Is Your Calf Sick or Well?"

Bloat is a swelling of the rumen, caused by the entrapment of fermentation gases in the rumen—which can't get out—causing the rumen to swell. Bloat may be caused by a number of things, all related to the type of feed. Finely ground hay and grain in finishing rations often cause bloat.

Show normal calf (rear view).
Show bloated calf (rear view).

Leader Notes

Show coursely ground feedstuffs.

Coarsely ground hay and grain seem to cause little incidence of bloat and, therefore, should be included in a finishing ration.

Legume plants, such as alfalfa, seem to cause a higher incidence of bloat than grass hays. And, some grains are more likely to cause bloat. For example, cattle fed barley or milo are more likely to bloat than cattle fed corn, wheat or oats.

Show Bloat Guard block.

Beside coarsely ground feed, there are other things that can be fed to help avoid bloat. A block containing poloxalene can be bought and fed to cattle. Poloxalene helps reduce the chance of bloat.

Show Therabloat bottle.

Also, poloxalene is available in a bottle and can be given to a bloated calf to release the built up gases.

Show rubber tube.

In order to directly release the trapped gases in the rumen, you can put a rubber tube down the calf's throat, into the rumen, and allow the gases to escape through the tube. This should only be done after attempting to relieve the calf via exercise—brisk walking for 15 minutes.

Show trocar or cannula.

And in very severe cases, a veterinarian may suggest using a trocar to puncture the rumen to release the trapped gases in a hurry. This method is only a last resort and should be used with extreme caution only after all other methods have failed.

SUMMARY:
In order to avoid bloat, once again, feed only coarsely ground grain, be sure to include some roughage in the ration, add a source of poloxalene to the ration and reduce the amount of legumes fed.

But no matter what you do, it seems each member will at some time have a calf that bloats at least once. If your calf bloats, try walking him to relieve the gas. If still bloated after 15 minutes of walking at a good pace, call a veterinarian or someone experienced with dealing with bloat. Do not try to relieve the gas by yourself. You may injure the calf when you're trying to help.

DIALOGUE FOR CRITICAL THINKING:
These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.
Share:

1. What causes bloat?
2. How can you tell if a calf is bloated?

Process:

3. Which feeds are more likely to cause bloat?
4. What experiences have you had with cattle bloat? How did you treat it?

Generalize:

5. What other livestock are prone to bloat?

Apply:

6. Can you apply what you've learned about controlling bloat to other livestock?

ACIDOSIS/FOUNDER

There is more than just pouring feed in the bunk to providing a healthy ration for your calf. The time of day and what you feed also may make a difference. Make a schedule for the year and stick to it. Most members feed twice a day—early in the morning and in the cool of the evening. When switching your calf from the growing phase (feeding high-roughage feed) to the finishing phase (feeding high-concentrate feed), do it slowly so there is a gradual change in the daily ration. After a week or two, the ration (will be) totally switched. If you don't follow these suggestions, you can cause your calf severe problems. A large increase in concentrates in the feed, or a large intake of the usual high-concentrate diet in a short time may result in acidosis.

Acidosis is caused by overproduction of lactic acid in the rumen due to the increase in energy available from the high-concentrate ration. When acidosis is not detected and treated, the rumen becomes immobilized causing a high fever and a change in the body, resulting in founder (extremely long and sore hooves.)

Show picture (or live calf) of a foundered calf.

One symptom of acidosis is the calf will quit eating. If this occurs, call your veterinarian immediately because fast action is needed to prevent permanent damage.

Give names of veterinarians in your local community.

Reduce the amount of feed you give your calf at the next feeding and ask your veterinarian about giving your calf sodium bicarbonate. This acts as a buffer and fights the acidosis if it is given as soon as the overeating and acidosis occurs.

Show sodium bicarbonate.

If you treat acidosis immediately, you should still be able to show your calf. If the acidosis goes unnoticed and untreated, the steer will have sore feet and become stiff. This is called founder. Once the steer is foundered he will not show very well even if he continues to gain enough to reach show weight.

Show steer with founder.

The best prevention is to feed at the same time each day. Any changes to rations should be made gradually. Make sure cattle eat in all weather conditions. If severe weather causes cattle to stop eating, cut back on the ration and feed more roughage. Gradually increase feed levels back to pre-storm levels.

Leader Notes

Review by listing symptoms and treatment of acidosis/founder on chalkboard or flip chart.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What seems to be the main causes of acidosis?
2. How can acidosis be prevented?

Process:

3. What is the main treatment for acidosis?
4. How might the weather affect acidosis?
5. Why is it significant to treat acidosis quickly to prevent founder?

Generalize:

6. What other livestock may develop acidosis resulting in founder?
7. Once an animal founders, what are the chances for it to founder again? Why?

Apply:

8. Discuss the advantages and disadvantages of self-feeding livestock as it relates to acidosis and founder.

GOING FURTHER:

1. Visit a local veterinarian about bloat and founder prevention and treatment.
2. Visit a local feedlot about prevention of bloat and founder.
3. View the video, *Health Care of Club Calves,* Kansas Cooperative Extension Service.

REFERENCES:

Kansas Beef Cattle Handbook, Cooperative Extension Service, Kansas State University, Manhattan, Kansas

Beef Cattle Science, M.E. Ensminger, the Interstate Printers and Publishers, Inc., Danville, Illinois

Beef Cattle, Roscoe R. Snapp and A.L. Neumann, Publisher John Wiley and Sons, Inc., New York, New York

Author:

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Cooperative Extension Service
Kansas State University
Manhattan

Common Cattle Diseases: Foot Rot

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- How foot rot infection in cattle occurs
- How to control and treat foot rot

ABOUT THEMSELVES:

- To understand prevention measures for better health

Materials Needed:

- Picture of a calf with foot rot (or live animal with foot rot)
- Picture of wet, sloppy and muddy lots or pens (or visit a muddy, sloppy pen)
- Picture of dry, clean and sanitary pens or lots (or visit a dry, clean pen)
- Sample of organic iodine

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

Leader Notes

Keeping cattle healthy is our job. It not only benefits them, because they feel well and eat well, but also because they gain and produce better when they are healthy. Even a small problem can become a big problem for cattle producers. Foot rot is one of those problems, that can easily be avoided and treated, but becomes a big problem if left untreated.

This calf has foot rot. It is caused by a complex of bacteria that enter the foot through a cut or abrasion. Foot rot makes the skin swell and turn red just above the hoof, between the toes and in the bulb of the heel of the calf. This swelling and soreness makes the calf limp.

Show calf (or picture of calf) with foot rot. Point out the leg with foot rot and where it is affected.

Foot rot occurs most often when cattle are exposed to wet, sloppy, muddy pens. The bacteria quickly multiply under these conditions, and if a calf stands in these conditions for a long time, the chances of foot rot increase.

Show muddy lot (or picture of lot).

The bacteria that cause foot rot are still present in dry conditions, such as a well-drained lot or pasture, but there are not as many and it is more difficult for the bacteria to get into the foot of the calf. Therefore, the best prevention of foot rot is to make sure the pen where your calf is housed is clean and dry.

Show clean, dry lot (or picture of lot).

In pens or on farms where foot rot has been a problem, methods of prevention such as feeding organic iodine should be used.

Leader Notes

Show organic iodine.

Show picture of calf with foot rot again and give a local veterinarian's name and Extension agent's name.

Point out joint cavity.

But, even with prevention, some calves will get foot rot. A calf with foot rot will have swelling and reddening of the foot area, causing the calf to limp. If your calf has these symptoms, contact your veterinarian or county Extension agent for treatment recommendations. Without treatment, the infection may move to the joint cavity, resulting in fever, weight loss and even death. Any class of cattle can get foot rot: cows, bulls, heifers, steers, etc. But, one calf cannot get foot rot from another, except when the bacteria from one are on the ground and invade the other's feet.

Even though there is a treatment, it must be emphasized that the best way to avoid problems with foot rot is to prevent it!

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What are the best preventive measures for foot rot?
2. What are common symptoms of foot rot?

Process:

3. Why is preventing foot rot important?
4. Have you had any experience with foot rot? What did you do?

Generalize:

5. What other livestock diseases are caused by the spreading of bacteria?
6. In what ways can bacteria be controlled?

Apply:

7. Foot rot in cattle is caused by bacteria entering an abrasion or puncture. What antibiotics are used on your farm or in your home to kill bacteria?

GOING FURTHER:

1. Visit a local feedlot after a wet period and see what incidence of foot rot they have and how they treat it.
2. Visit with a local veterinarian about diagnosis and prevention of foot rot.
3. Watch the video, *Health Care of Club Calves,* Kansas Cooperative Extension Service.

REFERENCES:

Kansas Beef Cattle Handbook, Cooperative Extension Service, Kansas State University, Manhattan, Kansas

Beef Cattle Science, M.E. Ensminger, The Interstate Printers and Publishers, Inc., Danville, Illinois

Beef Cattle, Roscoe R. Snapp and A.L. Neumann, Publisher John Wiley and Sons, Inc., New York, New York

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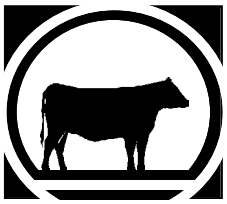

Selecting the Breeding Beef Heifer

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- Three major criteria used in the selection of Breeding Beef Heifers
- Terms used in selecting beef heifers
- Major points to evaluate in visual appraisal of a heifer
- The relative economic return of major selection traits of beef cattle
- Heritability estimates of five economically important beef traits

ABOUT THEMSELVES:

- How they make decisions
- How computers help make decisions

Materials Needed:

- Activity Sheet 6, Matching Selection Terms
- Activity Sheet 7, Member Listening Sheet
- Leader's Key, Activity Sheets 6 and 7
- Handout 13, Standards for Beef Selection
- Handout 14, Economically Important Beef Traits and Heritability Estimates
- Handout 15, Relative Economic Return of Three Major Selection Traits in Beef Cattle
- Handout 16, Kansas 4-H Beef Cow Record, P-1041 (2 pages)
- Chalkboard, poster board, markers (optional)
- Overhead projector and transparencies (optional)
- Pictures of different breeds of heifers (optional)

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

To stay current in the beef cattle industry, a cow-calf producer has to maintain a high-performance cow herd. The producer must start with a good cow herd, use proven sires (bulls) and select new heifers to replace poorer producing cows removed (culled) from the herd each year.

TOP ECONOMICALLY PRODUCING HERD

What is a "top producing herd" and how do you achieve it? A herd owner with a superior cow herd will have records on the accomplishments of each cow and can tell how productive a cow has been. This is usually determined by how often they calve and how much the calves weigh at the time they are weaned. A good herd is made up of highly productive, consistent producing, good milking, moderate-framed, feminine, healthy, uniform cows. Good managers cull their herd and carefully select.

Leader Notes

Before beginning lesson, pass out Activity Sheet 6, Matching Selection Terms, and have members complete. Check answers and help members learn meanings of selection terms. Could be used as a pre-test and post-test.

Describe the merits of a practical and economical beef herd.

4-H SHOW PROJECT SELECTION

Selection of the breeding beef heifer for show is probably the most important learning experience during a 4-H project. Although nutrition, facilities, health management, grooming and showing are all important and valuable experiences, they may be ineffective if serious errors are made in the selection phase.

Make the members aware that the selection principles used for show ring standards do not differ from those imposed on heifers selected for the breeding herd.

Many youngsters and advisors have an idea that the selection of a heifer for show and the selection of a replacement female for breeding on the ranch are quite different. Nothing is further from the truth; in fact, they are, and should be, the very same. The heifer should be an individual capable of growing into a very fertile, long-lived, productive female, capable of calving once every year, with calves of high weaning weights, and exceptional marketable value due to exceptional conformation.

HOW TO SELECT HEIFERS

Discuss the limitations of visual appraisal and stress that it is only one of several tools used in selection.
Stress the merits of the other information used for selection and the concept of using **all** available information along with visual appraisal.

Judges in the show ring today have only some of the tools needed in the selection of cattle. The judge is normally given only the animal and its age, and the decision must be based upon what is observed and the experience associated with types of animals and their performance. Performance records and pedigrees are usually unavailable to the judge but they are tools (other than visual appraisal) that should be insisted on by the purchaser of a heifer.

Pass out Activity Sheet 7, Member Listening Sheet and have them fill in blanks as points are covered. Take time to define each term and discuss its meaning.

(1) Performance information, (2) Expected progeny difference (EPD), (3) Visual appraisal and (4) Pedigrees are all generally used in selection of heifers.

(1) Performance Information

Use Handout 13, Standards for Beef Selection, to discuss minimal and acceptable standards of selection.

Individual performance information is a requirement to effectively select beef cattle. Properly measured performance is the best estimate of the animal's breeding value. It includes growth characteristics, reproductive ability, longevity, and the ability to produce acceptable quality meat at a minimal unit cost.

(2) Expected Progeny Difference (EPD)

A heifer's calves are called her progeny. EPD can be used to predict the traits of the offspring. When you select a heifer for your herd, you're not only selecting a heifer, you're also selecting all of her offspring. EPD is a good predictor of the characteristics of the heifer's calves.

(3) Visual Appraisal

Although objective information is most important in the overall selection process, visual appraisal, or looking an animal over, remains extremely important. A trained eye can accurately determine composition of gain, degree or type of muscling, skeletal size and correctness, and masculine and feminine characteristics.

(4) Pedigree

Pedigrees provide family information and generally tell what an animal should do because of what is known about the parents and their performance. Pedigree information when used alone provides low accuracy in estimating the breeding value, and is of almost no consequence beyond the parents.

Use pictures of ideal types to discuss those traits most easily evaluated by visual appraisal.

SELECT FOR ECONOMICALLY IMPORTANT BEEF TRAITS

Improvement in the breeding herd may be brought about through selection of heifers and bulls. There are three important facts for the breeder to consider if improvement is to be made.

- The selection must be accurate.
- The selection must be for heritable traits. (traits passed from one generation to the next)
- The selection must be for traits of economic value.

The most economically important beef cattle production trait is that of **reproduction.** The young heifer has to sexually develop and calve as a two-year-old and continue to calve every year of her productive life to be considered a proficient breeder. Research information indicates that a heifer, or bull for that matter, should only be selected from cows with demonstrated reproductive ability (12-month calving interval), longevity, and proven milking and mothering ability. It further states, that birth weights should not be excessive.

Use Handout 15, Relative Economic Return of Three Major Selection Traits in Beef Cattle. Have members complete definition of traits listed.

When selecting a heifer, ask for the maternal information of the cow. An exceptional **performance** record in itself will not totally ensure that the heifer in question will be a productive breeder, but it means a lot. Also, use visual appraisal and try to select those heifers that look feminine, with a more refined head and neck, properly developed udder with correct sized teats, and a well-developed vulva. Combining performance information, EPD information and visual appraisal should allow for a reproductively sound heifer to be selected.

Show Handout 14, Economically Important Beef Traits and Heritability Estimates.
List these according to

- Reproduction
- Performance
- Carcass

and discuss their relative importance.

It is important to be aware of **growth traits** in the selection process. Although growth traits are important and second in economic importance to reproduction, a great deal of judgement must be exercised in using this data. For example, high weaning weights sometimes are associated with heavy birth weights that can be associated with calf losses. In addition, some heavy weaning weights may be associated with over-fattening and thus jeopardize later reproductive performance. Poor weaning weights might be associated with poor environmental conditions instead of a poor producing cow.

Show Kansas 4-H Beef Cow Record, P-1041. Send a copy of this sheet home for each member to use for each cow they own.

The next economically important trait is that of **carcass traits** or conformation in the live animal. This information is most easily obtained from the processed carcass, but devices such as back fat probes and ultrasonic equipment allow for estimating fatness and muscle size in the live animal.

These are effective and important in sire selection, but are less utilized in heifer selection. Heifers still should be appraised as to muscling and fattening characteristics. Early fattening and both excessive heavy muscling and light or poorly muscled females should not be considered.

STANDARDS OF EXCELLENCE

Most breed associations are concerned in retaining productive traits and projecting an individuality or type to be utilized in the beef cattle industry. Each association and commercial breeder has an idea of what an ideal beef female looks like in regards to her goal of production. Standards of excellence are based ultimately on production goals.

Show Handout 13, Standards for Beef Selection, and discuss the combined information approach to selection.

Discuss Breed Association Standards of Excellence, if applicable, to your group. Have pictures of different breeds to discuss.

Regardless of body conformation and breed character standards, breeding females must be structurally sound in their feet and legs with no evidence of lameness. They should have sound, clean bone joints, a good solid foot underneath, and the ability to walk long distances for a long, productive life.

Evidence of a fertile productive female should be easily observed in her femininity, udder soundness and development of external genitalia. The mammary system should be strongly attached in the front and rear with no blind teats. The teats should be uniform and moderate in size. The highly fertile female should appear to be graceful and feminine with a lean, clean face, neck and throat. Long and smooth muscling will be apparent with trimness in the brisket, shoulder and flank areas. She should indicate good constitution with moderate depth of breast, bold sprung rib, large hip, and high and wide at her pins. Avoid heifers of small size (frame 1 or 2) because larger cows (1) live longer, (2) have higher calving percentages, and (3) wean heavier calves. Extremely large-framed heifers (frame 7 or 8) should also be avoided because it takes more feed to maintain them and they may take longer to reach breeding age.

PUTTING IT ALL TOGETHER

Selection of a breeding beef heifer should be for an economically productive mother cow. To increase your success in beef heifer selection, the following rules are suggested based upon using, performance data, EPD information, visual appraisal and pedigrees.

Summarize the efforts and goals of heifer selection. Review steps in selecting a breeding beef heifer.

1. Study the EPDs, performance information and pedigrees of the cows of the heifers in question.
2. Select only heifers from cows with demonstrated reproductive ability, longevity, and proven milking and mothering ability.
   a. Cow must have a good sound udder with no defects in udder attachments or teat size.
   b. Cow must have calved regularly every 12 months.
   c. Cow must have received little or no assistance in calving depending on the circumstances.
   d. Cow must have received little or no assistance in acceptance or nursing of calf.
3. Select heifers on the basis of quality and conformation based upon breed association standards of excellence.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. Which criteria for selecting heifers do you feel are most important? Why?
2. Which traits do you feel are most economically important? Why?

Process:

3. What traits have you found the most difficult to select for? Why?
4. What effect does the environment have on the selection of various traits?

Generalize:

5. What long term effects will selecting heifers have on your beef project?
6. How will determining criteria and making decisions about selecting heifers help you study, analyze, and make decisions about selecting other livestock projects?

Apply:

7. How might computer programs help you analyze data to make decisions? Career choices? Major purchases?

GOING FURTHER:

1. Members can tour local commercial and purebred cattle operations to evaluate heifer selection programs.
2. Members can select a breed association and write for information on the standards of excellence for the breed and report to the group.
3. Attend a breed field day.
4. Attend a major livestock show where purebred cattle are exhibited.
5. Attend a purebred beef cattle auction.
6. Visit a purebred cattle ranch and compare two heifers. Select the best heifer based on the criteria in the lesson.
7. View the video, *Selecting a Youth Project Heifer*, Kansas Cooperative Extension Service.

REFERENCES:

Breed associations
Local purebred breeders

Author:

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SELECTING THE BREEDING BEEF HEIFER

BEEF, LEVEL III

Activity Sheet 6, Matching Selection Terms

Match the correct definition to each term.

_____ Inheritability	A. Judging cattle only on what you see: “eye balling"
_____ Replacement heifer	B. Cow’s instinctive ability to care for her young
_____ Performance record	C. Traits passed on from sire or dam to offspring
_____ Weaning weight	D. Breed Association’s concept of the “ideal animal”
_____ Visual appraisal	E. Breeding cattle unit that is efficient, practical and profitable
_____ Economic traits	F. Time lapse between a cow’s calving dates; hopefully only 12 months
_____ Pedigree	G. Results from calf grading at weaning time
_____ Economical beef herd	H. Important traits that reflect dollars returned to producer
_____ Standards of excellence	I. Weight measured when a calf is weaned from cow
_____ Carcass traits	J. A carcass measurement that indicates the amount of muscle in a carcass
_____ Cow mothering ability	K. “Ancestory” or list of parents, grandparents, etc.
_____ Calving interval	L. Heifer calf kept for potential use in the breeding herd
_____ Efficiency of gain	M. Traits related to meet quality and cutability
_____ Weaning conformation score	N. Amount of feed required to make a pound of gain
_____ Rib eye area	O. A record or measure of an individual’s ability to perform

SELECTING THE BREEDING BEEF HEIFER

BEEF, LEVEL III

Activity Sheet 7, Member Listening Sheet

Fill in steps as they are covered in the lesson.

1. _____

2. _____

A. _____

B. _____

C. _____

D. _____

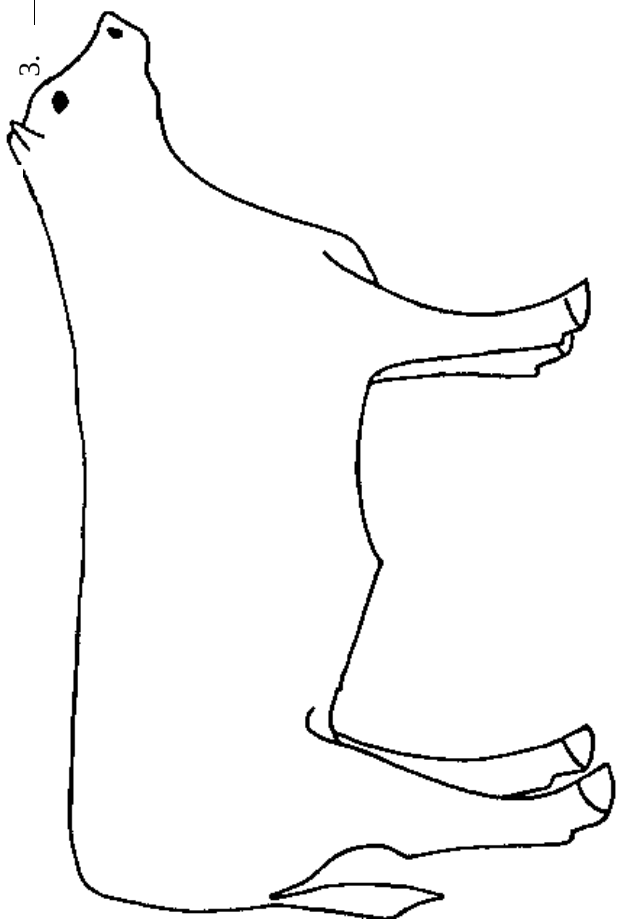
3. _____

A. _____

B. _____

C. _____

D. _____



SELECTING THE BREEDING BEEF HEIFER

BEEF, LEVEL III

Leader's Key, Activity Sheets 6 and 7

Member Listening Sheet

1. Pedigree

2. Performance Information
   A. Growth characteristics
   B. Reproductive ability
   C. Longevity
   D. Production of acceptable quality meat at minimum cost

3. Visual Appraisal
   A. Muscling
   B. Frame
   C. Udder and female reproductive characteristics
   D. Testicles and male reproductive characteristics

Matching Selection Terms

1. C
2. L
3. O
4. I
5. A
6. H
7. K
8. E
9. D
10. M
11. B
12. F
13. N
14. G
15. J

SELECTING THE BREEDING BEEF HEIFER

BEEF, LEVEL III

Handout 13, Standards for Beef Selection

Trait	Heifer	Bull
Maternal	Selected from cows with demonstrated reproductive ability (12-month calving interval), longevity, and proven milking and mothering ability.	
Birth weight	Weights should not be excessive so that calving is easy: 60–90 pounds.	
Growth rate: 205-adjusted weaning weight 365-adjusted weight growing ration high concentrate ration	510 pounds 750 pounds (1.5 ADG) Not recommended	560 pounds 1,000 pounds (2.75 ADG) 1,120 pounds (3.50 ADG)
Pounds feed per pound gain (high concentrate ration)	Not recommended	Less than 7.0
Carcass: Rib eye area	1.2 to 1.4 square inches per 100 pound live weight	
Thickness of outside carcass fat	.04 inches per 100 pounds live weight	
Carcass grade	Minimum USDA Quality grade-Low Choice on 900 to 1,300 pounds slaughter cattle	
Dressing percent	60 percent or higher	
Percent boneless retail trimmed loin, rib, round and chuck	50 percent or higher	

SELECTING THE BREEDING BEEF HEIFER

BEEF, LEVEL III

Handout 14, Economically Important Beef Traits and Heritability Estimates

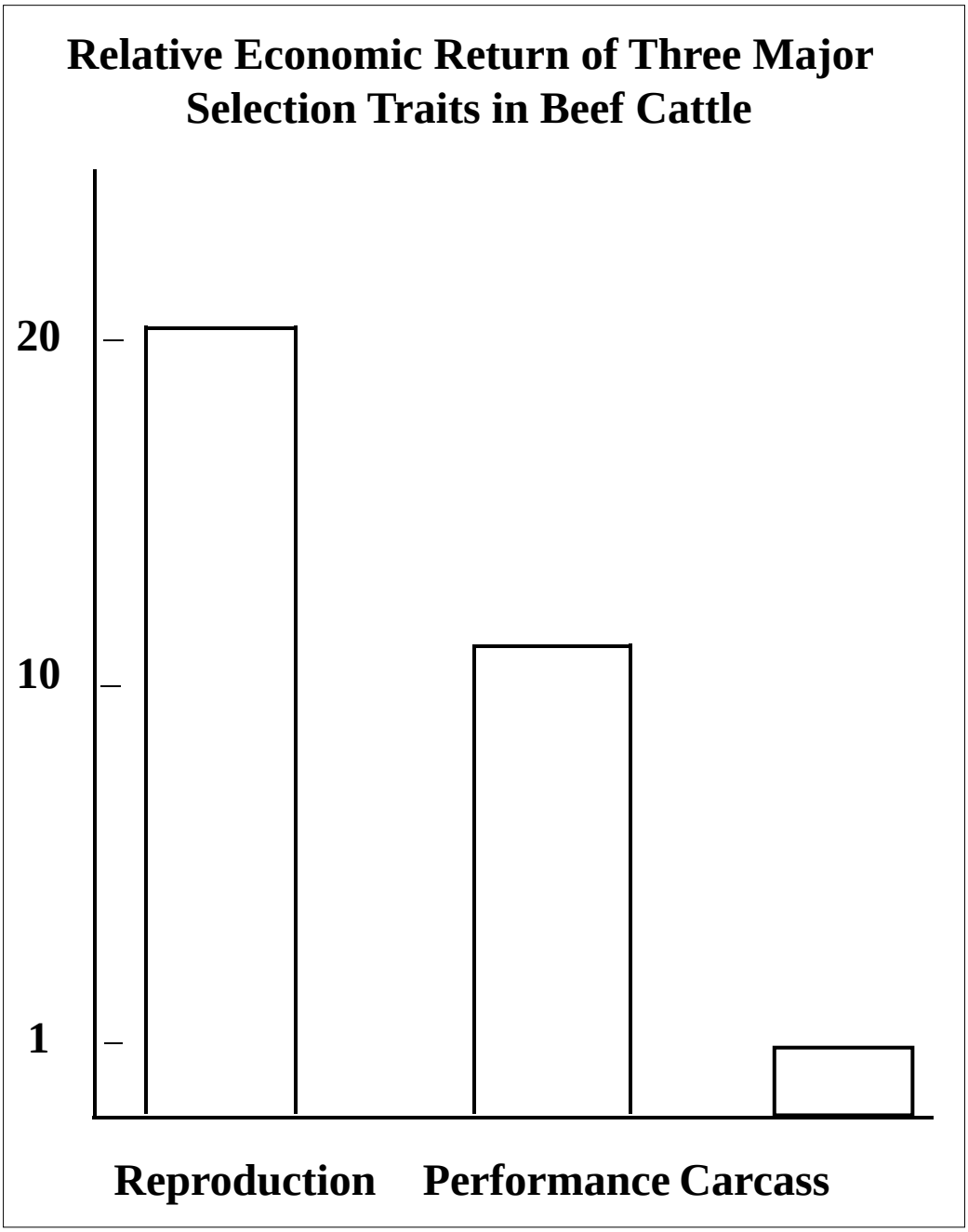
Economically Important Beef Traits and Heritability Estimates

Trait	Heritability (%)	Emphasis In Selection
Calving interval (fertility)	10	Low
Birth weight	40	High
Weaning weight	30	High
Cow mothering ability	40	Medium
Feedlot gain	45	Medium
Pasture gain	30	Medium
Efficiency of gain	40	Low
Yearling weight (feedlot)	60	High
Yearling weight (pasture)	40	High
Weaning conformation score	30	Medium
Yearling conformation score	40	Medium
Carcass grade	30	Medium
Rib eye area	70	High
Thickness of outside carcass fat	30	Medium

SELECTING THE BREEDING BEEF HEIFER

BEEF, LEVEL III

Handout 15, Relative Economic Return of Three Major Selection Traits in Beef Cattle



Kansas 4-H Beef Cow Record*

Name of
Cow and No. _____

Date of Birth _____ Birth wt. _____

Sire _____

Dam _____

Weaning Data	Yearling Data
Age in Days	Actual Weight
Act. Wt.	Gain
Adj. Wt.	Wt./day of Age
Weight Ratio	Adj. 365 da. wt.
Conformation	Wt. Ratio
Frame Score	Frame Score

Produciton Record

						Weaning Data						Yearling Data								
Animal Year	Animal No.	Sex	Sire	Date of Birth	Birth Wt.	Age in Days	Act. Wt.	2 Adj. Wt.	2 Wt. Ratio	1 Conf. Grade	1 Frame Score	Age in Days	Act. Wt.	Ave. Daily Gain	2 Adj. 365d. Wt.	Wt. Ratio	Wt./ Day Age	1 Conf. Grade	1 Frame Score	Remarks

[1] See Introductory Beef Breeding, Unit 1

[2] See back

* Use separate form for each cow

SELECTING THE BREEDING BEEF HEIFER

BEEF, LEVEL III

Handout 16, Kansas 4-H Beef Cow Record, P-1041, *continued*

You will need to use this information to help complete you Kansas 4-H Beef Record for each cow you have in your herd. You may want to ask your parents to help figure the adjusted weights. Your beef leader or Extension Agricultural Agent might also help you determine the conformation and frame score of your calves.

Adjusting Weaning Weights

Weigh calves when they are between 160 to 250 days of age. Use the following calculations to determine adjusted 205-day weights and rations:

$$\text{Average Daily Gain (ADG)} = \frac{\text{Weaning Weight - Birth Weight}}{\text{Age in Days}}$$

$$\text{Adjusted 205-Day Weight} = \text{Actual ADG} \times 205 + \text{Birth Weight} + \text{Adjustment Factor (age of dam)}$$

(For the Adjustment Factor, see table on this page)

Adjusting 365-Day Weights

Weigh yearlings when they become between 330 to 400 days of age. Use the following calculations to determine adjusted 365-day weights and ratios:

$$\text{Actual Post-weaning ADG} = \frac{\text{Actual Yearling Weight - Actual Weaning Weight}}{\text{Number of Days Between Weights}}$$

$$\text{Adjusted 365-Day Weight} = \text{Actual Post-weaning ADG} \times 160 + \text{Adjusted 205-day Weaning Weight}$$

Weight Ratios

$$\frac{\text{Adjusted 205- or 365-day Weight of Individual Calf}}{\text{Groups* Averaged Adjusted 205- or 365-day Weight}} \times 100$$

*Within Sex Group Managed Alike

Age of Dam Weaning Weight Adjustments for Various Breeds*

Angus

Age of Dam	Male	Female
2 yr	45	37
3 yr	21	18
4 yr	9	7
5-10 yr	0	0
11 yr & over	9	9

Hereford

Age of Dam	Both Sexes
to 2 yr 3 months	52
2 yr 3 mon to 3 yr	35
3 yr to 3 yr 11 mon	23
3 yr 11 mon to 4 yr 11 mon	9
over 4 yr 11 months	0

Polled Hereford

Age of Dam	Male	Female
2 yr	60	54
3 yr	40	36
4 yr	20	18
5-10 yr	0	0
11 yr & over	21	18

Charolais

Age of Dam	Male	Female
2 yr	69	59
3 yr	35	30
4 yr	10	11
5-10 yr	0	0
11 yr & over	30	30

Simmental

Age of Dam	Male	Female
2 yr	50	40
3 yr	14	17
4 yr & over	0	0

Age of Dam

Age Range	Age of Dam
through 32 months	2 yr
33 through 44 months	3 yr
45 through 65 months	4 yr

Production of Quality Hay

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- To identify five classes of forages that may be used for hay production
- When hay should be harvested for the greatest amount of digestible nutrients
- The best environmental conditions for hay harvesting

ABOUT THEMSELVES:

- The importance of good timing and preparation

Materials Needed:

- Charts and tables
- Vegetative plant (pre-head formation)
- Mature plant (headed)
- Handout 17, Forage Class Quality
- Handout 18, Forage Crude Protein and Stage of Growth

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

Leader Notes

A major resource of Kansas is its grassland production. The production of grass or forage is the major source of nutrients for livestock. The forage can be either grazed as pasture or harvested and stored as hay for feeding at a time when pasture is not available. All forages that serve as pasture can also be harvested as hay.

Special attention should be given to hay quality since animal performance is directly related to the quality of hay or pasture being consumed. Legumes such as alfalfa, clovers, peas, and vetches usually produce the highest quality hay because they are high in protein and minerals, and are readily digested. Grasses usually produce higher forage yields, but are generally lower in protein and minerals, and less digestable than legumes. Annual grasses (planted yearly) are more easily digested than perennial grasses (re-grown from rootstock each year). Cool-season grasses are higher in digestibility than warm-season grasses.

Have members list forages they know are used for hay production.

Handout 17, Forage Class Quality, shows this relationship.

Weather conditions that favor growing, harvesting, and drying of hay occur during the warm season. So warm season annual and perennial forage is favored. Cool season forages, such as oats, wheat, or ryegrasses, can make good quality hay when weather conditions are favorable for harvesting and drying.

Leader Notes

Adequate amounts of plant nutrients are essential for good quality hay. In addition to increasing hay yields, fertilizer improves protein level, palatability (taste), and performance of animals consuming the hay. A ton of 15 percent crude protein grass hay removes approximately 50 pounds of nitrogen, 15 pounds of phosphorus (P_2O_5) and 40 pounds of potassium (K_2O), in addition to secondary and micro-nutrients. Since soils vary in their ability to supply plant nutrients, a soil test is important in determining the kind and amount of fertilizer needed for hay production.

Show a vegetative plant (pre-head formation) and a mature plant (headed) to visually see stem and leaf difference in forages.

State of growth (plant maturity) is another factor that affects the quality of forage. As forage plants mature (get older), crude protein percentage, digestibility, and palatability of those plants decline.

Review Handout 18, Crude Protein and Stage of Growth.

Harvest hay plants when the greatest amount of digestible nutrients per acre can be obtained. This is usually at a stage of growth slightly before the plants begin maturing (producing seedheads). Delaying harvest may provide an increase in yield but protein and digestibility decline so quality of the hay is lower. Highest yield of digestible nutrients will usually be obtained when the crop is harvested in early bloom.

Cure hay quickly after mowing. Hay crops contain 60 percent and higher moisture when harvested and must be dried to 12 to 18 percent moisture for safe baling and storage. Rapid curing and baling conserves leaves, nutrients, color, palatability, and other quality factors. Use a hay conditioner or a swather equipped with a crimper to reduce curing time, especially for large-stemmed plants. Hay conditioners or crimpers permit moisture to evaporate quickly and reduce losses from climatic factors which reduce quality. Use a hay conditioner within 15 minutes after cutting. To prevent heating and molding, avoid baling hay with excess moisture.

Store baled hay inside a shed, or on dry, level, well-drained sites. Stack the bales to avoid wasted space and permit easy handling. Even large round bales must be set on a well-drained site. Crushed rock makes a good base for those bales. The bales will act like a sponge and soak up moisture from wet soil. More spoilage will occur on the bottom side of the bale than the top.

SUMMARY

Hay production is a major activity for livestock producers. Knowledge of the factors affecting quality hay production is essential. Only by producing and feeding high-quality hay can individuals get the animal performance desired.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What forage crops make high quality hay? Why?
2. What types of forages best meet the needs of various ages of cattle?

Process:

3. What is the significance of stage of growth, cool versus warm season, and annuals versus perennial?
4. What problems have you experienced in trying to produce or purchase high quality hay?

Generalize:

5. Good timing and preparation are important in hay production. What are five things related to your 4-H projects that require good timing and preparation?
6. Which is most important, timing or preparation, in the items you listed? Why?

Apply:

7. Planning ahead, goal setting and preparation are important skills for life. How have you used goal setting in 4-H in the past and how will you use it in the future?

GOING FURTHER:

1. Actively participate in or observe hay production and harvesting, and prepare a report describing activities with possible suggestions that might improve the quality of hay being harvested.
2. Attend a hay show and observe the different qualities of hay.
3. Give an illustrated talk on producing quality hay.
4. Observe a hay crop and project when the best time for harvest would be.
5. Visit a farm equipment dealer and become familiar with hay harvesting equipment.
6. Help your county Extension agent organize a county hay show.

REFERENCES:

Author:

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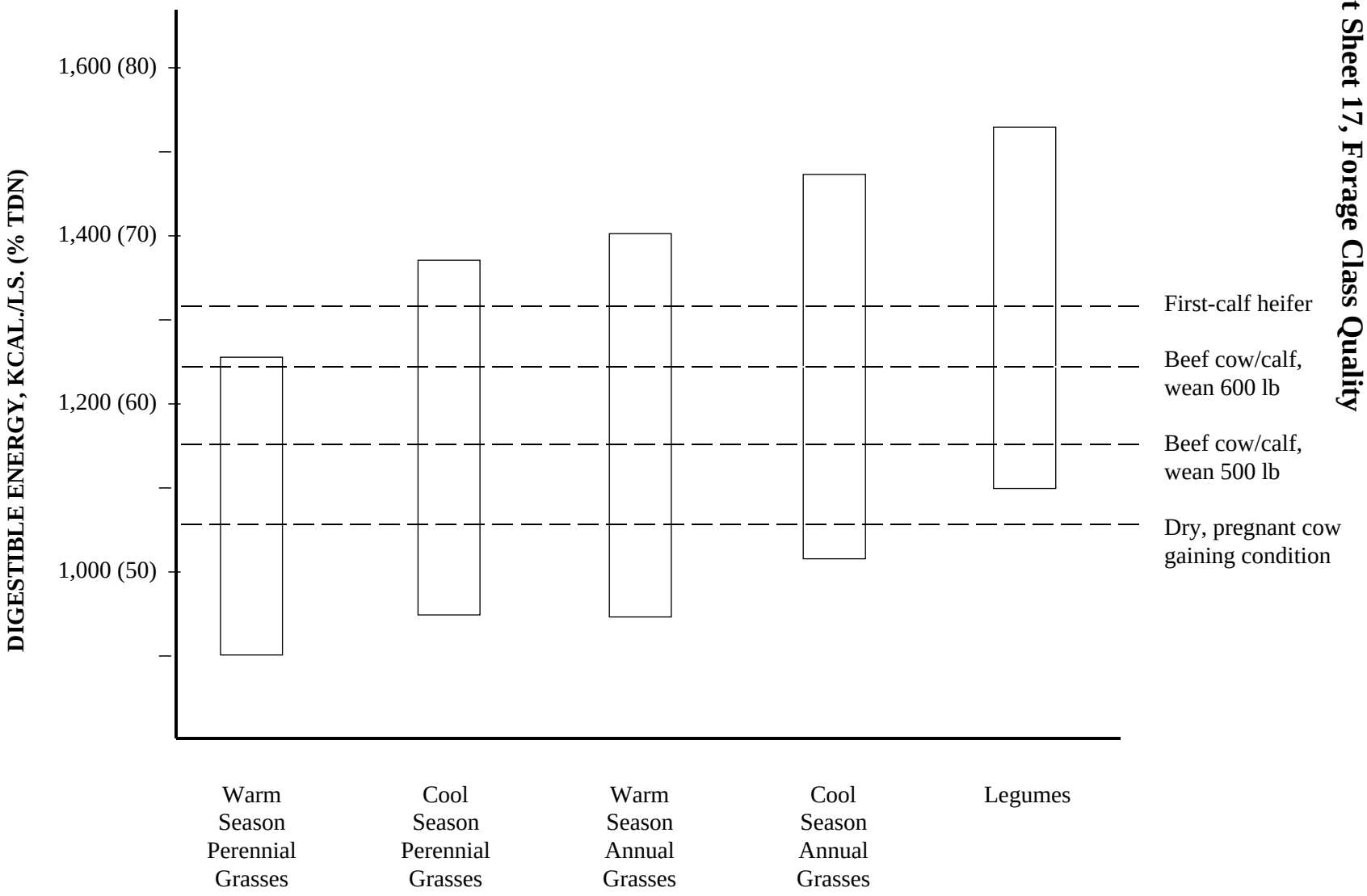
Classes of Forages and Their Quality



Range in digestible energy of several classes of forages and the ability of the forage to meet the needs of cows.

PRODUCTION OF QUALITY HAY

BEEF, LEVEL III

Handout Sheet 18, Forage Crude Protein and Stage of Growth

Crop	Stage of Growth	Percent Crude Protein
Alfalfa	Early bloom	18
	Full bloom	14
Wheat	Boot	18
	Full bloom	8.5
Sudan	Early boot	17
	Full bloom	8
Brome	Late boot	17
	Full bloom	12.5
Prairie grass	Early boot	13
	Mature	6

Taking a Hay Sample

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- How to sample forages properly
- Why forage testing is important

ABOUT THEMSELVES:

- The importance of following directions
- The importance of quality control

Materials Needed:

- Bale of hay
- Forage probe
- ½-inch electric drill
- Extension cord
- Source of electricity (110-volt generator will work if electricity is not available)
- Bucket
- Plastic bag
- Label and date sheet

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Leader Notes

Changing low-quality roughages and forages into quality protein is one important part of beef production. Forage testing is the only sure way of knowing the amount of nutrients supplied by forages. This helps you know the correct grain mix to meet the animal's nutrient requirements.

Hays have a wide range of nutrient content both within and between species. For example, alfalfa hay might average about 16 to 18 percent Crude Protein, but may vary from as low as 12 percent to as high as 30 percent on a dry matter (0 percent moisture) basis. The same is true of grass hays. Prairie hay will usually average about 5 percent crude protein, but may vary from as low as 3 percent to as high as 10 percent.

To accurately formulate beef rations, one must know the nutrient content of each feed ingredient. Testing is the best way to find out what nutrients are in the hay.

Relative feeding value can be calculated from results of several chemical analyses. This is an extremely helpful measurement of hay quality that can be used to compare forages.

Leader Notes

Begin procedure.

Show bale probe.

Demonstrate each of the steps slowly.

Allow members to core bales and prepare samples.

To give an accurate test, one must start with a representative sample. In the case of hay, sample eight to 10 bales of the hay to be tested, using a forage probe.

Chuck the forage probe tightly in the electric drill chuck. Plug in the drill and core the bale of hay. You will notice that as the teeth on the probe tip cut through the hay, the cutting will be inside the probe. It is better to bore the bale on an angle or from the end of the bale. If you bore vertically into the side, the probe tends to go between the slice of the bale missing cuts of hay. After one or two corings from the bale, release the probe from the chuck adapter and dump the hay cuttings into a bucket.

Continue coring each of the remaining bales and dumping the probe cuttings into the bucket. Mix the subsamples well by stirring with your hand.

Place about a quart of the mixed hay samples into a plastic bag. Seal the bag air tight so that the lab receives hay with the same moisture content as it was in the bale.

Fill out the data sheet supplied by the laboratory of your choice and indicate what tests you want the lab to perform, including any special instructions. You are now ready to prepare the bag of hay clippings for shipping to the lab.

DIALOGUE FOR CRITICAL THINKING:
These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.
Share:

1. What happened when you took core samples from hay bales?
2. What was the most difficult step in taking samples?

Process:

3. What problems have you experienced with hay quality? Why?
4. Why is it important to get good samples from several bales?
5. How would an accurate analysis of your hay help formulate a ration?

Generalize:

6. What did you learn about following directions from this lesson?
7. How does following directions relate to saving time and energy?

Apply:

8. How can you apply what you learned about quality control to other situations in the future?

GOING FURTHER:

1. Send samples to lab for testing. Evaluate results at next meeting.
2. Visit a feedlot or someone that buys lots of hay to see how they test for quality before feeding hay.

REFERENCES:

Author:
This lesson was modified from original material authored by Ted Wary, County Extension Agent, Kansas, and Brian A. Swisher, County Extension Agent, Kansas, with adaptation by:
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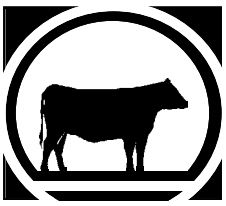

Fitting and Grooming Beef Show Heifers

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- To identify and use show grooming equipment
- How to develop a good hair coat on a beef animal
- To describe clipping techniques for show heifers
- How to groom a beef heifer to accentuate strong points and minimize weak points

ABOUT THEMSELVES:

- How much determination and endurance it takes to achieve a long-range goal
- The importance of preparation for major activities or events

Materials Needed:

- Basic grooming equipment
- Gentle heifer
- Flip chart or chalkboard
- Video, *Fitting Market Steers for Show*, optional
- Note cards for each member
- Activity Sheet 8, Grooming Crossword
- Leader's Key, Grooming Crossword

ACTIVITY TIME NEEDED: 3 HOURS

Depending on types of demonstrations and member activities, this lesson could be divided into two or three different lessons: Equipment, Preparation at Home, and Clipping and Grooming

ACTIVITY

Leader Notes

To be good at grooming, one must first form a mental picture of how the finished animal should look. No two animals are ever exactly alike and, therefore, no two animals are ever trimmed alike. The overall purpose of fitting and grooming beef heifers for show is to make the heifer look attractive and as near like the ideal heifer for her breed as possible.

Study the breed standards and the grooming guidelines and trends of the particular breed of heifer that you have or want to learn about.

Study the heifer to be shown and evaluate her strong and weak points as compared to the breed standard. Plan how to groom the animal by making the weak points look as good as possible and emphasizing the strong points.

Give live demonstration outlined in this lesson.

Leader Notes

Grooming heifers varies considerably between breeds, but the big difference is between the long-haired British and European (Continental) breeds and the American or Brahman based short-haired breeds.

Show pictures of both types, if available.

Long-haired breeds usually show with the hair brushed up while the short-haired breeds are shown with the hair brushed down for a slick, more natural appearance.

Show pictures of groomed heifers in summer and winter, if available.

Showing heifers in summer versus winter conditions also affects some techniques of grooming that differ according to season.

EQUIPMENT

Make an equipment list on a flip chart or give members cards for their personal list.

In grooming either type of heifer, some basic equipment is needed.

Show Equipment and Grooming Aids and describe use.

Trim or Grooming Chute—This is an essential piece of equipment. The trim chute stabilizes the animal and makes it easier and safer for the animals to be groomed. Chutes come in an array of styles and designs and can be either purchased in a complete unit from any number of dealers or built at home.

Electric Blow Dryer**—**The blow dryer helps dry a heifer after she has been washed, helps clean the hair of dust and foreign matter and is a valuable aid in training the hair at home.

Electric Clippers—Electric clippers with a good motor and interchangeable heads are a good investment. Heads can be changed for clipping longer body hair or for close clipping of head or other parts of the body.

Scotch Comb (2)—Most exhibitors prefer to have two scotch combs—one for grooming body hair and one for using with adhesives in grooming leg hair.

Rice Root Brush—The brush is used for cleaning and training hair.

Soft Scrub Brush or Plastic Brush—This brush can be attached to a garden hose for washing beef animals.

Shampoo or Soap—A good commercial livestock shampoo or any good liquid soap is needed to wash beef animals. Do not use detergents as they are difficult to rinse and may cause dandruff.

GROOMING AIDS

Adhesives—Used for causing the hair to stand up. There are three types of grooming adhesives:

- **Standard Adhesive** is preferred by some exhibitors to use on the legs because it is rather heavy and slower to dry. If only one type of adhesive can be purchased, the standard type will do for most general purpose use.

- **Tail Adhesive** is also a heavy type. It dries very quickly and is used to set tail head hair and in forming the bush of the tail.

- **Body Adhesive** is a light adhesive and dries slowly. It is useful in setting body hair as it allows for easy combing through the hair even after it has set.

Commercial Adhesive Remover—A good commercial product designed for removal of adhesives as soon as a beef animal has been shown—a good investment.

Clean Rags—Rags have a number of uses in grooming. They are used to help clean a heifer prior to grooming as well as spot cleaning as needed.

Alcohol—Rubbing alcohol is used on a clean rag to remove dust and dandruff from a heifer before grooming.

Show Foams or Shaving Cream—These are used in working up and setting hard to manage hair.

Hair Gloss, Sprays or Oils—These are added to the hair just before entering the show ring. Use sparingly so as not to make a greasy unattractive appearance. Do not use on animals that have had show foams or shaving creams used on their hair.

Paints and Lacquers—Used for hooves.

PREPARATION AT HOME

Develop good hair coat at home

A good hair coat is the best tool to use in covering many of a heifer's minor faults. No matter what type of hair an animal has to begin with, it can be made to look better through good care.

1. Wash once or twice a month as soon as animal is through the halter breaking stage, and a feeding routine has been developed.
Washing stimulates hair growth and washing and drying can be used to begin training of the hair to go in the direction it needs to go.

2. Regular Brushing—As the hair grows, the brush and blow dryer are excellent tools in training the hair to go in the desired direction.

3. Train the heifer's hair at least 20 minutes a day, beginning at least 2 months before the show. No matter what type of hair a beef animal has, it can be made to look better through daily brushings.

Demonstrate training of hair with blow dryer and brush.

To begin working the hair, brush off any excess dirt and follow by either rinsing the heifer with the hose or wetting her hair down with a hand or pump sprayer. Generally, hair should be brushed and combed forward and slightly up, at 30° to 45° angle, as this gives a smoother appearance.

All the hair needs to be combed including the inside and outside of the legs. At this point, the only hair that needs to be combed straight up is the hair on the tailhead. For best results, the heifer should be brushed until she is nearly dry.

To promote hair growth in warm weather, try to keep the animal cool and increase the number of times a day that the heifer is wet down and brushed.

Many fitters work hair early in the morning and late in the afternoon, the coolest times of the day. During the day, keep the heifer under a shade that is cooled by a brisk breeze or fan.

Training and Preparation of Horns

If either heifer has horns, this can be demonstrated.

Some heifer's horns need weights attached to them early to train them to grow downward. Be sure to remove them early enough to prevent them from turning too far downward as this can lead to problems later in mature life.

Polish horns at home by scraping them with a good sharp knife.

CLIPPING

Head and Neck Clip

Demonstrate head and neck clip.

The brisket, dewlap, under jaw, face and muzzle of the heifer should be clipped closely.

Of course, not all heifers like to have their neck and head clipped and sometimes it takes a great deal of time and patience to accomplish the desired effect.

The standard method used on the head is to clip close, to a point in front of the ears.

This method of clipping the head applies to most polled, or hornless breeds. However, it is recommended that Polled Herefords, Angus and some other polled breeds have the entire head clipped except for the poll, which is shaped to a point to give the appearance of a sharper poll and longer head. A big knob of hair is not necessary and this tends to make the animal look coarse. A neat, sharp poll enhances the appearance of an animal.

Neck and Shoulder Clip

Demonstrate neck and shoulder clip.

Other than size, the single most important trait most heifer judges seem to look for in heifers is angularity. For this reason, it is preferred to leave a small amount of hair on the neck and shoulder region to help promote angularity and smoothness through the top of shoulders and neck when viewed from the rear and down the top. Some heifers may look equally smooth with the neck being close-clipped with the grain of the hair on the neck.

The selection of heifers which are long, thin-necked and smooth shouldered (not open in the top of the shoulder) helps solve some of the problems and makes this clip easier.

Body Clip

Demonstrate body clip.

If necessary, explain rib capacity and depth of rib.

Judges prefer a heifer that has some rib capacity and depth of rib when viewed from the side. Leaving longer hair in the flank and mammary region in back of the naval helps to give the appearance of a deeper sided

heifer. Some heifers often need to appear taller; thus, leaving hair on the underline may not be desirable.

However, the belly should be clipped short or raised. As you leave the rumen area and progress to the ribs and topline, the hair should be left as long as possible without sacrificing smoothness. This will give the heifer the appearance of extra height and body mass.

Leg Clip

The forearms should be left flat, and/or trimmed very closely to de-emphasize muscle and also make the heifer look taller. The hind legs and quarter should be trimmed fairly close. Do not exaggerate the stifle muscle as in steers, as a long smooth muscle design is desired in heifers.

Demonstrate leg clip.

GROOMING FOR SHOW

The steps in grooming a beef heifer for show are as follows:

1. If an electric blower is available, go over the animal once to free the hair of any foreign substance such as dust or straw and give the hair a good fresh fluffed appearance. If a blower is not available, a good brisk 10 minute application of a rice root brush, using a flip of the wrist at the end of each stroke, will accomplish the same results.

Demonstrate and describe grooming steps.

Could have each member bring their heifer and equipment and go through the steps.

2. Begin dressing the animal by boning up the back legs using a soft glycerine soap or spray-on adhesive.

Be sure to get an even distribution of adhesive on all parts of the leg including the front, back and inside, all the way to the hoof. You can use a scotch comb, but continued use of such, as at several stock shows, tends to irritate the skin and cause the animal to kick when you try to work the sensitive areas.

Give instructions for each step, allowing time for members to complete that step before continuing to the next. Teen leaders could help the members complete the steps.

3. The next step is to dress the remainder of the hair coat. Begin by pulling the hair upward and forward with the scotch comb. Using a rice root brush, at this point in time and especially on coarse-haired animals is futile. It is true that some very fine-haired animals may benefit from the use of a soft-fiber brush, but basically brushing is something you should have taken care of in the months prior to the show.

4. Next, apply show foam or some similar product used for styling the hair. Several preparations are suitable and the one used will depend primarily on the texture of each individual hair coat and the weather on the day of the show.

Using a plastic scrubbing brush, work the substance into the hair. Use a combination of upward and forward motions until it is evenly distributed and obvious traces of the materials used are eliminated.

Regardless of the hair set product or method of application, pulling the hair up and forward with a scotch comb after it has been applied will give the hair a chance to fluff up for a more natural appearance.

Another method of fitting is called the "slick look appearance." The procedure is most commonly practiced in the summer and early fall, but some cattle just naturally have hair that is hard to break. The procedure in obtaining the slick look is basically the same as previously described, as you should begin dressing the heifer by boning up the legs. The rear legs should be boned at least to the stifle region.

Then, the remainder of the hair coat should be brushed straight downward and laid flat against the animal's body with a light coat of a coat dressing. The rest of the grooming procedure should then be done as for any other animal.

5. The next step in grooming is to fluff and set the tail switch. Begin by brushing the hair backwards or out with a rice root brush or a tail comb. Next, rat the switch with a ratting comb or your fingers. The normal procedure is to form the switch into a ball at the height of the twist. Many exhibitors use long tufts of switch hair to tie the switch up or they use a tail tie string, rubber band, or pipe cleaner for the same result.

Don't forget to remove it as soon as the show is over. Use a liquid hair set for a final holding action and use scissors to clip away any loose hairs.

6. Prior to show day, use sandpaper to smooth the horns and hoof facings. As you complete the final grooming process, use a pocket knife to clean the hooves and the dew claw.

7. Once every hair is in place, a light coat of oil is added for gloss. Wait until as close as possible to show time to oil the animal, because the oil will tend to cut through the different hair set products and make the styling job fall apart. Oil also makes the animal warm and uncomfortable. Several commercial products are available, such as aerosol or liquid preparations of Final Mist, Grand Champion of Franklin's Coat Dressing or Purple Rag oil.

Regardless of what is used, the key is to apply the mixture evenly and only in the quantity to give a bloomy appearance. The best results can be obtained by using an aerosol can or a small hand-held fine mist sprayer to apply a light coat of oil. Avoid putting on so much that the hair becomes sticky or gummy. Judges don't care to handle oily hair and excessive oil causes deterioration of the styling job. Avoid oiling the areas of the legs and the lower quarter that had adhesives applied to them. Always remember to use your scotch comb and blow dryer to put your heifer's hair in place.

8. As the animal is oiled, remember to also oil the horns, hooves and dew claw to give them a shiny appearance. Don't forget the animal should be washed as soon as possible after her show ring appearance to remove coat dressings.

Hand out Activity Sheet 8, Grooming Crossword, for a take home or on site review.

Next, put a properly fitted show halter on the animal. Rub some oil on the halter to make it shine. Use either a safety rope or put the show halter on over the rope halter and then slip the rope halter from beneath the show halter and from the head. Now the heifer is ready for the show ring.

Note: Use of brand names is not intended as an endorsement but as an example of products available.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What are two ways to develop a good hair coat?
2. What four major areas do you clip on most beef animals?
3. What parts of grooming need to be planned and done before the day of the show?
4. What part of grooming an animal is the most difficult? Easiest? Why?

Process:

5. What problems have you experienced when grooming animals? Why?
6. What is the significance of each "fitting" practice suggested? (List all practices and discuss each on its own merits.)

Generalize:

7. Why is time an important issue in planning for grooming?
8. Can you groom all heifers the same? Why or why not?

Apply:

9. How can you apply what you know about grooming to selecting your show heifer?
10. How would you groom your heifer differently next time?

GOING FURTHER:

1. Tour local and major livestock shows where cattle are being exhibited and observe grooming techniques.
2. Tour local purebred cattle ranch that exhibit show animals.
3. Give illustrated talks on grooming.
4. Take part in 4-H beef cattle tours. (Example: beef project tours)
5. Develop a grooming demonstration.
6. Develop good hair coat on beef project animal.
7. Clip a heifer.
8. Groom a heifer for show.
9. Discuss ways your beef project group could minimize the investment in fitting and grooming equipment.

Leader Notes

REFERENCES:

Breed associations, see lesson on Breeds of Beef Cattle for addresses

Author:

This lesson was modified from original material authored by Don Richardson, County Extension Agent, Texas, with adaptation by:

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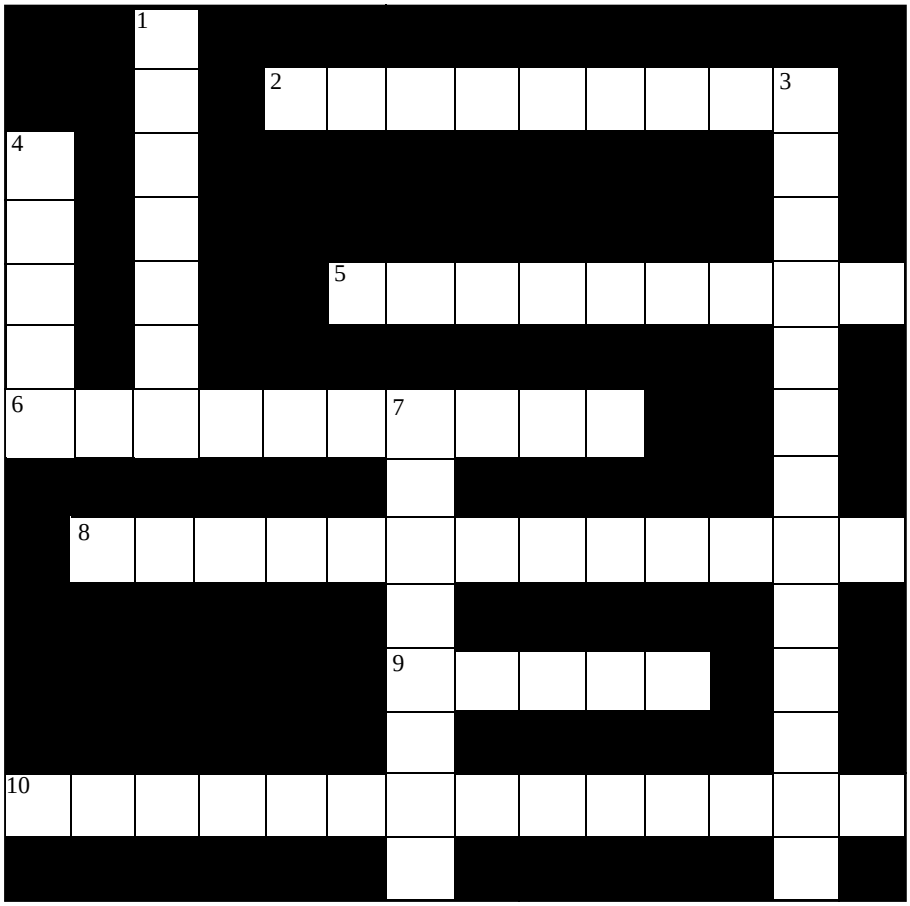
FITTING AND GROOMING BEEF SHOW HEIFERS

BEEF, LEVEL III

Activity Sheet 8, Grooming Crossword



ACROSS

2. For cleaning, training the hair, and after washing; electric
5. For "fixing" fluffed up hair
6. For grooming hair
8. For confining the animal (two words)
9. For coloring and shining hooves
10. Tool for washing (two words)

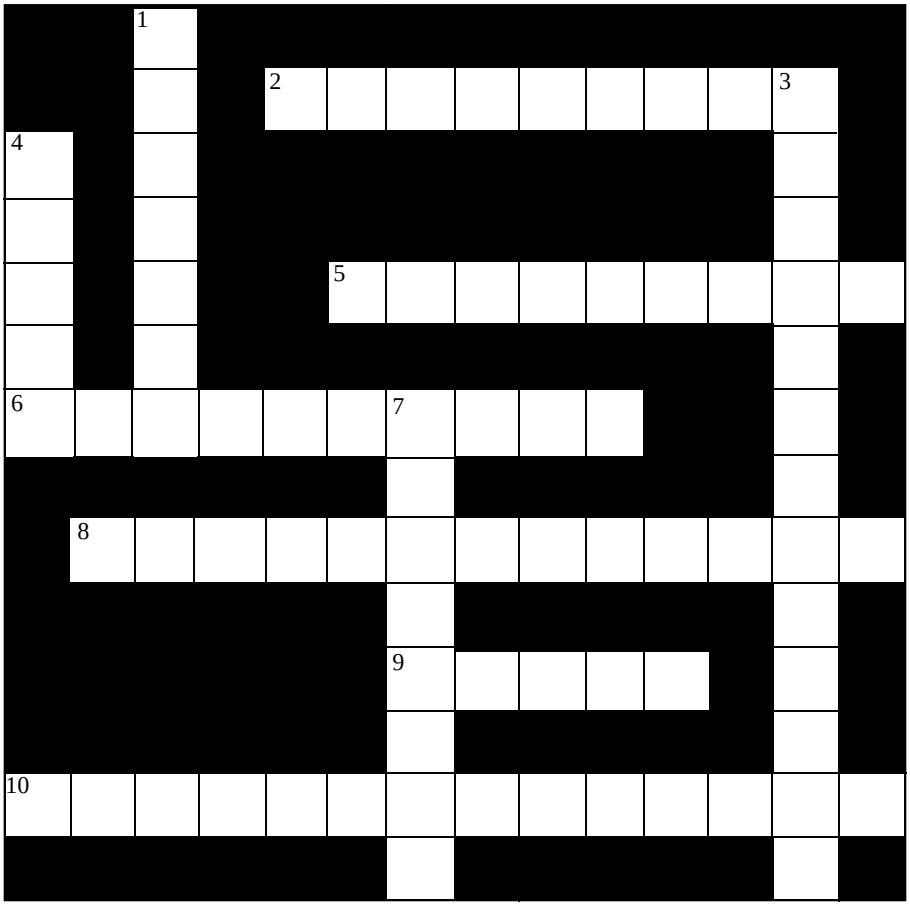
DOWN

1. Soap for washing
3. Tool for cleaning and training hair (three words)
4. For making hair shine
7. For trimming hair

FITTING AND GROOMING BEEF SHOW HEIFERS

BEEF, LEVEL III

Leader's Key, Grooming Crossword



ACROSS

2. For cleaning, training the hair, and after washing; electric
5. For "fixing" fluffed up hair
6. For grooming hair
8. For confining the animal (two words)
9. For coloring and shining hooves
10. Tool for washing (two words)

DOWN

1. Soap for washing
3. Tool for cleaning and training hair (three words)
4. For making hair shine
7. For trimming hair

Introduction to Giving Oral Reasons

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- The definition of oral reasons
- Terminology used in beef cattle reasons
- How to take notes during a judging class
- How to write a set of reasons

ABOUT THEMSELVES:

- How to develop written and verbal communication skills
- How to improve organization skills
- Ways to develop self confidence

Materials Needed:

- Handout 19, Reasons Terminology for Market Beef Cattle (2 pages)
- Handout 20, Reasons Terminology for Breeding Beef Cattle (2 pages)
- Handout 21, Oral Reasons Notes Guide
- Chalkboard or writing surface and chalk or marker
- *Judging Steers and Heifers* videotape
- Handout 22, Oral Reasons outline

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

INTRODUCTION

A member prepares and gives a set of oral reasons to explain or defend why decisions were made to place a class.

As a teaching aid, oral reasons are perhaps the best part of the judging program. Reasons can be very useful for teaching communication skills, organization, self-confidence, and terminology needed to understand selection of animals.

In order to give a set of reasons, members must have:

1. Knowledge of ideal beef animals.
2. Knowledge of terminology (judging vocabulary)
3. Knowledge of reasons organization.
4. Ability to take good notes.
5. Confidence.

Second and third year members can begin learning to write and give reasons on beef cattle classes. This will improve the overall ability to judge beef cattle. Note: Young members need to be encouraged to write and read a short set of reasons, but not pressured to memorize and give long sets of reasons.

Knowledge of Ideal Beef Animals

Members need to continue to learn what to look for in judging different kinds of beef cattle. This information will not be taught in this lesson.

Information from the lesson on introduction to judging beef cattle Level II can be inserted here, if desired.

Leader Notes

Knowledge of Terminology

A. Members **must** know the parts of the beef animal.
B. Members **must** know descriptive and comparative terminology of beef cattle.

How can there be three pairs of animals in a class of 4?
1–2
2–3
3–4

A judging class is made up of four animals. Reasons are given by comparing three pairs of animals: **top pair, middle pair, bottom pair** and explaining why one animal is better than another.

Most one-syllable terms can be used comparatively by placing an "er" ending after the word.

Write example on board:
long<u>er</u>
strong<u>er</u>
deep<u>er</u>
wid<u>er</u>

The words "more" or "less" can be used to make comparative terms.

There are many ways to say the same thing. The challenge of reasons is to say the same thing more than once in a set of reasons, but worded such that the reasons do not become repetitious.

More correct set to feet and legs. **More** volume of muscle.

Imagine that you are **describing** the class to a person who has not seen it, mainly by **comparing** one animal to another.

Pass out Reasons Terminology for Beef Cattle. (Market or Breeding depending on example chosen)

Knowledge of Reasons Organization

Organization of reasons is a must if all differences are to be discussed in a logical order. Reasons are divided into the following sections:

1. Introduction
2. Top pair paragraph
3. Middle pair paragraph
4. Bottom pair paragraph
5. Bottom individual paragraph

Write these sections on writing surface for members to see.

Introduction

The introduction to a set of reasons is always the same except for the name of the class and the placing. Example: for a class of yearling heifers placed 4-3-2-1, the introduction should read as follows:

"I placed this class of yearling heifers 4-3-2-1."

Top, Middle and Bottom Paragraphs

The three paragraphs within a set of reasons are all organized in much the same manner. Each paragraph is composed of a series of sentences which describe the two beef animals in that particular pair.

Show on Chalkboard: Paragraph Sentences

A. Introduction

A. The first part of the paragraph is the **introduction** which serves to introduce the paragraph. Continuing the example of the yearling heifer class, the introduction would be, "In regard to my top pair, I placed 4 over 3 because" or "In my top pair I placed 4 over 3 because . . ."

B. Topic Sentence

B. The next part of the first sentence is the **topic sentence** and should contain the most important factor involved in the placing.

". . . because 4 was larger framed and longer legged."

This sentence would leave no doubt in the reason taker's mind that 4 was larger than 3 and that difference was the **most important** factor involved in placing that pair of heifers.

C. The **furthermore sentence** is devoted to the next largest difference between the two animals and our example class might read, "Furthermore, 4 was a more feminine heifer showing more refinement about her head, a cleaner, neater throat, and a longer, cleaner neck."

C. Furthermore Sentence

Because of the way in which it is said, it is obvious that we feel that 4 is a more refined heifer. Yet by putting this statement second, we have said differences in femininity are not as large as differences in frame.

D. The **in addition sentence** may be used alone or along with an **also sentence**. Whether one or both are used depends on whether the remaining differences between the animals are large enough to justify the use of both sentences. Assuming in the class of heifers, number 4 is an easy top, these sentences might read:

D. In Addition Sentence

"In addition, 4 was a more level, stronger topped heifer that stood wider when viewed from behind."

E. Next is the **grant sentence**. The grant sentence admits that the lower placed animal in the pair has some traits superior to the higher placed animal. The grant sentence may well be the most important sentence in the paragraph, particularly in a close placing where the member may have switched the pair.

E. Grant Sentence

If the differences or points in which the bottom animal in a pair was superior are all brought out and the reason taker realizes that the member saw the difference, but simply switched the pair, he or she may not take off many points. On the other hand, if the member switched the pair and had no grant sentence or a very weak one, then the reason taker would probably take off more points.

A well-worded grant sentence is essential. In the heifer class, the pair was not close and the grant sentence may read: "I grant, however, that 3 showed more depth of heart and hind rib indicating more body capacity."

F. The last sentence is the **criticize sentence**. This sentence is important because if there is a fault in the second animal it should be brought out. In the heifer class the criticize sentence might read: "I criticize 3 as she is short legged and small framed."

F. Criticize Sentence

If all of the sentences are put together, the top paragraph would read:

". . . In my top pair, I placed 4 over 3 **because** 4 was larger framed, and longer legged. **Furthermore**, 4 was a more feminine heifer showing more refinement about her head, a cleaner, neater throat, and a longer, cleaner neck. **In addition**, 4 was a more level, stronger topped heifer that stood wider when viewed from behind. **I grant**, however, that 3 showed more depth of heart and hind rib indicating more body capacity. However, I criticize 3 as she is short legged and small framed."

The paragraphs pertaining to the middle and bottom pair are composed in the same manner as the top paragraph except with different introductory statements. The introduction of these two paragraphs might read:

"In my middle pair, I placed 3 over 2, because"

"In regard to my bottom pair, I placed 2 over 1 because . . ."

After having finished the discussion of the top, middle, and bottom pairs, all that remains is a description of the bottom individual and the closing statement.

The Bottom Individual Paragraph

If the bottom animal was an easy last place and grants over the third place animal are very minimal, then the last place animal should be criticized to let the judge know you really saw the animal. Remember that, although they might be hard to find, all animals have some strong points. We will call that a grant to the class and start the paragraph with it. A typical bottom individual paragraph might read:

"Realizing 1 was adequately muscled, I nonetheless fault her and leave her at the bottom of the class because she was coarse about her head and neck, short and bunchy in her muscle and stood extremely cow hocked when viewed from behind."

Taking Notes

Show Handout 21, Oral Reasons Notes Guide.

Taking good notes is almost as important as terminology in giving reasons. This note taking guide has been found to be useful for taking notes on classes. The important thing is to take notes one can read and understand later, sometimes hours later, when preparing reasons.

Have members decide on some abbreviations they will need to use consistently.

In taking notes, one should take a mental photograph of the class and take notes so that this photo is recalled when actually preparing the reasons. It is a good practice to use abbreviations when taking notes. Make sure the abbreviations are clear and easy to understand. There is nothing as frustrating as not being able to remember what an abbreviation stands for when trying to prepare a set of reasons.

Show class of market steers. Have members take notes using a note taking guide. Go over class and help members fill out note taking guide with most important points using correct terminology. Pass out Handout 22, Oral Reasons Outline, and have members write a set of

Now we will use this information in preparing a set of reasons.

SUMMARY
Continue to learn terminology and develop a thorough knowledge of good beef cattle characteristics. Practice note taking, writing and reading reasons and eventually giving memorized reasons. This will contribute to a members' success in giving oral reasons.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. Discuss the process of taking notes and organizing thoughts to defend your placing?
2. What was the most difficult or easiest when preparing your reasons? Why?

Process:

3. What skills/knowledge do you need to take notes and prepare a set of reasons? NOTE: parts of animal, terms.
4. What is the significance of being able to explain and defend a decision?

Generalize:

5. What did you learn about your ability to organize thoughts?
6. How will this reasoning process help you make other decisions?

Apply:

7. How do you think this process of judging, notetaking, and giving an oral defense will help you in the future?

GOING FURTHER:

1. Participate in beef cattle judging practices.
2. Participate in livestock judging contests.
3. Observe other members giving oral reasons.

REFERENCES:

4-H Livestock Judging Guide

Author:

This lesson was modified from original material authored by Bill Jackson, Extension 4-H Specialist and Brian Cummins, County Extension Agent, Texas, with adaption by:
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Lance Huck, Graduate Teaching Assistant, Animal Sciences and Industry, Kansas State University
James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

reasons using their notes and correct terminology you have given them.

Ask for volunteers and have a few members **read** their reasons. Strongly compliment their first efforts. Leave criticizing until later sessions. Learning to take notes on a class and to verbally defend a placing will make members more skillful evaluators and judges of beef cattle.

Compliment examples:
"You've done a good job with . . ." or "I like the way you . . ."

Leader Notes

Cooperative Extension Service
Kansas State University
Manhattan

INTRODUCTION TO GIVING ORAL REASONS
BEEF, LEVEL III
Handout 19, Reasons Terminology for Market Beef Cattle

Skeletal Size, Structure and Soundness

Desirable
1. More correct set to feet and legs
2. More desirable in length and slope of shoulder and pastern
3. Sounder, freer, easier in movement
4. Stronger topped
5. Longer, leveler rump
6. More circumference of heart, larger heart girth, deeper, wider chest, more body capacity
7. More size, larger frame, more body mass, more correct in length and height of body, more correct length of leg, more massive

Undesirable (Criticisms)
1. Post legged, knock-kneed, cow hocked, sickle hocked
2. Too short and straight in shoulder and pastern
3. Stiff, constricted, unsound in movement.
4. Weaker topped, more sway backed
5. Shorter, steeper rump
6. More shallow bodied, more narrow and shallower chest, smaller girth, less body capacity, shallower, more narrow rib
7. Smaller, smaller frame, shorter bodied, shorter legged, too long legged, less body mass

Finish (fatness)

Desirable
1. More correctly finished (.25 to .45 inch of fat at 12th rib)
2. More uniform in finish
3. Trimmer (less excess fat) in brisket, rear flank and twist

Undesirable
1. Overfinished (more than .5 inch of fat at the 12th rib)
2. Less uniformity of finish, patch finish
3. Wasty in brisket, rear flank and twist

Muscling

Desirable
1. Wider and fuller in stifle
2. Thicker quarter
3. Longer muscled
4. Stands and walks wider
5. Thicker, more muscular round
6. Heavier muscled loin or more evidence of muscle in loin

Undesirable
1. Flatter, more narrow stifle
2. Flatter quarter
3. Shorter muscled
4. Stands and walks narrow
5. Thinner, lighter muscled round
6. Lighter muscled loin or more narrow, flatter muscled loin

INTRODUCTION TO GIVING ORAL REASONS

BEEF, LEVEL III

Handout 19, Reasons Terminology for Market Beef Cattle, *continued*

Carcass Terms for Slaughter Cattle

1. Because of less finish and/or superior muscling a carcass will yield
   - A higher percent of muscle
   - A higher lean to fat ratio
   - A higher percent of trimmed retail cuts
   - Less excessive fat trim
   - A more desirable yield grade

2. Because of more finish...
   - Will yield a higher quality grade
   - Will result in a higher dressing percentage

3. Should have a higher dressing percent because
   - Fatter
   - Less fill
   - Trimmer middle
   - Lighter hide
   - Smaller percent dress-off items
   - More muscular

4. Will dress lower because
   - Lacks finish
   - Excessive fill
   - Wastier middle
   - Heavier hide
   - Higher percent of dress-off items
   - Lighter muscled

INTRODUCTION TO GIVING ORAL REASONS

BEEF, LEVEL III

Handout 20, Reasons Terminology for Breeding Beef Cattle

Muscling

Bulls

1. More bulge and fullness of muscle in stifle area
2. Thicker quarter
3. Longer muscled round
4. Smoother muscled shoulder
5. More strength and thickness of muscle down the top
6. More volume of muscle in round

Heifers and Cows

1. Longer muscling in round
2. Smoother more functional muscles
3. Not as thick and bunchy muscled
4. More refined in her muscling
5. Moderate thickness of muscling

Finish or Condition

Bulls and Heifers

1. Less predisposition to waste
2. No excess fat along underline
3. Trimmer, less wasty brisket, rear flank
4. More evenly distributed finish or more uniformly finished
5. More desirable finish
6. Less fat in udder or scrotum (cod)
7. No excessive fat deposits
8. Exhibits more fleshing ability

Sex Characteristics

Bulls

1. More masculinity about head and neck
2. Better developed testes
3. Tighter sheath
4. More correct length of leg
5. More functional reproductive system

Heifers and Cows

1. More refined
2. More feminine about head and neck
3. Longer, leaner neck
4. Smoother shoulder
5. Stronger udder attachment
6. Better balanced udder
7. More productive udder
8. Smaller teats, more correct teat size
9. More correct udder development
10. More well-developed vulva

INTRODUCTION TO GIVING ORAL REASONS

BEEF, LEVEL III

Handout 20, Reasons Terminology for Breeding Beef Cattle, *continued*

Performance Terms

1. More weight per day of age
2. Superior growth rate
3. More efficient feed utilization
4. Gained faster
5. More weight at a younger age
6. Less feed per pound of gain
7. Yield more pounds of retail cuts per day of age

Transition Words for Oral Reasons

Furthermore
Even so
Nevertheless
However
And
Moving to
Therefore
Admit
Grant
Realize

INTRODUCTION TO GIVING ORAL REASONS

BEEF, LEVEL III

Handout 21, Oral Reasons Notes Guide

Class Name _____

Placing _____

Compare	Grant	Criticize

INTRODUCTION TO GIVING ORAL REASONS

BEEF, LEVEL III

Handout 22, Oral Reasons Outline

I. **Introduction**

"I placed this class of __class name__ 4 - 3 - 2 - 1 .

II. **Top Pair Paragraph**
A. Introductory Sentence
B. Top Sentence
C. Furthermore Sentence
D. In Addition Sentence
E. Grant Sentence
F. Criticize Sentence

III. **Middle Pair Paragraph**
A. Introductory Sentence
B. Top Sentence
C. Furthermore Sentence
D. In Addition Sentence
E. Grant Sentence
F. Criticize Sentence

IV. **Bottom Pair Paragraph**
A. Introductory Sentence
B. Top Sentence
C. Furthermore Sentence
D. In Addition Sentence
E. Grant Sentence
F. Criticize Sentence

V. **Bottom Individual Paragraph**

Determining Shrink and Dressing Percent for Market Steers

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- To calculate "shrink" in cattle
- To calculate dressing percent

ABOUT THEMSELVES:

- Math skills needed in marketing systems

Materials Needed:

- Flip chart or chalkboard
- Pencils and paper for each member
- Calculators (optional) for each member

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

"What's my steer worth?" This is the question that has been pondered by many producers. Simply put, live cattle and carcass prices are determined by the economic principle known as "Supply and Demand." The supply side of this principle is an easy concept to comprehend. Example: In 1988, more than 35 million head of fat cattle were processed in the United States. This is a large supply of beef. The price for this beef depends on demand. The demand for beef is dependent on many factors, some of which are the price of the product, family income level, type of occupation, ethnic background, religious beliefs, health awareness, diets and food fads, just to name a few.

The objective of this lesson is **not** to understand the economics behind price determination, but to gain a working knowledge of how to calculate shrink and dressing percent. These are necessary first steps in determining what **your** steer is worth.

Shrink

Cattle will lose from 3 to 4 percent of their weight if kept off feed and water for 24 hours. This is referred to as "shrink." It has become a general practice for cattle buyers to demand this shrink, usually as a mathematical deduction from the full-fed weight. The standard "pencil-shrink" is approximately 4 percent and "shrunk" live weight can be calculated by multiplying the live weight in pounds by 4 percent, then subtracting this from the live weight.

Leader Notes

Demonstrate this. Have members practice "shrink" on cattle of varying weights.

Example:

Live weight		1,100 lbs
Pencil-shrink	×	.04
		44 lbs
		1,100 lbs
	−	44 lbs
Shrunk weight		1,056 lbs

Dressing Percent

After slaughter, carcasses, minus the head, hide and internal organs, are weighed. This is known as hot carcass weight. If you know the animal's live weight and the hot carcass weight, you can figure dressing percent or carcass yield. Carcass yield refers only to the weight of the carcass (muscle, fat and bone), expressed as a percent of the animal's live weight. Carcass yield is more commonly designated as dressing percent. The formula for calculating dressing percent is as follows:

Hot carcass weight (lbs) ÷ live weight (lbs) × 100

Demonstrate figuring dressing percent. Have members practice figuring dressing percent using typical weights.

For example: 625 lbs hot carcass weight ÷ 1,000 lbs live weight = .625

.625 × 100 = 62.5%

Dressing percent is a function largely of fill and fat; thus, fatter cattle usually dress higher than trim cattle. However, muscle is more dense (weighs more) than fat, so a lean, heavy-muscled animal may dress higher than a fat, light-muscled animal. In any case, the animal with more fill will dress lower than a shrunk animal. Most cattle have dressing percents around 60 percent. Heifers run slightly lower in dressed yields. Cattle buyers often discount prices offered for heifers as insurance against pregnancy. Pregnancy lowers dressing percentage considerably, sometimes as much as 10 percent.

Quality and Yield Grades

After the cattle have been slaughtered, carcasses are chilled for 24 hours. The carcass is then cut between the 12th and 13th rib. At this time, a USDA grader will assign a quality grade and/or a yield grade.

Quality grade is determined by the maturity of the carcass and the fat (marbling) level in the lean of the ribeye muscle. Yield grade is determined by fat level over the ribeye, internal carcass fat, ribeye muscle size, and carcass weight.

The basic carcass price is often modified by these grade factors. Occasionally, factors such as muscle color, carcass weight range, poor carcass conformation, bruise or other trim damage may further modify value.

DALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What are the advantages/disadvantages of automatically reducing the sale weight of an animal by 4 percent?
2. What factors affect dressing percent the most?

Process:

3. What are the advantages of using a “pencil shrink” for the buyer? Seller?
4. What is the significance of dressing percent in today’s beef industry?
5. With increased consumer demand toward lean meat with less fat, what are ways to reward (pay) producers whose cattle meet this new demand?

Generalize:

6. What does the phrase “value-based marketing” mean to you? What are the producer and consumer aspects?
7. What are other situations that require uses of percentages?

Apply:

8. How will the issues raised by this lesson be useful to you in the future?

GOING FURTHER:

1. Visit a feedlot or sale barn and discuss the basis on which cattle are sold. Determine value in dollars that shrink can make on different animals.
2. Visit a local meat processing plant and learn the importance of shrink and dressing percent as it relates to their business. Ask what other shrink considerations are important.

REFERENCES:

Author:

This lesson was modified from original material authored by Jason K. Apple, Graduate Research Assistant, Kansas State University, with adaptation by:
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Cooperative Extension Service
Kansas State University
Manhattan

Beef Carcass Anatomy (Skeletal)

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- The skeletal structure of the beef animal
- The difference between a side of beef, a forequarter and a hindquarter
- The wholesale cuts of the beef carcass and where they are located

ABOUT THEMSELVES:

- How skeletal structure affects meat buying and cooking decisions

Materials Needed:

- Activity Sheet 9, Beef Skeletal Structure
- Activity Sheet 10, Wholesale Cuts of Beef
- Leader's Key, Activity Sheet 9 and 10

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

People in the beef cattle business need to understand the conversion of live animals to meat and how consumer preference and demand influence beef production. These preferences also influence judges in selecting animals in livestock shows.

In order to obtain a good understanding of the beef carcass, we must take a close look at the bone structure. The bone structure determines the amount and type of muscle that will be present. This structure also sets the standard for dividing the carcass into wholesale and retail cuts. Identification of beef retail cuts sold at the grocery store is made easier by knowing the bone structure.

Give each member a copy of the Activity Sheet 9, Beef Skeletal Structure. Ask them to find what bones they are familiar with. Let them work in small groups. Have groups share answers until everyone has all parts labeled.

Because the beef carcass is so large, it is not practical to transport it in one piece from the packer to the wholesaler or retailer. The carcass is split into sides. The sides of beef are divided into the forequarter and the hindquarter. A good example is a dollar bill; one-half of a dollar is 50 cents, split the 50 cent piece and you have two quarters. Beef carcasses are split down the chine or backbone to produce two sides of beef. These sides are then "ribbed" between the twelfth and thirteenth rib to separate the forequarter from the hindquarter.

Have members draw a dark line between the twelfth and thirteenth rib on skeletal handout to show where forequarter and hindquarter are separated.

The beef carcass is divided (fabricated) into wholesale (primal) cuts, subprimals, and then retail cuts. The size and shape of the wholesale cut should give the member an idea of the size and shape of the retail cut. Since the mid-1970s most beef has been shipped in wholesale type cuts that are vacuum packaged (without air) in plastic and then put in boxes

Pass out Activity Sheet 10, Wholesale Cuts of Beef. Have members write down retail cut names below their respective wholesale cut, as each wholesale cut is discussed. This will help members understand the relationship between wholesale and retail cuts.

averaging about 75 pounds. Boxing beef for shipping has made the cost for shipping much less and thus helped to keep beef a more economical buy for the consumer.

Ask members what bones are found in particular wholesale cuts. For example, the beef chuck contains the shoulder blade bone, arm bone, neck bones (cervical vertebra) a few feather bones and five rib bones. Continue with each wholesale cut.

Wholesale (primal) cuts are larger sections of beef cut to separate lean cuts from fat cuts, more tender from less tender and thick from thin cuts. These cuts are usually not sold directly to the consumer.

Retail cuts are the small cuts displayed in grocery stores and meat markets for consumers to buy. They are cut from wholesale (primal) or subprimal cuts which usually come as vacuum-packaged boxed beef.

The **foreshank** and **hindshank** are the legs of the beef animal. They contain muscles used for locomotion and are less tender because they contain a large amount of connective tissue.

The **chuck** contains the large humerus bone and blade bone. Retail cuts such as arm steaks, pot roasts, blade steaks and beef for stew are obtained from the chuck.

The main difference between steaks and roasts are that roasts are usually cut at least 1½ to 2 inches thicker than steaks.

The **brisket** and **short plate** produce boneless brisket, corned brisket, beef short ribs, stew meat and ground beef. The “skirt” from the plate has become popular for fajitas (fa-HEE-tas). These cuts are less tender than thicker cuts of beef and usually require braising or some type of moist heat cookery.

The wholesale **flank** contains one flank steak which is sold as such.

The **rib** wholesale cut is one of the more tender parts of the beef animal. It contains rib bones and thoracic vertebra. Retail cuts are short ribs, rib steaks and rib eye steaks. The roast used for prime rib comes from the wholesale rib.

The **short loin** contains the lumbar vertebra. The more tender cuts come from the loin and rib which contain muscles that were used for support. The short loin is fabricated into T-bone steaks and porterhouse steaks, or boneless top loin and tenderloin steaks.

The **sirloin** contains the sacral vertebra and ilium. The beef sirloin, when boned out, yields top sirloin (boneless sirloin), sirloin tip and tenderloin steaks.

The **rump** retails as rump roasts.

The **round** wholesale cut contains the large femur bone and several cuts will contain a cross-section of this round bone. The round contains retail cuts of round steaks and roasts.

SUMMARY

Be sure each member has identified the correct bone and wholesale cut areas. This is very important in understanding the process of converting the carcass to meat sold over the grocery store counter.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. How can you use your knowledge of beef skeletal structure and wholesale cuts of beef?
2. What was the most difficult part to understand when thinking of the relationship between wholesale and retail cuts?

Process:

3. What are the price differences between wholesale and retail cuts? (Consider costs of labor, equipment, and facilities.)
4. What is the significance of boxed beef?

Generalize:

5. What other changes have been made in the beef industry that have impacted the cost to the consumer?
6. What did you learn about roles and functions of skeletal structure?

Apply:

7. How would knowing the production process of goods and services assist you in making consumer choices?

GOING FURTHER:

1. Tour a processing plant.
2. Tour a large grocery store where boxed beef is being fabricated. Let members see the retail cuts being cut from wholesale cuts. Walk through the meat counter and look at the packaged retail cuts. Have members identify the wholesale cut each retail cut is from. Also, identify the bones in each cut.

REFERENCES:

National Live Stock and Meat Board, 444 North Michigan Avenue, Chicago, Illinois 60611

Principles of Meat Science, John C. Forrest, et. al, W. H. Freeman and Company, San Francisco, California

Meat Identification, Leader Guide, LI-687, and *Member Guide*, LI-686, Dave Schafer and Terry Dockerty, et al, National 4-H Council, 7100 Connecticut Avenue, Chevy Chase, Maryland 20815

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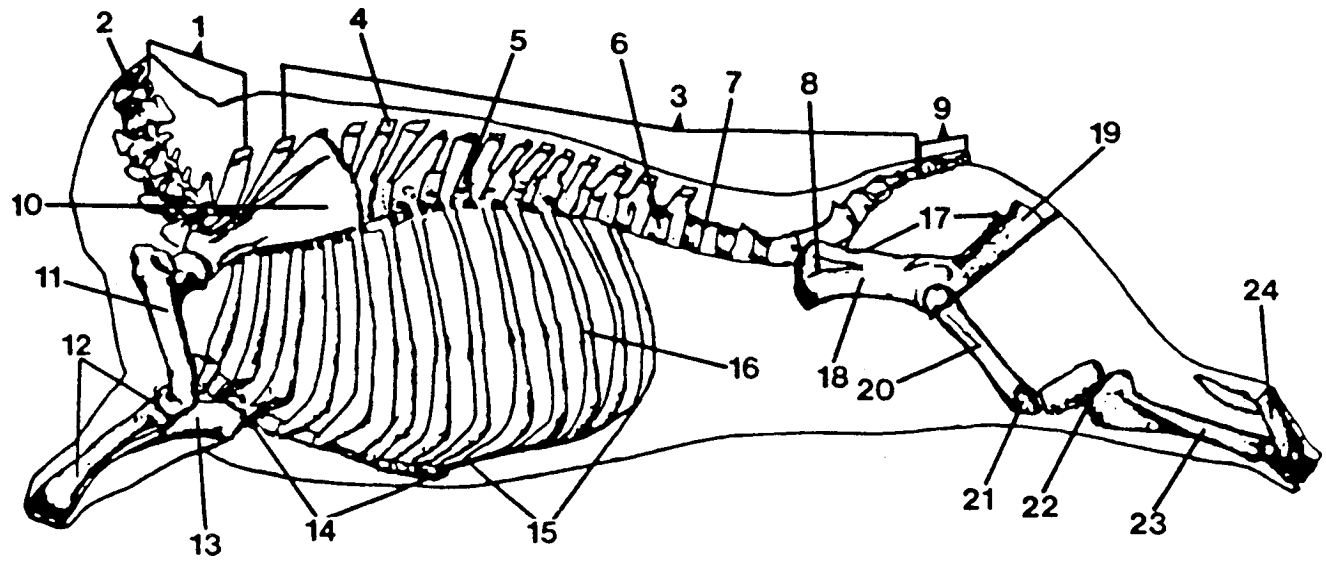
BEEF CARCASS ANATOMY (SKELETAL)

BEEF, LEVEL III

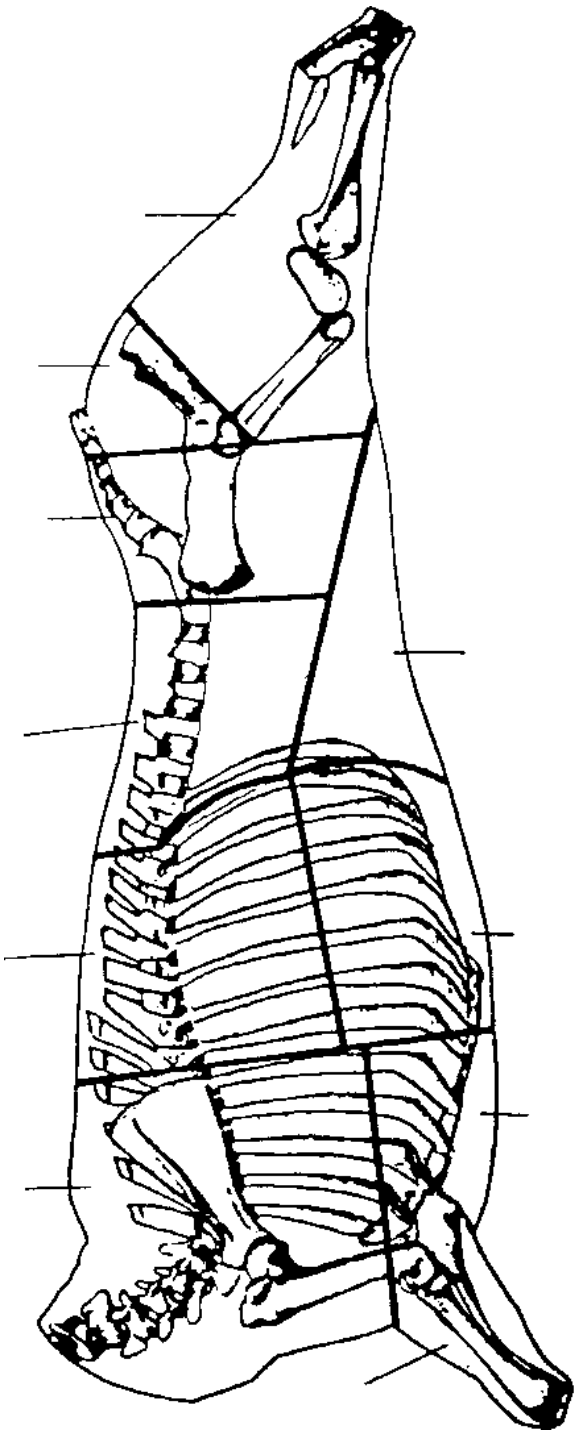
Activity Sheet 9, Beef Skeletal Structure



BEEF CARCASS ANATOMY (SKELETAL)

BEEF, LEVEL III

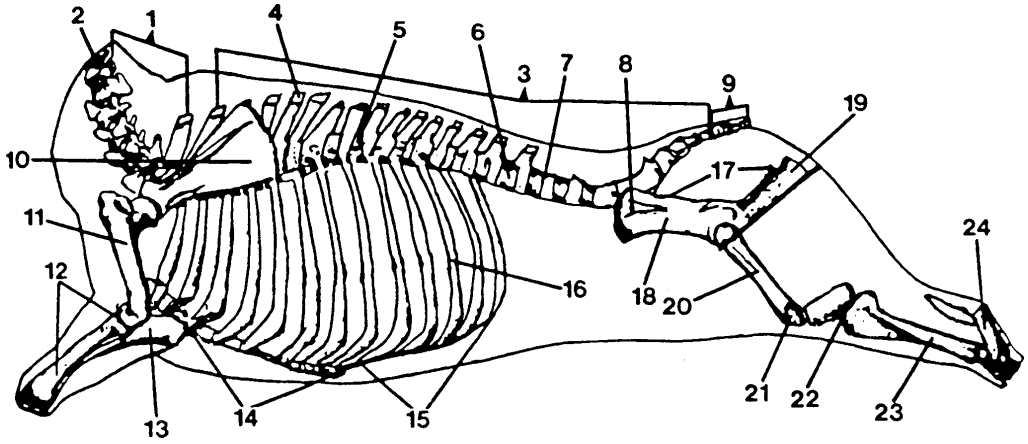
Activity Sheet 10, Wholesale Cuts of Beef



BEEF CARCASS ANATOMY (SKELETAL)

BEEF, LEVEL III

Leader's Key, Activity Sheet 9, Beef Skeletal Structure



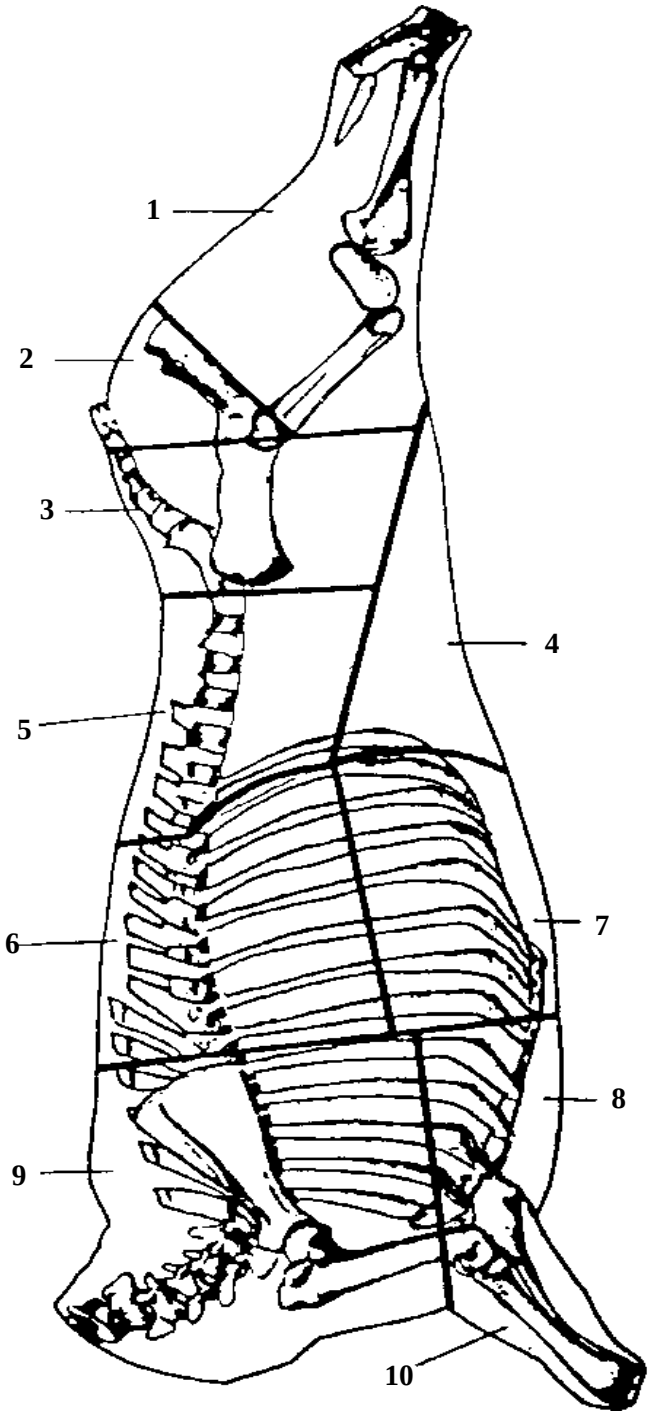
Common Name	Technical Name
1. Neck bone	1. Cervical vertebrae
2. Atlas	2. First cervical vertebrae
3. Back bone	3. Thoracic vertebrae (1–13) Lumbar vertebrae (1–6) Sacral vertebrae (1–5)
4. Button	4. Cartilage of spinous process
5. Feather bone	5. Spinous process
6. Finger bone	6. Transverse process
7. Chine bone	7. Body of vertebrae
8. Slip joint	8. Sacroiliac disthrosis
9. Tail bone	9. Caudal vertebrae (2–6)
10. Blade bone	10. Scapula
11. Arm bone	11. Humerus
12. Foreshank bone(s)	12. Ulna and radius
13. Elbow bone	13. Olecranon process
14. Breast bone	14. Sternum
15. Rib cartilage	15. Costal cartilage
16. Rib	16. Rib
17. Pelvic bone	17. Pelvis
18. Hip bone	18. Ilium
19. Rump bone or aitch bone	19. Ischium symphysis pubis
20. Leg (round) bone	20. Femur
21. Knee cap	21. Patella
22. Stifle joint	22. Femero-tibial articulation
23. Hind shank bone	23. Tibia-fibula
24. Hock bone	24. Parts of the tibia and fibular tarsal bones

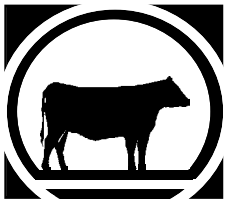
BEEF CARCASS ANATOMY (SKELETAL)

BEEF, LEVEL III

Leader's Key, Activity Sheet 10, Wholesale Cuts of the Beef

1. Round
2. Rump
3. Sirlion
4. Flank
5. Short loin
6. Rib
7. Short plate
8. Brisket
9. Chuck
10. Foreshank





Beef as a Food

Beef, Level III

What Members Will Learn . . .

ABOUT THE PROJECT:

- The five categories of beef consumers
- The role beef plays in a healthy diet
- The yearly consumption of meats, beef in particular

ABOUT THEMSELVES:

- An understanding of meat and a healthy diet
- Their preferred meat consumer category
- How to be tolerant of people with differing viewpoints yet feel good about their own

Materials Required:

- Nutri-Facts and Recipes in which beef is used (National Live Stock and Meat Board, Chicago, Illinois)
- Flip chart or chalkboard

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

To a great extent, the beef industry was built on the taste appeal of beef. In earlier years, people enjoyed the taste of beef and knew the importance of it as a protein source.

It is important to understand how consumption has changed over the past 20 years before we can identify what role beef plays in a well-balanced diet.

According to the USDA, in 1988, the total consumption of red meat, poultry and fish was at an all-time high of 186 pounds (boneless) per person. This represented a 15 percent increase over 1965 figures. The largest increase in per capita consumption has been for poultry; between 1965 and 1991, chicken increased 96 percent and turkey increased 140 percent. At the same time, the per capita consumption of all red meats has decreased by 10 percent. The highest level of red meat consumption reached 135.3 pounds in 1971, and has dropped to 120.2 pounds (boneless) in 1991. Beef accounts for 60 percent of beef, pork, lamb and veal in the red meat category. Beef consumption peaked in 1976, at 89 pounds per person.

Now that you have some idea of how much meat is consumed yearly per capita, it is important to understand different reasons people have for purchasing meat. With this knowledge, we may be able to understand why

poultry consumption has increased so dramatically while beef and other red meat consumption has decreased slightly.

Today's consumer is changing and no single description can encompass the variety of consumers in the marketplace. Five categories of consumers have been identified for the beef industry. Each of these segments has a level of beef consumption and different reasons for selecting beef for their diet.

List these categories on a chalkboard or flip chart as they are discussed.

Consumers have been divided into five categories: (1) Health Oriented; (2) Active Lifestyle; (3) Price Driven; (4) Creative Cookers; and (5) Meat Lovers.

The **Health Oriented** group makes up approximately 27.3 percent of the population. This group believes in limited fat intake, and avoiding cholesterol. Generally this group has a negative attitude towards meat.

Active Lifestyle consumers account for 22.2 percent of the population. The concern for this group is not the price of meat but the limited time available for meal preparation. Their negative attitude toward meat comes from the belief that it takes too much time to prepare a "home-cooked meal."

Another 22.2 percent of the consumer population is made up of the **Price Driven** segment. The price of food is the primary concern that determines whether meat is in their meals. They have a positive attitude towards meat, but will choose a cheaper alternative.

The **Creative Cook** segment represents about 21.2 percent of the consumer population. This group enjoys preparing creative meals from exotic recipes that are both appetizing and healthy.

Finally, 7.1 percent of the population is made up of the **Meat Lovers** segment. This group believes that meat is a must in a meal because of its appealing taste and healthy nature in a well-balanced diet.

Another area to consider before we look into the nutritional value of beef is the recommended levels of nutrients that should be consumed in a healthy, well-balanced diet. A summary of national dietary guidelines was compiled by six national health organizations: American Heart Association, American Cancer Association, Surgeon General's Report, U.S. Senate Select Committee on Nutrition, National Institute of Health Consensus Development Panel, and National Research Council Recommended Daily Allowances. The summary recommends that a person eat only enough calories to maintain a desirable weight and avoid obesity. Foods high in fat and cholesterol should be limited, while selecting foods rich in calcium, iron, and vitamins. It is assumed that most Americans receive adequate levels of protein in their diets.

So the question you may be asking by now is why should beef be included in our diets? Well, beef is a nutrient-dense food, especially rich in protein,

the B vitamins, iron and zinc. There is 27 to 32 grams of protein in a 3-ounce serving of beef. The carbohydrates and fat make beef an excellent source of energy. Beef is especially important as a source of vitamins in well-balanced diets. Beef is high in B-complex vitamins and contributes some of the fat-soluble vitamins A, D, E and K. Beef also is an excellent source of the minerals zinc and phosphorus.

The nutrient composition of fresh, cooked beef differs by cut and grade and to a lesser degree, by method of preparation, since most fresh beef is cooked by broiling and roasting or braising. A change to leaner beef multiplies the beneficial effects on the total diet, because it includes a higher concentration of the B vitamins, iron, zinc and phosphorus, with less fat.

This lesson has identified groups of meat consumers with differing concerns and provided nutritional information about beef, that will help you understand the importance of beef in a well-balanced diet.

For further information concerning the role of beef in the diet, you can contact your county Extension agent or a dietician. The National Live Stock and Meat Board supplies Nutri-Facts, which detail the nutrient content of certain beef cuts and the nutrient content of meals that contain beef. These Nutri-Facts can be found at your local grocery store or by writing the National Live Stock and Meat Board in Chicago, Illinois or the Kansas Beef Council in Topeka.

As you can see, lean beef is important in a healthy diet and should always remain in our diets. With the information that has been presented, hopefully you have a better understanding of the positive and negative aspects of consumerism and nutrition facing the beef industry.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the State 4-H Staff in collaboration with a committee of agents, volunteers, animal science and human development specialists.

Share:

1. What are the five categories of beef consumers?
2. How does the nutrient content of beef contribute to a healthy diet?

Process:

3. If you are a beef consumer, which category suits you best?
4. What might be some reasons why individuals choose to be vegetarians? What impact does their choice have on the beef industry?
5. What changes have the beef industry made to react to consumer demands or choices?

Generalize:

6. What did you learn about yourself from this activity?
7. How will the understanding of consumer motives make you more tolerant of people with different viewpoints?

Apply:

8. How do you feel the beef consumer categories will change in the future? Why?
9. How can you use this activity to help you analyze and study other products or consumer situations?

GOING FURTHER:

1. Have your county Extension home economist visit with your group.
2. Have a representative of the Kansas Beef Council visit with your group on the importance of beef in the diet.
3. Order some Nutri-Facts pamphlets and beef recipes from the National Live Stock and Meat Board and hold a meeting to cook some of the recipes.

REFERENCES:

*Designing Foods, Animal Product Options in the Marketplace,*1988, National Academy Press, Washington, D.C.

Kansas Beef Council, P.O. Box 4567, 6031 SW 37th Street, Topeka, Kansas 66604-0567. Phone 913-273-5225

National Live Stock and Meat Board, 444 N. Michigan Avenue, Chicago, Illinois 60611. Phone 312-467-5520.

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Kansas 4-H Beef Leader Notebook

Level IV

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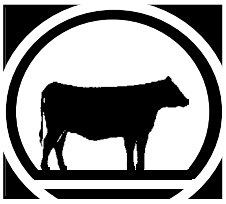

Budgeting and Financing a Calf

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Cost of producing a calf
- Monthly payment for a loan
- Terminology associated with financing

ABOUT THEMSELVES:

- How to develop a budget
- Understanding use of credit and borrowing

Materials Needed:

- Activity Sheet 1, Cost-Return Projection for a Steer
- Handout 1, Amortization Table
- Handout 2, Calf Interest Example
- Chalkboard or flip chart

ACTIVITY TIME NEEDED: 60–90 MINUTES

ACTIVITY

Leader Notes

Members spend many hours raising, feeding, showing and grooming their calves for the annual county fair. This job begins many months before the event—when you select your steer. Selection of the right calf is very important. You will want a calf that is likely to produce economical gains. Remember that your objective in raising this calf is to sell the finished steer for more than the total of all your production costs.

You can show pictures of steers when they are originally purchased and when they are in the showring.

When deciding how much you can afford to pay for your calf, it is a good idea to estimate what selling price you will need to break even (not have a profit or a loss). By looking at how your "breakeven" price changes as the calf's purchase price varies, it will help you determine the maximum price you can afford to pay for the calf.

Show a budget—Activity Sheet 1, Cost-Return Projection for a Steer. (line 24)

Cash costs are incurred when inputs (feed, grooming supplies, etc.) are purchased for production. The cost of the input is the actual amount of money it took to buy it. **Non-cash costs** are more difficult to handle, because they represent items like unpaid family labor, interest on owner's investment, and depreciation (the gradual wearing out of equipment and buildings).

Make a list on a flip chart or posterboard of examples of cash costs and non-cash costs. Let the members make suggestions.

It's obvious that the member must pay for all purchases (cash costs). But for the calf to be truly "profitable," members should cover all costs—even non-cash costs. It is important to cover these costs because feed that you raise and feed to your calf could have been sold for cash and you could have gotten a summer job and worked for pay rather than spend time with your calf.

Non-cash costs or opportunity costs are confusing, especially to young people. It might be helpful to have a banker or local economist visit to explain this further.

One way to view a non-cash cost is to think of it as the cost of an opportunity you gave up. In the example of the summer job, you could have earned a wage for the number of hours you worked at a fast food restaurant instead of spending time working on your calf. That money that you never saw is a non-cash cost.

The **purchase cost** of the calf often determines whether the member will make a profit. If a member pays too much for the calf, it may not be possible to generate a profit even with good management. There are two costs associated with the purchase of a feeder calf. Obviously, the first is the **actual purchase price** of the calf. The second cost, which you might not have thought of, is the **cost of having money invested** in the calf during the feeding period. This cost is usually referred to as the **interest cost** on the calf's purchase cost.

Interest cost may either be a cash or a non-cash cost. If you withdraw money from your savings account to purchase the calf, you have given up the opportunity to earn interest from the bank on that money with very low risk. Like your labor, it is a non-cash cost.

If you borrow money to purchase the calf, then you will pay interest to the lender (a bank, your parents) and interest will be paid in cash. In most cases a cattle feeder will use some of their cash and borrow the remaining amount to purchase feeder calves. The cattle feeder's money is their net worth or equity in the cattle. Since that money could have been earning interest in a bank account, we assign that interest lost or foregone as a cost in our cattle feeding budget. This interest cost is sometimes referred to as the opportunity cost of the money invested in the calf.

Write "amortized" on the chalkboard or flip chart with an explanation.

There are many different types of loans. One example is an **amortized loan,** which is often used for the purchase of a car, house or land. In an amortized loan, equal payments that include both principal and interest are made to repay the lender. An example is a car loan where the car buyer makes 48 monthly payments to the lender and each one is for the same amount. The borrower receives the funds to purchase the item and then makes payments to the lender.

Write "single payment" on the chalkboard or flipchart with an explanation.

Most feeder cattle loans are **single payment loans**. The cattle feeder receives the loan and purchases the cattle. When the cattle are sold, the cattle feeder pays the note back in a single payment.

Write down these two ways to calculate interest. Write down total finance charges and APR. Explain.

There are also many ways to calculate interest. Examples would include **simple interest** and **compound interest**. Because there are so many different methods for calculating interest, Congress passed a law that requires lenders of consumer loans to inform borrowers of the total finance charges and the **annual percentage rate (APR)**.

Most members that borrow money to purchase their calf will use a single payment loan. Interest may or may not be compounded. The interest cost will depend on the amount of the loan, the length of time the money is borrowed, and whether interest is compounded or not. Quite often, the

cattle note is for a short period and the simple interest method is used to calculate the interest payment.

If you borrow money for the purchase of your calf, you will need to repay the original loan plus interest.

Show Handout 1 Amortization Table.

Using the simple interest method, let's calculate how much money you would have to repay at the end of the loan for a feeder calf. Assume that you need to borrow $400 for 6 months at an interest rate of 12 percent per year. On the amortization table, locate the column for 12 percent interest and the row for a 6-month loan. Multiply the figure on the table (1.060) by the $400 to determine how much money you will have to repay at the end of 6 months.

$400 × 1.060 = $424

The result is the total amount you must repay at the end of the loan.

Most farmers have to borrow at least a portion of a calf's purchase price. The amount borrowed is known as the loan amount. The amount of money they must repay is the original loan amount plus the interest on the money borrowed. (Handout 2, Calf Interest Example)

Following the initial purchase cost of the calf, feed cost is the largest expense category. Remember to include the cost of all feed fed, including feed grown on your own farm. Feed grown on your farm should be valued at the feed's market price because that is what you would have received if you sold the feed. Remember that selling the feed on the market is the "opportunity you gave up" when you decided to use the home-grown feed to finish your calf.

Have members enter the current feed costs for their steer. (Activity Sheet 1, Cost-Return Projection for a Steer)

The next item is the **cost of labor.** The budget shows $18 for labor in the total column and zero in the cash column. The cash column is zero because the members is providing the labor rather than hiring someone else to do the labor. The $18 in the total is an estimate of what your time would have been worth if you had gotten a part-time job instead of spending your time working with your calf.

Show columns mentioned on Activity Sheet 1.

The next cost item is **veterinary expense**. Good management will help keep your calf healthy and, ultimately, lower your total cost of raising the calf, due to lower or no veterinarian bills.

Show mentioned columns in Activity Sheet 1.

The **marketing cost** for most calves is the "pencil shrink" used by packers to calculate the expected weight reduction that will occur during transport to the packing house. Most packers calculate this by assuming that 4 percent of the finished steer or heifer's weight will be lost prior to slaughter.

Show how to figure the "pencil shrink" of a calf by multiplying 4 percent by the live sale weight.

Fuel for the truck to haul feed to the calf is also an expense. Estimating **fuel usage** is difficult, but it's important to try to itemize all production costs.

There are also repairs to be made on the pens and other facilities that are necessary for raising calves. The cost of these repairs should be included in your budget.

Figure an estimate based on miles per gallon and approximate miles driven per day to feed the calf.

Members will have interest costs on their calf, and they will have interest costs on the cash expenses. Notice that interest is only charged on one-half of the expenses, while interest is charged on the full amount of the calf. That is because we purchase feed and other items throughout the feeding

List repairs that might be done.

period which means that we don't borrow all of the cash at the beginning of the feeding period. Charging interest on half of the cash expenses is a way of estimating and charging interest on the average investment in the calf.

Typically, members will not have **fixed costs** because they are likely to use their parents' barn and pens, and the member does not own them. Fixed costs are the costs on buildings and equipment that remain regardless of whether you feed a calf. Ultimately, if you decide to go into the business of feeding cattle, you will have some fixed costs.

Show the two different prices and how they are figured.

Finally, it is time to sell the calf. Notice that the income from selling the calf really comes from two sources. The first item is the **market price**, or the price meat packers are willing to pay for a fed steer. If a member raises steers commercially, this would be the only source of revenue. But a member may also receive a **premium** at the local county fair. Packers or other buyers often pay a premium over and above the market price for cattle as a means of promoting their business. This premium is the "second source" of income from the sale of a steer. Commercial cattle producers do not receive this premium.

Now, let's estimate the return from finishing the calf. Remember the purchase price of the small calf the member started with must be subtracted from the revenue generated by the sale of the finished steer. The result is the gross return per head.

Write on chalkboard or flip chart.

Next, subtract the total costs from the gross return to estimate returns over all costs.

If everything goes well, the member will have a positive net return that will provide a return for their management and for accepting the risk of feeding cattle.

Write on a flip chart or posterboard the risks.

1. Death loss
2. Changes in cost of feed
3. Changes in cost of gain
4. Fed cattle market price changes

There are many risks in the production of beef and members will be exposed to most of them. Several of the risks are as follows:

1. Your calf may die and you will lose your entire investment.
2. Feed prices may increase, raising your production costs above your estimate, causing you to lose money.
3. Your calf may not gain as efficiently as you projected in your budget, meaning you will have less pounds of gain to spread your costs over, possibly resulting in a net loss for you.
4. The market price for fed steers may decline, reducing your revenue, causing you to lose money.

SUMMARY

Often, the difference between total revenue and total costs when feeding cattle is very small. As a result, it takes a manager that not only knows how to feed cattle, but also knows how to manage costs and market cattle to make money feeding cattle. But even the best managers will occasionally lose money feeding cattle because of unexpected price changes, bad weather or health problems.

Remember, you are like a small feedlot. You are a cattle manager on a smaller basis. You must manage risks and costs in order to make a profit.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What are some of the costs of producing a steer or heifer?
2. What costs are difficult to understand? Determine?

Process:

3. Why is interest (cost of having money invested) an important factor in budgeting?
4. What type of interest do you pay for most cattle loans? Why?
5. What are marketing costs?
6. What are opportunity costs?

Generalize:

7. What other times in your life would it be important to know about budget and finance issues?
8. What budget decisions seem most important to you? Why?

Apply:

9. Prepare a monthly budget of your income and expenses. What is needed to balance your budget? Why? How will you accomplish a balanced budget?

GOING FURTHER:

1. Make a budget for your project and stick to it. This can be included in your project records.
2. Help a younger member make a budget.

REFERENCES:

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BUDGETING AND FINANCING A CALF

BEEF, LEVEL IV

Activity Sheet 1, Cost-Return Projection for a Steer

	Steers		Your Calf	
	Total	Cash Flow	Total	Cash Flow
VARIABLE COSTS PER HEAD:				
1. Pasture (____ mos × ____ per mo)	$	$		
2. Silage (6,900 lbs × $21 per T)	72.45	72.45		
3. Hay (____ lbs × $60 per T)				
4. Grain (3,200 lbs × $1.45 per bu)	82.86	82.86		
5. Protein (350 lbs × $1.95 per T)	34.13	34.13		
6. Vitamins–Minterals (50 lbs × $.03 per lb))	1.50	1.50		
7. Feed Processing (57 bu × $.25 per bu)	14.25	14.25		
8. Labor (3 hrs × $6 per hr)	18.00	.00		
9. Veterinary, Drugs, Supplies	8.50	8.50		
10. Marketing Cost—4% Shrink (4% of line 20)	30.80	30.80		
11. Hauling				
12. Utilities, Fuel, Oil	7.75	7.75		
13. Buildings–Equipment Repair	9.00	9.00		
14. Miscellaneous	6.50	6.50		
15. Interst on Purchased Livestock @ 12%, 8 mos.	40.00	32.00		
16. Interest on ½ Variable Costs @ 12%, 8 mos	11.43	10.71		
A. TOTAL VARIABLE COST	$ 337.17	$ 310.45		
FIXED COST PER HEAD:				
17. Depreciation on Equipment and Facilities	$	$		
18. Interest on Equipment and Facilities				
19. Insurance on Equipment and Facilities @ .25%				
B. TOTAL FIXED COST	$	$		
C. TOTAL COST PER HEAD (A + B)	$ 337.17	$ 310.45		
RETURN PER HEAD:				
Market Animal:				
20. Steers: 1,100 lbs × $70 per cwt.	$ 770.00			
21. 4-H Premium @ $10 per cwt	110.00			
22. Less Cost of Animal: Steers 500 lbs × $100 cwt	500.00			
23. Less Death Loss				
D. GROSS RETURN PER HEAD	$ 380.00			
E. RETURN OVER TOTAL COST WITHOUT PREMIUM (D – C – line 21)	$ –67.17	$ –40.45		
F. RETURN OVER TOTAL COST (D — C)	$ 42.83	$ 69.55		
G. AVERAGE SELLING PRICE AND PREMIUM NEEDED:				
24. To Cover Total Cost and Feeder (C + line 22 + line 23) ÷ (selling wt)	$ 76.11	$ 73.68		
H. BREAKEVEN PURCHASE PRICE:				
25. Breakeven Purchase Price Needed to Cover All Costs (line 20 + line 21 – C – line 23) ÷ (purchase wt)	$ 108.57	$ 113.91		
26. Breakeven Without Premium (line 20 – C – line 23) ÷ (purchase wt)	$ 86.57	$ 91.91		

BUDGETING AND FINANCING A CALF

BEEF, LEVEL IV

Handout 1, Amoritization Table

Future Value of $1.00

Months	8%	10%	12%	14%
1	1.0067	1.0083	1.01	1.0117
2	1.0134	1.0167	1.02	1.0235
3	1.0121	1.0252	1.03	1.0354
4	1.0269	1.0338	1.04	1.0475
5	1.0338	1.0424	1.05	1.0597
6	1.0407	1.0511	1.06	1.0721
7	1.0476	1.0598	1.07	1.0846
8	1.0546	1.0686	1.08	1.0972
9	1.0616	1.0775	1.09	1.1100
10	1.0687	1.0865	1.10	1.1230
11	1.0758	1.0956	1.11	1.1361
12	1.0830	1.1047	1.12	1.1493

BUDGETING AND FINANCING A CALF

BEEF, LEVEL IV

Handout 2, Calf Interest Example

Example of Interest on a Purchased Calf

Cost of the calf	$500
Down payment	100
Amount borrowed	400
Months borrowed	6
Interest rate	12%
Amortization factor	1.060

Calculation:

1.06 x $400 = $424

$400 = Principal repayment

$ 24 = Interest cost

Cattle Handling Facilities

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Principles of cattle pen design
- Understanding of layout design for easy handling of cattle
- Ways to design facilities to protect cattle from injury
- Beef animal behavior characteristics

ABOUT THEMSELVES:

- The importance of their actions and attitudes when working with animals
- Most comfortable living and learning environment

MATERIALS NEEDED:

- Handout 3, Principles of Pen Design
- Handout 4, Beef Animal Characteristics
- Handout 5, Two-Pen Corral Diagram
- Brochures from companies selling cattle handling equipment

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

With “good” help hard to find, good working corrals or pens can replace a lot of hired labor.

Trying to work cattle in facilities that were improperly designed can be very frustrating. In addition to the handler becoming upset, animals can lose weight or be bruised or injured.

Provide pictures or drawings of several cattle handling facilities and let members discuss advantages and disadvantages of each.

Good equipment or facilities are a valuable investment. Facilities need not be expensive; but should be built for convenience, efficiency, and according to proper “cattle psychology.”

Describe an example of a farm or ranch situation and have small groups of members list the cattle handling facilities needed.

The following operations should be kept in mind when designing cattle handling facilities: branding, dehorning, castrating, palpating and other veterinary needs, sorting, loading and unloading, spraying or dipping, and, with the emphasis on performance testing, a place for weighing animals. It is a big job to plan a facility to handle all these jobs.

- Pens and facilities should accommodate both large and small bunches of cattle of varying weights and sizes.
- Provide special pens with fences high enough (5½ feet to 6 feet) and tight enough to prevent climbing. They must also be strong enough to withstand crowding.
- Provide a way to separate and sort cattle.
- Maintain complete control over animals with minimum effort.

Give members Handout 3, Principles of Pen Design.

- Design for “cattle psychology” or behavior.

UNDERSTANDING BEEF ANIMAL CHARACTERISTICS

“Cattle Psychology”

Give members Handout 4, Beef Animal Charcteristics.

Many problems with new and old facilities for beef cattle may be caused by a lack of understanding of beef cattle characteristics. Cattle have a virtual 360° wide-angle panoramic vision, which enables them to see all around themselves without turning their heads. Thus, a steer standing in a crowding pen is able to see other cattle and people behind him. However, cattle have very poor depth perception. The poor depth perception results in an extreme sensitivity to contrasts. This sensitivity may make an animal balk if a shadow crosses its path.

Cattle probably can hear a wider range of sounds than a human, and high frequency sounds actually hurt their ears. For this reason, every step should be taken to minimize noises. This may explain some of the reasons why cattle are often balky or skittish.

The sense of smell is extremely important to animals, especially between females and newborn young. Animals often react to odors that we do not detect. For example, cattle may be lured by the smell of new mown hay. A bull often becomes aggressive when he detects cows in heat.

Beef cattle are known for an even disposition. But when startled, they can inflict injury to anyone in their way. Groups of animals are easy to “spook.”

Although cattle are not likely to attack a person, they can overwhelm a person with their size and weight.

Most animals have a strong territorial instinct and will develop a “homeland” in their pens, corrals and pastures. They develop a very distinctive, comfortable attachment to this area. One example of this homeland trait would be the well-worn paths animals create in most pastures and between pastures and buildings, and water troughs and feed bunks. Removal from this homeland disturbs the animal.

Similar problems are created when moving animals away from feed, separating them from the herd or when an unfamiliar human approaches them.

Domestic livestock, especially cattle and sheep, are herd or flock animals. They tend to be uncomfortable when separated from the group and will usually try to return to the group.

Animals also have a definite social order. Dominant animals have first choice on location, direction of travel and feed. Crowding a subordinate animal against a dominant animal during handling may disrupt the social structure of the group. Cattle’s actions during these situations are unpredictable and potentially dangerous.

Cattle are more dangerous when handled in a confined area. Excited cattle will attempt to escape.

These beef animal characteristics should be considered in planning livestock facilities.

FACILITIES DESIGN

Considerable planning should precede capital investment in new facilities. Building design should take present circumstances into account and provide for any future expansion.

Some of the details to be considered in designing pens, floors, fences, gates, catwalks, restraining chutes, loading chutes and portable facilities are discussed in detail in the following sections.

FENCES

Fences around holding pens should be strong enough to withstand livestock crowding against the fences. Any of the several makes of corral or livestock panels which are of the open mesh type will suffice for this use. However, to assist livestock in moving into a restraining or loading chute, use solid panels for the sidewalls to keep the livestock from seeing people on the outside of the fence.

Give members Handout 5, Two-Pen Corral Plan.

Show brochures from equipment dealers or tour a beef handling facility.

GATES

Gates can be constructed of metal or wood or a combination of the two. Metal gates can either be steel or aluminum.

Gates should be standardized as to design, height, length and hardware for economy where possible. They should be hung 3 or 4 inches above floor or ground level. They should have a balanced design to prevent twisting and distortion.

All gates should be strong enough to hold the various kinds and sizes of livestock. They should be designed and constructed to eliminate sharp projections that can cause injury to livestock. Lightweight material for gates reduces the need for heavy gate posts and hardware.

One of the more popular types of gates is the one constructed of metal and wood. It has metal stiles and tension braces with the rails made of wood.

Fencing and gates are extremely important in any livestock facility, and should be strong enough to withstand animal crowding. A variety of materials are available; remember that the key is strength and durability. Fences and gates should also be free of any sharp projections, such as nails or wire, that could injure animals.

LEADUP ALLEYS, CHUTES

As with other areas of the crowding pen, use solid walls to prevent livestock from balking as they enter the chute. If a permanent chute is

installed, use a catwalk and guard rail similar to the one used around the crowding pen.

Keep the chute clean to prevent operator and livestock falls. Side walls should be smooth and free of obstructions to prevent bruises and cuts to livestock and operator. Floors should be rough for proper traction.

Alley and loading chutes should be wide enough to allow an animal to pass, but not wide enough to allow it to turn around. If an animal turns around or tries to turn around, it runs the risk of getting caught or getting down in the chute or alley.

RESTRAINING OR "SQUEEZE" CHUTES

Restraining equipment is an important part of any beef operation. A fixed restraining chute should be free from any obstacle that could hurt an animal, while allowing a handler free access to any part of the animal without having to reach over or through the chute. Use anti-kick and back-up bars to prevent balking in the chute. This can be accomplished by installing side rails that can be easily removed to expose the animal. Balking animals and operators reaching through the fences or walking behind the livestock are conditions that contribute to accidents.

On hydraulic restraining chutes, care should be used to guard all moving parts. Suppliers of this type of chute should be able to provide or fabricate guards for this equipment.

Many of the hazards on existing chutes are due to age. These are flimsy or worn latches, exposed pinch points, broken railing, and worn or broken head gates. A chute needs to be kept in good repair and working order through a systematic maintenance program. This will decrease accident potential and increase operator efficiency.

Because of the extreme stress put on restraining equipment, it should be checked regularly for loose or worn latches, pinch points, and broken railings or head gates.

PORTABLE FACILITIES

For some livestock operations, portable facilities may be required. This includes loading and squeeze chutes and some fencing.

The most important item when using portable facilities is to make sure that they are securely anchored to prevent them from tipping over. This is especially true with portable fencing which, if tipped over, would let penned livestock out, possibly injuring them.

Portable chutes with wheels to facilitate moving must be anchored securely. The main concern with these is to lock the wheels if they are raised off the ground. Several injuries have occurred when an individual climbed onto the wheels and had them rotate. This resulted in being

thrown onto the ground, or into or against a truck bed or fencing with injury to the individual.

CATWALKS

Catwalks are used on the outside of crowding pens, leadup alleys, restraining and loading chutes. They permit the monitoring of the movement of livestock through these facilities without being in the facility with the livestock. A railing should be installed 36 inches above the catwalk floor to protect employees from falling.

LIGHTING

The best type of lighting to have in a livestock facility is even and diffused. Bright spots and shadows in alleys and crowding pens will spook livestock and cause them to balk. If these facilities are outdoors, the use of a solid roof over these areas will prevent partial shadows that occur when other forms of sun shade are used.

When laying out a work area, make sure that cattle are not looking directly into the sun when entering the restraining or loading chutes. Livestock will move from a dark area to a light area more easily than from a light area to a dark area.

Lighting is one important feature overlooked or taken for granted. The use of colored plastic roof panels will allow some natural light to enter a building. Artificial lighting is still necessary. Lighting fixtures need to be dust, insect, and vapor proof. Dust and insects reduce the illumination level from artificial light sources.

The illumination level for holding pens, crowding pens and alleys is 10-foot candles or lumens of light measured 3 feet above the floor. For the restraining chute area, a level of illumination of 75- to 100-lumens measured three feet above the floor is suggested. This gives adequate illumination when inspecting sick animals or when treating or vaccinating animals. This level of illumination will increase operator efficiency and can be provided by four lighting fixtures using color corrected mercury vapor light bulbs. These are arranged so two fixtures are on each side of the chute. One of the fixtures is directed to illuminate the front of the animal and the other fixture the rear of the animal. These four lights are controlled by a separate switch so they can be turned off when not needed.

TRUCK ACCESS

The need for better location of the animal production unit in relation to other farm buildings has developed as livestock facilities have increased in size. The location of the loading chute in relation to the buildings, traffic patterns, and roadways in and around the animal production unit must be considered. The question that has to be answered is, “Can a truck, semi-trailer truck, or goose-neck trailer be easily turned around and backed up to the loading chute?” This is not only an important consideration in the efficiency of getting trucks in and out, but also becomes a

safety factor. The more maneuvering that is done to turn a truck around and back it up to a loading chute, the greater the chance for an accident to occur involving people or buildings.

Handling facilities deserve careful planning for efficiency as well as for safety. Animals will move more willingly through a chute if they cannot see excitement ahead. Facility design should be such that it is never necessary for workers to enter a small or enclosed area with the animals. All holding pens should be equipped with a mangate or other means of quickly getting out of the pen if necessary. Crowding into sorting or working chutes can usually be done with crowd gates.

SUMMARY

Handling facilities are any buildings, gates and fences that restrict animal movement and restrain livestock. These facilities must be well-designed, strong, and safe for animals and handlers.

Adequate handling facilities do not have to be elaborate. A few gates placed in selected locations may be adequate for small herds. An inexpensive facility that is well-designed and properly constructed is better than a poorly designed, elaborate and expensive facility.

Facilities can make “working cattle” a routine operation or a dreaded experience. Poor facilities result in hard work and spoiled cattle.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What aspects of cattle handling facilities are most important? Why?
2. What are the basic facilities that you need for your project? How might these needs change if your animals were not halter broke?

Process:

3. What characteristics of cattle psychology have you encountered?
4. What type of facility design best accomodates an animal's behavior? Why?

Generalize:

5. Describe aspects of facility design that contribute to the safety of the workers and of the cattle.
6. How would you plan for facility design if you were raising Longhorn cattle? How does this differ from polled cattle? How would you plan for the design if you are raising both Longhorn and polled cattle?

Apply:

7. What features would you include in an ideal cattle handling facility.
8. How important is the work environment in determining a vocation or career choice?

GOING FURTHER:

1. Tour ranch and observe facilities
2. Tour livestock auction and observe facilities
3. Draw a diagram of actual cattle handling facility

REFERENCES:

Human and Livestock Safety Considerations, David Baker and Herman F. Mayes

Safe Handling of Farm Animals, Ray, A-3149, University of Wisconsin Cooperative Extension Service

Kansas Beef Cattle Handbook, Kansas Cooperative Extension Service, Department of Animal Sciences and Industry, Kansas State University

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Cooperative Extension Service
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CATTLE HANDLING FACILITIES
BEEF, LEVEL IV
Handout 3, Principles of Pen Design

Working facilities must . . .

- Be able to accommodate different sizes and numbers of cattle
- Have special pens with high fences
- Have a way to separate and sort cattle
- Allow the cattle producer to maintain complete control with minimum effort
- Be designed for “cattle psychology”

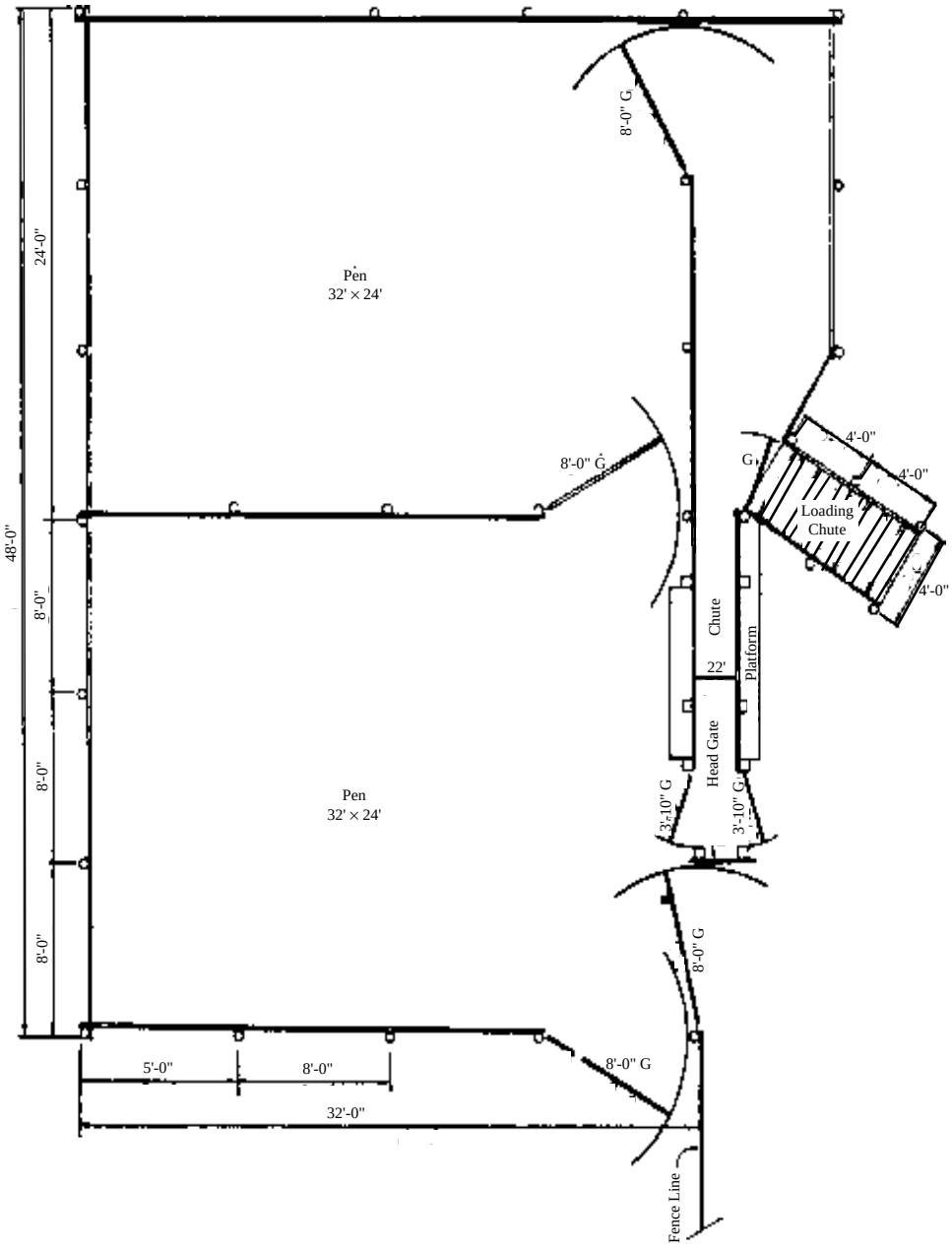
CATTLE HANDLING FACILITIES
BEEF, LEVEL IV
Handout 4, Beef Animal Characteristics

- Vision: Virtual 360° wide-angle view
  Poor depth perception
- Hearing: Wide range of sound
- Keen sense of smell
- Even disposition
- Develop “homeland”
- Herd animals
- Social order

CATTLE HANDLING FACILITIES

BEEF, LEVEL IV

Handout 5, Two-Pen Corral Diagram



Understanding Feed Labels

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Items required on a feed label
- Reasons for an item being listed on the label
- Skills in selecting quality feeds for beef cattle

ABOUT THEMSELVES:

- The importance of government regulations and standards
- The importance of following directions

Materials Needed:

- An actual feed tag for each member
- Handout 6, Feed Label Requirements
- Handout 7, Digestible Energy Content
- Handout 8, Collective Terms for Feeds
- One poster board per individual or group
- One magic marker per individual or group
- Flip chart or chalkboard

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

When feed is purchased, many members assume the feed is good quality and the correct formula for their animals. But, how many of you inspect the feed label or tag to see what is in the feed?

Today, we're going to put you in business as an owner of a feed mill and require you to prepare a feed tag. See if you can put all of the required items on your feed tag.

The Kansas Department of Agriculture is responsible for regulating the labeling of feeds and fertilizers. Feed manufacturers in Kansas are required to operate under the closed formula law. The law requires that commercial feed have a label which provides certain information.

This commercial feed law requires each bag or bulk load to be accompanied by a label indicating the following information:

1. **Net weight**
2. **Product name and brand name,** if any
3. **Drug additives,** if any
   Medicated feeds must show these items:
   a) The term "medicated"
   b) Name and amount of each drug
   c) Purpose for which drug was added

Leader Notes

Pass out poster boards and markers and have members make their "special formula" feed tag individually or in a group. Upon completing, let each individual display feed tag and explain details.
Note—Members will probably not know all that is required, but encourage them to try to think of things that people need to know about the feed they buy and include those.

Pass out Handout 6, Feed Label Requirements.

Give each member or group a feed tag. Having feed tags from a variety of different feeds will make a better learning experience.

Leader Notes

You may want to list these major points on a flip chart or chalkboard.

d) Adequate precaution and warning statement

4. **Guaranteed analysis of the feed**. Crude protein, crude fat and crude fiber must be guaranteed on all feeds except straight mineral or vitamin supplements, molasses or drug compounds. Guarantees for other nutrients are optional depending on the desires of the manufacturer. A guarantee for protein, fat and fiber is not required for substances which primarily supply minerals.
   a) **Minimum percentage of crude protein, percentage of equivalent protein from non-protein nitrogen, if any.** The amount of crude or total protein in a feed is guaranteed. Crude protein is determined by multiplying the nitrogen content of a feed by the factor 6.25.

Note on Feed Label Handout (For Ruminants Only).

   b) When non-protein nitrogen (NPN) is added to feedstuffs, a statement "for ruminants only" must appear underneath the name of the feed. Additionally, it must have a guarantee for crude protein which has been supplied from non-protein nitrogen. The feed label requirements handout shows a feed containing 12 percent crude protein that includes not more than 1 percent equivalent crude protein from non-protein nitrogen. Correct interpretation of these figures would be that one percentage unit of the 12 percentage units of protein is coming from NPN. It is incorrect to assume that 1 percent of the 12 percent, which would amount to .01, is the amount of protein equivalent being supplied by NPN. If the equivalent crude protein exceeds 8.75 percent or one-third of the total crude protein, a **warning** or **caution statement** must appear on the feed tag.

      Most vegetable or native protein sources have a fairly constant nutritional value when fed to livestock. This is not true for NPN products, such as urea, biurette, or ammoniacal compounds. The feeding value of NPN products varies greatly with the level of feeding and amount of protein energy in the ration. Thus, in evaluating feeds, it is necessary to distinguish between crude protein and crude protein equivalent from the total crude protein guarantee. On the example feed label, there would be 11 percent protein coming from vegetable feed sources (12–1=11). For NPN to have feeding value, it must be converted into protein by the microbial population which inhabits the ruminant animal's stomach. A "thumb rule" can be useful when comparing similar feeds for the same purpose. **The feed having the greater percent of natural protein would be worth more.** Recommendations concerning the nutritional value and use of NPN products are discussed in other Extension literature.
   c) **Minimum Crude Fat Content**. Fat has an energy value approximately 2.25 times the value of carbohydrate feedstuffs. Generally, the fat content of most feeds does not vary greatly, but feeds having higher fat values can be assumed to have higher energy values. Including over 5 percent fat in the total diet of ruminant animals may cause digestive problems. Levels of 5 to 12 percent added fat are sometimes used to limit feed intake.
   d) **Maximum Crude Fiber Content.** Crude fiber is a measure of the indigestible, or non-useful portion of a feed. Crude fiber is not

as accurate a measure of feed nutritional value as desired, but does provide a useful indication. Feeds having low fiber values tend to be higher in digestible energy or total digestible nutrients than those feeds having high fiber values. The feed with a lower fiber value will generally be worth more.

Pass out Handout 7, Digestible Energy Content.

e) **Minerals**. Feeds containing 6.5 percent or more minerals must show a guarantee of:
   1) Calcium—minimum and maximum
   2) Phosphorus—minimum
   3) Salt—minimum and maximum

f) **Vitamins, only if guaranteed**.

5. **Common and usual name of each ingredient or the collective term for each grouping of feed ingredients.** It is permissible for individual feedstuffs to be included in a mixed feed under collective terminology where the individual feedstuff is not identified.

Pass out Handout 8, Collective Terms for Feeds.

6. **Directions for use and cautionary statements.** Feeding instructions are given with most feeds and must be provided where drugs or NPN products are used. You will benefit by reading these instructions carefully, and heeding any warning or caution statements.
7. **Name and principal mailing address of the manufacturer.**

SUMMARY

Feed labels must include the information required by law and they also provide useful nutritional information. The ingredients in a commercial livestock feed do not have to be listed in any special order.

Ask questions to see if members can name the items required by law to be on feed tags.

Periodic samples are analyzed to see if the manufacturer is meeting the guarantee expressed on the label.

Also discuss reasons why it is important for some of the items to be listed.

Being able to read and understand feed labels will help in selecting the correct feed for specific animals.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What are some of the basic feed label requirements?
2. What label information is the most difficult to understand? Why?

Process:

3. How is the label information used to balance a ration?
4. What safety precautions are often on labels? Why?

Generalize:

5. Why are government regulations necessary? Where else may you encounter them?
6. Are these regulations helpful or a hassel for you? Why? Why not?

Apply:

7. Think of a time when you failed to read or follow label directions. What happened? What would you do differently next time?

GOING FURTHER:

1. Visit feed store and read feed tags. Compare labels.
2. Visit feed mill and see how they provide information to customers.
3. Give an illustrated talk on "How to Read a Feed Tag."
4. Learn to identify some of the feedstuffs and become familiar with classification of these foodstuffs (collective terms).
5. Read feed tags on feed sacks at home that are being fed to animals.
6. Learn more about the Kansas Department of Agriculture.

REFERENCES:

Kansas Department of Agriculture

Author:

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UNDERSTANDING FEED LABELS
BEEF, LEVEL IV
Handout 6, Feed Label Requirements

Note:
Numbers in ( ) refer to description in text of lesson.

Net Weight, 50 lbs	← Net weight must appear on the tag (1)
CHEWY BEEF RECEIVING RATION (for ruminants only)	← Name of feed (2). Statement must appear where NPN products such as urea, biurette, or ammoniacal compounds are used (4b)
MEDICATED Feed for 28 days as an aid in the maintenance of weight gains in the presence of respiratory diseases, such as shipping fever. WARNING: Feed only as Directed on this label. Discontinue use 7 days prior to slaughter. ACTIVE DRUG INGREDIENT chlortetracycline, 70 grams per ton	← Where drugs are present, the word medicated must follow the brand or product name. ← A claim giving the purpose of the drug must appear. (3c) ← Directions for use and precautionary statements must appear. Directions may appear elsewhere on the tag. ← The amount of an active drug ingredient must be given. (3b)
GUARANTEED ANALYSIS Crude Protein, not less than 12% (This includes not more than 1% equivalent crude protein from non-protein nitrogen.) Crude Fat, not less than 1.0% Crude Fiber, not more than 22%	← Guaranteed analysis (4) ← Minimum crude protein content (4a) ← The percentage units of equivalent crude protein being **supplied by NPN products**. (4b) If the equivalent crude protein exceeds 8.75% or ⅓ of the total crude protein a WARNING or CAUTION statement must appear. ← Minimum crude fat content. (4c) ← Maximum crude fiber content (4d)
INGREDIENTS* Ground corn, ground grain sorghum, dehydrated alfalfa meal, cottonseed hulls 37% , cottonseed meal, salt and limestone.	← All ingredients must be listed unless collective terms are used. (5)
FEEDING DIRECTIONS Feed at the rate of 10 pounds per head per day.	← Feeding instructions are usually provided and **must** appear if drugs or NPN are present. (6)
MANUFACTURED BY The Cow Feed Company White City, Kansas	← The name and principle mailing address of the manufacturer or person responsible for distributing the feed must appear on the tag. (7)

* State percent if roughage products are more than 5 percent of ingredients.

UNDERSTANDING FEED LABELS

BEEF, LEVEL IV

Handout 7, Digestible Energy Content

Maximum Estimated Digestible Energy Content Based on Crude Fiber Level[a]

Maximum Crude Fiber as Guaranteed Percent	Digestible Energy M cal per lb	TDN Percent
4.0	1.59	79
6.0	1.53	76
8.0	1.47	73
10.0	1.41	70
12.0	1.35	67
14.0	1.29	64
16.0	1.23	61
18.0	1.17	58
20.0	1.11	55
22.0	1.05	52
24.0	1.00	49

[a]Individual feeds may vary considerably from these values due to safety margins in the fiber guarantee, urea content and specific ingredients used. Estimates are not valid for salt limited feeds or liquid supplements.

UNDERSTANDING FEED LABELS

BEEF, LEVEL IV

Handout 8, Collective Terms for Feeds

Collective terms recognize a general classification of ingredient origin, which perform a similar function, but do not imply equivalent nutritional values. When a collective term is used, individual ingredients within that group cannot be listed on the label.

ANIMAL PROTEIN PRODUCTS	
Animal by-products meal	Meat and bone meal
Fish by-products	Poultry by-products
Fish meal	Whey, dried
Hydrolyzed poultry feathers	

FORAGE PRODUCTS	
Alfalfa leaf meal	Corn plant, dehydrated
Alfalfa hay, ground	Ground grass
Soybean hay, ground	

GRAIN PRODUCTS	
Barley	Rice: ground, brown, ground
Corn	paddy, ground rough, broken
Grain sorghums	or chipped
Oats	Rye
Wheat	

PLANT PROTEIN PRODUCTS	
Coconut meal	Peanut meal
Cottonseed meal	Soybean meal
Cottonseed, whole processed	Sunflower meal
Guar meal	Yeast, dried
Linseed meal	

PROCESSED GRAIN BY-PRODUCTS	
Brewers dried grain	Oat groats: oat meal, feeding
Condensed distillers, solubles	Rice bran
Corn gluten feed	Wheat bran
Grain sorghum mill feed	Wheat shorts
Malt sprouts	Wheat germ meal

ROUGHAGE PRODUCTS*	
Beet pulp, dried	Peanut hulls
Citrus pulp, dried	Rice hulls
Cottonseed hulls	Rice mill by-product
Husks	Straw, ground
Oat hulls	

MOLASSES PRODUCTS	
Beet molasses	Starch molasses
Cane molasses	Molasses distillers, condensed
Citrus molasses	Solubles

*If roughage products constitute more than 5 percent of ingredients, the percent must be stated.

Selection of Quality Hay

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Distinguish good quality hay from poor quality hay
- Two techniques for estimating hay quality
- Five physical characteristics of hay
- Value of chemical analysis in hay testing
- How to take a sample of hay for testing

ABOUT THEMSELVES:

- Importance of practice in developing a skill
- Importance of a quality standard

Materials Needed:

- Four actual hay samples
- A bale of hay and equipment for taking a hay sample
- Activity Sheet 2, Hay Judging Contest Grading Card
- Activity Sheet 3, Hay Judging Placing Card or plain paper
- Handout 9, Official Scoring for Hay Shows
- Chalkboard or flip chart

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

Hay is often a major ingredient in ruminant livestock rations. Special attention should be given to hay quality because animal performance is directly related to the quality of hay being consumed. Hay varies in quality more than any other harvested field crop. Livestock feeders seeking high profits consider good quality forage the basis of any live-stock ration because any essential nutrient not furnished in the forage must be supplemented by expensive concentrates.

Pass out Activity Sheet 3, Hay Judging Placing Card or plain paper. Have members place the hay samples 1st, 2nd, 3rd, and 4th with reasons. After the lesson, have them do it again to see if there are different placings.

A member who knows what to look for when evaluating hay will be in a much better position to provide an economical and balanced ration for their project.

Several factors may affect the quality or feeding value of hay. These include species of hay (alfalfa vs. prairie hay), fertilization program on the hay meadow, age or stage of maturity, and the curing or harvesting practices used.

List on chalkboard or flip chart.

Two major techniques for estimating quality in hay are:

1. visual estimation
2. chemical analysis (forage test) primarily for protein level

Techniques for estimating quality hay.

1. Visual estimation for physical characteristics
2. Chemical analysis or forage test

True hay quality can only be expressed as feeding value. Since hay must

be fed before true feeding value is known, the use of visual estimation or chemical analysis will provide an indication of hay quality that is correlated with animal performance.

Let's examine a hay sample and evaluate its physical characteristics.

Pass out Activity Sheet 2, Hay Judging Contest Grading Card, and have members score a hay sample as each physical characteristic is discussed.

VISUAL ESTIMATION

When estimating the physical characteristics of hay, a representative bale should be opened and one or more sections examined for maturity, texture, leafiness, foreign matter and color.

Stage of Maturity—The maturity at which hay is harvested is one of the most important factors influencing quality. This factor has a value of 40 points for grass hay and 20 points for legume hay. Values differ because legume plants do not lose quality as rapidly with age as grasses do. In determining the maturity score look for blooms or seedheads and examine the length of stem. As a guide, grass hays with 1 percent or more seed stems should score not more than 30 points. Legumes at the one-tenth bloom stage should not score more than 15 points. Hay harvested at younger stages should receive higher scores. More mature plants have long, course, fibrous stems, while small, pliable stems indicate immaturity.

Texture—Texture pertains to stem size and pliability or acceptance by animals. Small stems which are pliable and flexible have greater digestibility. Texture accounts for 20 points when judging grass hay and 15 points when judging legume hay. Texture is best determined by running the hand along the cut edge of the bale or by pressing a sample between the hands to determine pliability.

Leafiness—Leafiness refers to the proportion of leaves to stems. Leaves are higher in nutrients than stems, therefore, a hay containing a high proportion of leaves scores higher than one with a high proportion of stems. Leafiness accounts for 10 points when judging grass hays and 35 points when judging legume hays. This difference is due to the greater hazard of leaf shattering of legume hays. Leaf shattering is not considered a major problem in harvesting grass hay. Not only is it important to have a high percent of leaves, but the leaves should be attached to the stems to reduce feeding waste.

Foreign Material—Foreign material such as weeds, stubble, manure, mold, and any non-edible or injurious matter is objectionable. Foreign material accounts for 20 points when judging both grasses and legumes. A greater penalty is assessed for injurious material and noxious weeds than for non-injurious material and non-noxious weeds. The rules for some shows permit disqualification of samples considered to contain sufficient quantities of foreign material that may be hazardous to livestock.

Color—Color indicates carotene content and vitamin A potential. A bright green color also indicates good harvesting conditions. Although

color is the most visible characteristic of hay, it alone is not a reliable indicator of quality. Color accounts for 10 points when judging both grasses and legumes.

Determine physical score. The physical scorecard totals 100 points, as illustrated on the Official Scoring for Hay Shows handout.

Pass out Handout 9, Official Scoring for Hay Shows.

CHEMICAL ANALYSIS

A chemical analysis is a guide for estimating the nutrient value of hay. Crude protein percentage is the most common chemical determination and the level of protein is generally correlated with animal performance and hay quality. Chemical analyses are not able to indicate many of the objectionable features that are obvious on visual examination.

Sampling a forage for analysis is often a critical part of the analysis. The sample taken must be representative of forage being tested. A good way to get a forage sample is to use a "Penn State" forage sampler. This sampler fits a ½-inch drill or hand brace and is simply drilled into the end of the bale of hay. It cuts a forage sample as it drills into the bale and provides a very representative sample of the bale.

Have a forage sampler available and allow members to take samples.

A second method to obtain a sample of hay to be analyzed is the handsample. Open the bale and carefully lift out a handful of the hay as the sample. This should be accomplished in two to three places in the bale. Care should be exercised to keep from breaking leaves off the sample being lifted out. Simply grabbing and pulling out a sample will cause leaves to break off and result in a sample that is much stemmier than the rest of the hay, which results in non-representative samples. Since a stemmier sample results, the results of the analysis will be lower than the rest of the bale of the hay.

Have members take samples from blocks of hay. Call their attention to how easily leaves break off unless handled gently.

When the results of a chemical analysis are available, the hay can be rated numerically.

Determining Chemical Score—The analysis used to determine the chemical score is the crude protein content of the hay. Protein is a major nutrient requirement of livestock, and reliable laboratory analyses are readily available for determining nutrients. Other analyses beneficial for determining hay quality are available; however, many of these are laborious and not always available. The various hay plants have different protein level potentials. The chemical score of each type is based on a protein level considered attainable under practical management. These are indicated in the chemical scoring section of the Official Scoring for Hay Shows.

To rate the hay samples using either visual examination or chemical analysis or by averaging the two together, the following scoring system on the Official Scoring for Hay Shows handout is suggested:

May want to list chemical scorecard on chalkboard or flip chart and/or use Handout 9, Official Scoring for Hay Shows.

Leader Notes

Quality Rating	Ribbon Color	Score
Excellent	Blue	85 points or more
Good	Red	70–84 points
Fair	White	50–69 points
Poor	None	Below 50 points

SUMMARY

Have members re-evaluate the hay samples. See if placing of hay samples are different from placing prior to the lesson.

Since forage as grazing or hay is a major source of nutrition for livestock in Kansas, knowledge of the factors affecting quality in forage is valuable. By being able to determine if a forage is high quality or low quality, an individual can evaluate the nutritional status of livestock consuming the forage.

The visual factors of maturity, texture, leafiness, foreign materials, and color give firm indications of the quality of the hay. A chemical analysis gives a direct measurement of the forage's nutritive value. Using either or both methods of evaluations will provide a definite indication of forage quality and animal performance.

Wrap-up session with a placing or grading contest or have individuals explain the differences in two hay samples.

With practice, a member can learn to select quality hay for the beef project. This skill can improve the performance of the project animal and can increase the economy of feeding.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What are some physical characteristics of hay?
2. What physical characteristic of hay is hardest for you to evaluate? Why?
3. How easy or difficult was it to take a forage sample for chemical analysis?

Process:

4. What are the advantages of high quality versus low quality hay?
5. What types of animals can utilize lower quality forage?

Generalize:

6. Many of the things you do, like judging hay quality, require practice. What are some things you do that require practice? Why is practice important?
7. What is the significance of practice in developing a skill?
8. What is the purpose of quality standards in skill development?

Apply:

9. What skills are you currently developing? For what purpose?
10. What effect do quality standards have in other aspects of your life?

GOING FURTHER:

1. Attend the judging portion of local hay shows and discuss the judging procedures with the judge.
2. Participate in a hay judging contest.
3. Enter hay in a local hay show to have it evaluated.
4. Give an illustrated talk on "Selecting Good Quality Hay."
5. Evaluate hay being fed to project animals.

REFERENCES:

Author:

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SELECTION OF QUALITY HAY

BEEF, LEVEL IV

Activity Sheet 2, Hay Judging Contest Grading Card

Contestant's Name

Class Number:

SAMPLE No.	MATURITY			TEXTURE			LEAFINESS			FOREIGN MATTER					COLOR				SCORE
	Preboot or Pre-Small	Boot or 1/10 ---------	Headed or Full Large	Pliable --------	Moder-ately Pliable Medium	Un-Pliable --------	Leafy Bloom	Shattered Bloom	Stemmy Bloom	Clean	Weeds	Stubble	Mold	Other	Bright	Bleached	Dark	Non-Uniform	
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Scoring Point Value	Maturity	Texture	Leafiness	Foreign Matter	Color
Grass	40	20	10	20	10
Legume	20	20	30	20	10

SELECTION OF QUALITY HAY

BEEF, LEVEL IV

Handout 9, Official Scoring Card for Hay Shows

Both physical and chemical factors are considered in classifying all hay entries.

A. Physical Scorecard

Factor	Grass Hay	Legume Hay
Maturity	40	20
Texture: size of stem and pliability	20	15
Leafiness	10	35
Freedom from foreign material	20	20
Color	10	10
Total possible physical score	100	100

B. Chemical (Crude Protein) Scorecard

Type of Hay	Factor for each Percent Crude Protein		Percent Crude Protein for 100 Points		Total Chemical Score
Grass, including perennials such as blue stem and annuals such as sorghum-sudangrass hybrids	8.33	×	12.0	=	100
Grass-legume mixtures and other legumes	6.25	×	16.0	=	100
Alfalfa	5.0	×	20.0	=	100

C. The chemical score and physical score are averaged to determine the final classification score for each entry. Quality is determined as follows:

Final Score	Quality Rating
85 or above	Excellent
70 to 84	Good
50 to 69	Fair
Below 50	Poor

SELECTION OF QUALITY HAY

BEEF, LEVEL IV

Handout Sheet 3, Hay Judging Placing Card

Hay Judging Contest Placing Card

Contestant's name _____ Class number _____

First	Second	Third	Fourth
_____	_____	_____	_____

Range Forage for Beef Cattle Production

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Identify five major native grasses of Kansas
- Importance rangelands have in beef cattle production
- Kinds of native forage plants eaten by cattle
- Practices which enhance forage production for beef cattle

ABOUT THEMSELVES:

- Concepts developed in this lesson apply to other areas of their lives
- Appreciation for keeping up-to-date and current on farming issues and conservation of natural resources

Materials Needed:

- Information on local county ranges—acres in county, acres of range land in county, major noxious range plants in area and control methods, and range management practices in local area
- Specimens of 10 most common grasses to local area
- Chalkboard or flip chart

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Leader Notes

Many people in the cattle industry view livestock as the product raised on rangeland. But in fact, the product is range forage where the cow is merely the harvester who converts the crop for human use. The range forage crop requires considerable management to repeatedly produce a harvest that is from an unplowed, unseeded and unfertilized area.

The successful production of beef from the range resource requires sound plant and animal management beginning with a thorough knowledge base.

RANGELAND

Rangeland is the world's largest land type. The earth's total land surface area is composed of about 45 percent rangeland. Approximately 20 million acres, or 30 percent of Kansas land, are classified as rangeland.

Rangelands provide about 75 percent of the worldwide forage needs for livestock. These areas include not only natural grasslands, but also savannahs, shrublands, alpine communities, tundras, wetlands, and deserts. A distinguishing feature of rangelands is the natural vegetation consisting of grasses, forbs and woody plants. The kind of vegetation present, the quantity and the quality, have an impact on beef cattle. Range is defined as an extensive area of level, rolling, broken or mountainous

Consult your county Extension agent, the Soil Conservation Service, or USDA, to find out:

- How many acres are there in your county?
- How many acres of range-land are in your county?
- Do the plants growing there support the production of beef?

Leader Notes

Define what range is.

lands, usually not adapted to cultivation, and covered with native grasses and plants best suited for grazing of animals. When people first came to Kansas, the land was all rangeland and forestland. Even today, nearly every county in Kansas has some rangeland.

RANGE PLANTS

Consult the county agent or Soil Conservation Service to determine the 10 major grasses growing on rangeland in your county and for information describing range plants, pictures for identification, and the grazing value of important Kansas range plants.

Collect several samples of range plants and have members sort them into grasses, forbs, or woody plants.

The range plant is the primary producer of foodstuffs for grazing livestock. There are about 5,000 different plants growing in Kansas. The major classes of plants are grasses, grass-like plants, forbs, and woody plants. **Grasses** have jointed stems which are usually hollow except at the nodes. Leaves appear in two rows on the stem and are usually flattened. Leaf veins are parallel.

Forbs are broad-leaved plants with annual stems. Leaves may have either parallel or net veins, although net veins are more common. Forbs are often referred to as weeds. Forbs have a solid stem and usually have showy, colorful flowers.

Woody plants are plants with woody stems which live from one year to the next. The stems usually branch out near the base and can have showy flowers. This class of plants are often called browse or brush plants.

WHY KNOW THE NAMES OF PLANTS?

Can you suggest any reasons why the manager should know the name of a plant? Examples:

- To determine which plants in a pasture are forage plants for cattle.
- To determine plants which may be noxious and need to be controlled in a pasture.
- To understand the quality differences of grazing value to cattle.

People have always needed to name things in order to have a means of communication. The name used to identify plants is important because all the information known about that plant is attached to that name. The name used to identify plants in everyday conversation is the plant's **common name**. This is also the name which the cattle manager most often uses.

Big bluestem, like many of our grasses which produce the bulk of forage on range for cattle to consume, is a warm season, native perennial grass. Warm season perennial grasses grow during the warmer parts of the year and live for more than two years. On the opposite side, annual grass, such as cheatgrass, grows, produces seed, and dies in less than 12 months.

Cool-season plants grow mainly in the cool weather of fall, winter, and spring. Native plants grow naturally in Kansas, while introduced plants have been brought in from other states or parts of the world.

WHAT DO CATTLE EAT ON RANGE?

A suggested activity is to visit a pasture that has been recently grazed or is being grazed currently. Examine plants growing in the pasture to see if they have been grazed. Using a small notepad, record the classes of plants which show signs of being grazed. Determine the plant class which shows the greatest use by cattle in

Cattle are noted as being grass eaters, but they will also eat forbs, woody plants, vines, prickly pear, etc. Cattle are selective grazers and will try to eat a green diet from the overall resource. Cattle and forage belong together, but they don't exist for each others' convenience. In fact, plants appear to try to do anything to keep from being eaten. Plants often grow under rocks, grow thorns, give off obnoxious odors, and even produce toxic chemicals. It is your job as a producer and conservator of the range to see that plants and cattle foraging are kept in balance so that neither overwhelms nor destroys the other. The key to beef production is to provide a forage of high quality to meet the needs of the cattle.

MANAGEMENT OF RANGE FORAGE FOR CATTLE

The manager's number one tool in producing abundant quality forage is the grazing animal. A plant must have enough leaves to manufacture food during its growing season, but also produce enough growth for the cow to consume a portion.

We typically want to get about 50 percent use on the standing forage resource. Of this 50 percent, a cow will use one-half, and the other half disappears in the wind, is lost due to weathering, or may be destroyed by trampling. For instance, if a rancher has 100 pounds of forage, he or she will leave 50 pounds to protect the plants, the cow will eat 25 pounds, and 25 pounds will be lost to weathering and trampling.

A cow may spend six to 12 hours per day grazing to consume 20 to 30 pounds of dry forage. She may travel to water twice a day. How the cow grazes the range forage is influenced by the kinds of plants present, land topography, location of water, salt, and minerals.

The number of times a cow bites on a plant, the amount of leaf material she removes from the plant in a bite, and the time of year the cow uses a particular plant, can have certain effects on the plant. To keep grass growing each year for production of forage for cattle, we should:

1. Not graze the root crown which contains the stored nutrients.
2. Leave enough of the plant ungrazed to protect the root crown from adverse weather.
3. Allow the plant to grow in the spring to produce sufficient new growth to manufacture food.
4. Stop grazing in time to allow the plant to regrow and complete its normal life cycle.

MANAGEMENT PRACTICES TO PROMOTE GRASS PRODUCTION

Approved range practices increase the amount of usable range forage and thus the value of the range. These approved range practices will help replace poor producing plants with better plants. The practices will conserve soil and water and help restore the range resource. Some improvements may be permanent or semi-permanent and often include fencing, where salt is located, where water is provided in the pasture, and plant control measures.

Specific problems existing on Kansas rangeland which hinder the production of beef cattle include 1) the invasion of noxious plants, 2) lack of flexibility of stocking to maintain proper use of forage, 3) loss of desirable forage species, 4) water loss, and 5) soil loss. To improve our rangeland we can control brush, weeds, and poisonous plants; seed bare range or abandoned cultivated land, use flexible stocking rates, and use beneficial grazing systems. What are the major noxious range plants to be controlled in your county?

the pasture. This can also be done at different times of the year as the plants grow and mature, affecting the diet of the animal.

Another activity is to follow a cow in a pasture and visually observe what the cow is eating. Binoculars can be used for this activity. Viewing a cow at different times of the year will indicate diet differences.

A "rule of thumb" used in the management of range forage is to graze half and leave half. Cut a tall grass of any species off at the ground surface. Balance the aerial portion of the plant on your finger or a yardstick. For tall grasses, the middle of the grass by weight will be well below the mid-point of the plant height.

Where do cattle typically graze in a pasture? They like flat land and valleys. They use hillsides and hilltops or rough land less.

If the typical cow eats 25 pounds of forage per day, how much would she eat in a year?

If an acre of land has 4,000 pounds of edible forage growing on it, how many days could a cow graze the one acre before she was out of forage for proper use grazing?

What are the major range management practices used in your county?

What are the plant, soil, or animal conditions which have prompted the use of these practices?

What methods of control are used: Plant control is used to make land available for forage production or to keep the present forage plants available and productive. Methods may include mechanical control (i.e. root plowing, chaining, dozing),

chemical control (using herbicides for chemical plant treatment), prescribed burning, and biological control (control of undesirable plants by other plants or animals).

SUMMARY

Ask members the following questions to review what was learned.

- What is rangeland and how is it predominantly used in your county?
- How much dry forage does the average cow consume in a day?
- Why would I want to know the common name of plants in my pastures being grazed?
- What is the proper level of use on range forage?
- What range practices can benefit the production of grass and thus beef cattle in your county?
- What are the predominant noxious plants growing on range in your county?

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What did you learn about rangeland and forage in this lesson?
2. What are some common conservation and rangeland management practices in your county? Why, when, and how are they done?
3. What concept of range management do you think is most important? Why?

Process:

4. What is the value or importance of grasses? Forbs? Woody plants?
5. Why is proper use of range forage important?

Generalize:

6. Management, conservation, and responsibility are key concepts in this lesson. When and where can you use these concepts in other aspects of your life?

Apply:

7. What are your responsiblities for managing and conserving our natural resources? How can these responsibilities be accomplished?

GOING FURTHER:

1. Collect native grasses common to area, press and mount for a collection for the county.
2. Tour native pastures and observe plants and/or beef cattle eating habits.
3. Participate in a grass identification contest or activity.
4. Participate in a range judging activity or contest.
5. Collect information and maps and make map of county showing native rangeland location.
6. Participate in Extension Field Days, Beef Tours.
7. Give an illustrated talk on native range plants in the area.
8. Conduct a grass identification activity for a local club or civic group.

REFERENCES:

Motion picture, *The Maverick*, 1983
Motion picture, *Rangelands — An American Heritage*, 1983
Motion picture, *Rangelands — The Silent Resources*, 1983
Slide set: *Rangelands: An Overview*

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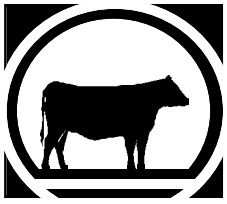

Knowing Your Range Plants

Beef, Level IV

Members Will Learn . . .

ABOUT THE PROJECT:

- Distinguish between grasses, forbs, shrubs, and legumes
- Name at least three plants in each category
- Different life forms of range plants
- Common Kansas range plants and their value to the livestock industry

ABOUT THEMSELVES:

- Recognize "indicators" of quality standards
- Identify classification systems used in today's society

Materials Needed:

- Activity Sheet 4, Range Plant Identification and Evaluation Form
- Handout 10, Rangeland Plant Type Examples (4 pages)
- Handout 11, Range Plant Type Characteristics
- Samples of common range plants from each category: grass, grass-likes, forb, shrub
- Chalkboard or flip chart

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

A knowledge of range plants is essential to good range management and livestock production. Teens who are involved in livestock production need to understand the basics of plant classification and identification.

A knowledge of plants—as well as a knowledge of other fields like soils, animal science, forestry, geology—is essential to proper livestock production.

Range is a kind of land that is unsuitable to cultivation because of soil, climate or topography. Since we can't change the kind of soil we have or the weather, range managers who are interested in livestock production have a choice between managing the animals on the land or managing the plants. Frequently, we must strive to manage the vegetation to a great extent and the livestock to a much lesser extent. For example, it is hard to tell an animal which plants to eat and how much. Certainly, we can use fences, salt blocks, water tanks and grazing systems to distribute livestock more effectively on pastures, but a basic understanding of plants will go a long way toward helping us recognize what is happening to our land.

Leader Notes

Project leaders will want to conduct this meeting during late June or early July and at a location where members will be able to identify the important Kansas range plants in the field. You are encouraged to work closely with the members to help them identify range plants before ever considering setting up a range plant identification contest. It would be best to have some examples of each plant type and life form on hand for the meeting if a field trip is not possible.

Leader Notes

Without a knowledge of plants, you will be lost as a livestock producer and range manager—like a carpenter without tools. A good range and livestock manager knows the plants on the land, and knows that many of these plants are "indicators" which give us clues about the health or condition of a particular site. Just as a physician can tell a great deal about what is going on inside a human being by taking the temperature, listening to your lungs and other things, a range and livestock manager can tell a lot about the condition of the land by knowing something about plants.

Use a chalkboard or flip chart to list important points.

There are several ways to classify plants to make our discussion of them easier. First, we can describe plants according to their **life spans**. Plants can generally be classified as either annuals, perennials or biennials.

Some examples are cheatgrass, lamb's quarter, velvetleaf.

Annuals are plants which germinate from seed, grow, live and die all in one year. Most annuals are easily pulled up since their root systems are not well developed. What kinds of plants can you think of which might be classified as annuals?

Some examples are big bluestem, Indiangrass, alfalfa, leadplant, fescue.

Perennials are plants that live from one year to the next, usually sprouting from root crowns that have been dormant during the winter. Many of our most desirable range plants are perennials. What are some examples of perennial plants that you can think of?

Some examples are money plant, curley cupped gumweed, stenosiphon.

Biennials are plants whose life span usually lasts two years. These kinds of plants are not as common as annuals or perennials. Can you think of any biennial plants that you might be familiar with?

Not only do plants have different life spans, but a handy way to classify plants is by type. Generally, we can talk about five types of plants that occur on Kansas rangelands. You will want to refer to the handout that will help explain the different types more clearly.

GRASSES

Pass out Handout 11, Range Plant Type Characteristics. Use as each type is discussed. Have members describe each type from a sample before discussing the handout.

Grasses are one of the most important types of plants in the world with well over 6,000 species including many you are familiar with but which you may not think of as grasses:

bamboo	sorghum	oats	rye
rice	corn	wheat	barley

Grasses have several distinguishing characteristics:

- their stems are always jointed and usually hollow and pithy
- their leaves occur on two sides of the stem and have parallel veins
- flowers are small and generally rather inconspicuous

Grasses have many uses—for soil conservation and protection (like bromegrass for highly erodible soils); beautification projects (like fountaingrass); recreational uses (like bentgrass for golf greens); and for industry (syrups and oils).

Grasses also tend to be of one of two types: sod-formers or bunchgrasses. Some examples of sod-formers are Kentucky bluegrass and buffalograss. Bunchgrasses are plants like big bluestem, wheat, and tall fescue.

GRASS-LIKE PLANTS

Another category of plants that closely resembles the grasses are the grass-likes. Grass-likes include rushes and sedges, a rather large class of plants with many species. These plants typically have several common characteristics:

- solid stems
- stems are round or triangular
- absence of nodes or joints
- leaves are found on either two or three sides of the stem (see Handout 11, Range Plant Type Characteristics)

An easy way to remember the difference between the grasses and the grass-like plants is contained in the following rhyme:

"Sedges have edges, and rushes are round
And grasses have nodes wherever they're found."

FORBS

The forbs include the broad-leaved plants and are some of the most important range plants here in Kansas. Forbs may have a more woody structure than grasses although they are not shrubs. Forbs have several distinguishing characteristics:

- solid stems
- veins in leaves are net-like
- flowers are usually showy and quite conspicuous

Some common examples of Kansas forbs are yarrow, milkweed, Illinois bundleflower, dotted gayfeather, sunflowers, snow-on-the-mountain and many others.

SHRUBS

Shrubs are usually easily distinguished from other plants because of their woody texture and low profile (as compared to trees). Many shrubs are important range plants and have generally been overlooked as beneficial sources of browse for range animals. Shrubs are usually distinguished by:

- growth rings
- leaf veins are netlike
- showy flowers

Some examples of common Kansas shrubs are sagebrush, ceanothus, dogwood, sumac, and buckbrush.

Leader Notes

TREES

Kansas rangelands support a number of native tree species, and these trees often provide welcome shade and resting areas for livestock. Some examples of Kansas native tree species are Eastern red cedar, oaks, osage orange, and mulberry.

All of our range plants can be classified according to their grazing value and this is where a knowledge of range plants can be useful to a good range and livestock manager. Grazing value is usually based on nutrient content of the plant, its dependability as a forage for animals, and the preference an animals shows for the plant. Grazing value is typically ranked as excellent, good, fair, poor or poisonous.

Many plants that are placed in the excellent category tend to be "indicator" plants—those that will tell us about the condition of the range. While not everyone agrees with this kind of assessment of range condition, use of "indicator" plants can be a helpful way to gauge the improvement or deterioration of your land from year to year.

Take a field trip, use Handout 10, Rangeland Plant Type Examples, to identify and take notes about the plants you find.

Some important "indicator" plants for Kansas rangelands are:
leadplant—usually not found in overgrazed areas
Western yarrow—an invader of abused ranges, unpalatable perennial
daisy fleabane—an annual forb that is an indicator of overused rangelands
wooly verbena—a common invader of run-down, abused, dried-out pastures
black samson—a highly palatable, nutritious plant whose presence is an indicator of good range condition

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.
Share:

1. What plants can you identify by life span? Annual? Perennial? Biennial?
2. What plant type are you most familiar? Least familiar? Why?

Process:

3. What plant types do you feel are the best indicators of range condition? Why?
4. What are some management techniques that can compensate for lower quality forage?
5. What relationships might you find between forage quality and cattle performance?

Generalize:

6. Why is it important to know about plants when you are raising livestock?
7. How does pasture plant growth impact your livestock program?
8. Plants are identified by types, use, grazing value, etc. What classifications or types might be used in other 4-H projects?

Apply:

9. How would what you've learned in this lesson help you if you were to purchase or rent pasture or grassland?

GOING FURTHER:

1. A good follow-up to the preceding material would be to have several samples of the various plant types, growth forms, and life forms for your members to examine more closely. In addition, you may want to take them out to some pasture and look at the plants present and have them keep a list on the accompanying sheet of the plants identified (we have included a list of some common Kansas range plants).
2. You may want to ask your members to collect at least 15 plants (five of each of the grasses, forbs, and shrubs) and dry and mount these.
3. Use Activity Sheet 4, Range Plant Identification and Evaluation Form when preparing for a range and pasture judging contest.

REFERENCES:

Pasture and Range Plants, Phillips Petroleum Company, Bartlesville, Oklahoma, 1980

Range Grasses of Kansas, C-567, Cooperative Extension Service, Kansas State University, Manhattan, Kansas, 1983

Author:

This lesson was modified from original material authored by Kirk A. Astroth, Extension Specialist, 4-H Youth Programs, Kansas, with adapation by:

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KNOWING YOUR RANGE PLANTS

BEEF, LEVEL IV

Activity Sheet 4, Range Plant Identification and Evaluation Form

NAME OF PLANT	TYPE Of PLANT			LIFE SPAN		ORIGIN OF PLANT		SEASON OF GROWTH		GRAZING RESPONSE			FORAGE VALUES			
	Grass	Shrub	Forb	Annual	Perennial	Native	Introduced	Cool	Warm	Green	Yellow	Red	Good	Fair	Poor	Poisonous

KNOWING YOUR RANGE PLANTS
BEEF, LEVEL IV
Handout 10, Rangeland Plant Type Examples

Grasses	Scientific Name	Notes
Western Wheatgrass	*Agropyron smithii*	
Big Bluestem	*Andropogon gerardi*	
Silver Bluestem	*Andropogon saccharoides*	
Little Bluestem	*Andropogon scoparius*	
Blue Grama	*Bouteloua gracilis*	
Hairy Grama	*Bouteloua hirsuta*	
Sideoates Grama	*Bouteloua curtipendula*	
Japanese Brome	*Bromus japonicus*	
Buffalograss	*Buchloe dactyloides*	
Windmillgrass	*Chloris verticillata*	
Wildrye	*Elymus species*	
Plains Muhly	*Muhlenbergia cuspidala*	
Switchgrass	*Panicum virgatum*	
Scribners Panicum	*Panicum scribnerianum*	
Indiangrass	*Sorhgastrum natans*	
Tall Dropseed	*Sporobolus asper*	
Sand Dropseed	*Sporobolus cryptandrus*	
Grass-like		
Small Soapweed	*Yucca glauca*	
Sedge	*Sedge species*	

Handout 10, Rangeland Plant Type Examples, *continued*

Trees and Shrubs	Scientific Name	Notes
Smooth Sumac	*Rhus glabra*	
Aromatic Sumac	*Rhus aromatica*	
Eastern Red Cedar	*Juniper virginiana*	
Buckbrush	*Symphoricarpos orbiculatus*	
Roughleaf Dogwood	*Cornus drummondi*	
Ceanothus	*Ceanothus ovatus*	
Forbs		
Common Yarrow	*Achillea millefolium*	
Common Ragweed	*Ambrosia artemisiifolia*	
Western Ragweed	*Ambrosia psilostachya*	
Louisiana Sagewort	*Artemisia ludoviciana*	
Butterfly Milkweed	*Asclepias tuberosa*	
Green Antelopehorn	*Asclepiodora viridus*	
Heath Aster	*Aster ericoides*	
Silky Aster	*Aster sericeus*	
Aromatic Aster	*Aster oblongifolius*	
Purple Poppymallow	*Callirhoe involucrata*	
Texas Croton	*Croton texensis*	
Black Samson	*Echinacea angustifolia*	
Daisy Fleabane	*Erigeron strigosus*	
False Boneset	*Kuhnia eupatorioides*	
Snow-on-the-Mountain	*Euphorbia marginata*	

Handout 10, Rangeland Plant Type Examples, *continued*

Forbs, continued	**Scientific Name**	**Notes**
Nuttall Evolvulus	*Evolvulus Nuttallianus*	
Gaura	*Gaura species*	
Curlycup Gumweed	*Grindelia squarrosa*	
Annual Broomweed	*Gutierrezia dracunculoides*	
Maximilian Sunflower	*Helianthus maximiliani*	
Ashy Sunflower	*Helianthus mollis*	
Annual Sunflower	*Helianthus annuus*	
Narrowleaf Bluets	*Houstonia nigricans*	
Wavyleaf Thistle	*Cirsium undulatum*	
Dotted Gayfeather	*Liatris punctata*	
Pincushion Cactus	*Mamillaria missouriensis*	
Pricklypear Cactus	*Opuntia humifusa*	
Narrowleaf Four O'Clock	*Mirabilis linearis*	
Cannon Flax	*Linum usitatissimum*	
Missouri Evening Primrose	*Oenothera missouriensis*	
Serrateleaf Evening Primrose	*Oenothera serrulata*	
Cobaea Penstemon	*Penstemon cobaea*	
Prairie Coneflower	*Ratibida columnifera*	
Fringeleaf Ruellia	*Ruellia humilis*	
Pitcher Sage	*Salvia azurea*	
Compassplant	*Silphium laciniatum*	
Stenosiphon	*Stensiphon linifolius*	

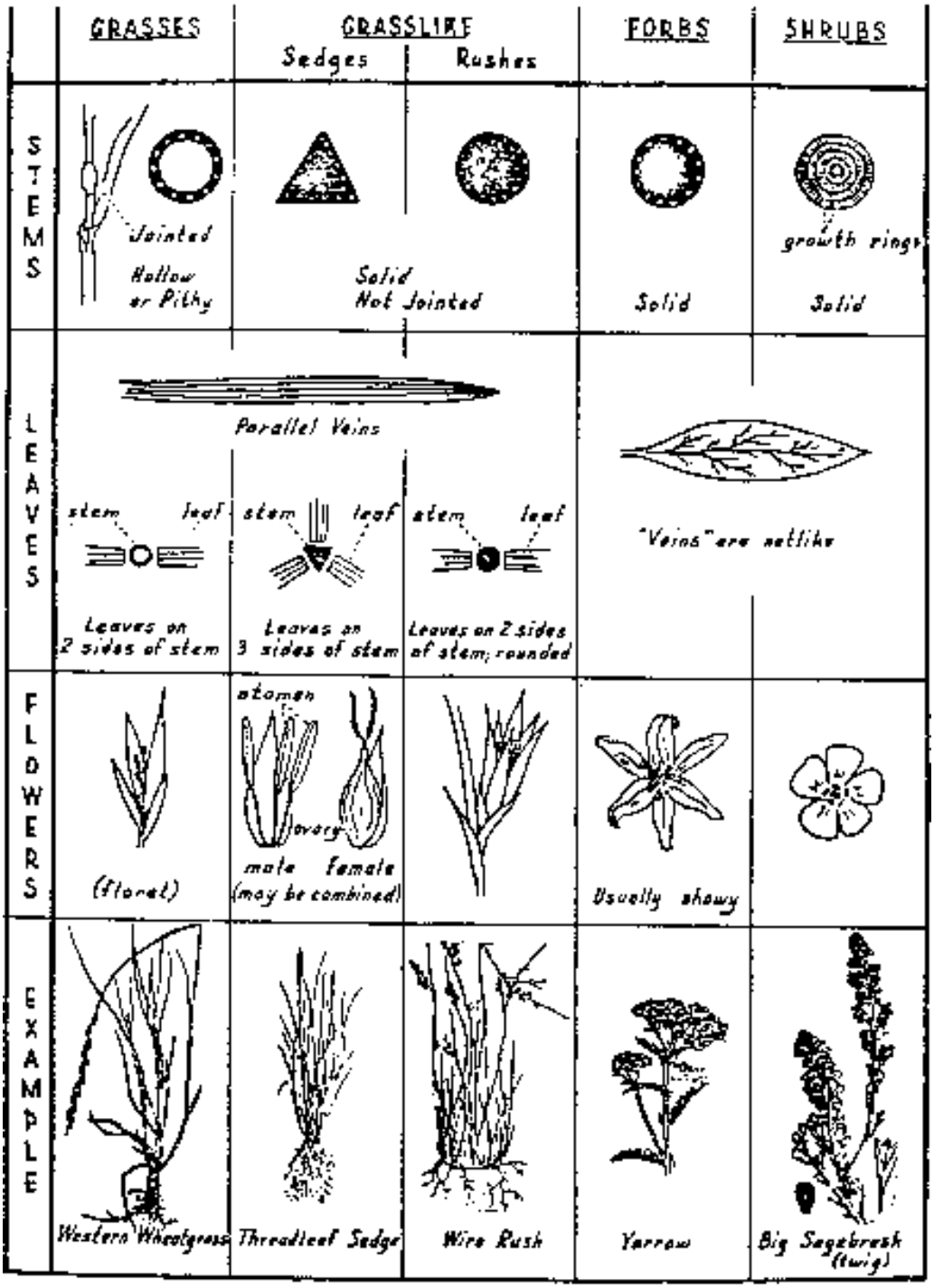
Handout 10, Rangeland Plant Type Examples, *continued*

Forbs, continued	**Scientific Name**	**Notes**
Nettleleaf Noseburn	*Tragia ramosa*	
Woolly Verbena	*Verbena stricta*	
Baldwin Ironweed	*Veronia baldwini*	
Missouri Goldenrod	*Solidago missouriensis*	
Stiff Goldenron	*Solidago rigida*	
Legumes		
Lead Plant	*Amorpha canescens*	
Blue Wild Indigo	*Baptisia minor*	
Silktop Dalea	*Dalea aurea*	
Nine Anther Dalea	*Dalea enneandra*	
Illinois Bundle Flower	*Desmanthus illinoensis*	
Roundhead Lespedeza	*Lespedeza capitata*	
White Prairie Clover	*Petalostemum candidum*	
Purple Prairie Clover	*Petalostemum purpureum*	
Roundheaded Prairie Clover	*Petalostemum multiflorum*	
Slimflower Scurfpea	*Psoralea tenuiflora*	
Catclaw Sensitive Briar	*Schrankia nuttallii*	

KNOWING YOUR RANGE PLANTS

BEEF, LEVEL IV

Handout 11, Range Plant Type Characteristics



The Animal Unit Concept

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Define Animal Unit and other terms associated with range management
- Calculate Animal Units
- Calculate Animal Unit Months for grazing and hay needed for beef cattle

ABOUT THEMSELVES:

- Reflect and analyze the importance of preplanning major events in their lives.

Materials Needed:

- Activity Sheet 5, Livestock and Forage Inventory
- Activity Sheet 6, Animal Unit Concept Word Match
- Leader's Key, Activity Sheet 6, Animal Unit Concept Word Match
- Handout 12, Animal Unit Conversion Factors
- Flip chart or chalkboard
- Markers or chalk

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Leader Notes

Farm and ranch operators may raise two or more different kinds of livestock—beef, dairy, sheep or horses. In addition, within each herd of livestock, animals may differ in age and sex class—bulls, cows, yearlings and calves. The number of different kinds and classes of livestock will influence the amount of harvested forage and acres of grazing land required because their daily forage needs are different.

Animal Unit—Considered to be a mature, 1,000-pound cow and calf, or the equivalent based on average forage consumption of 26 pounds of dry matter per day.

Pass out Handout 12, Animal Unit Conversion Factors.

The animal unit concept is used to determine the amount of harvested forage and grazing required to maintain the herd or flock throughout the year. The amount of forage in the form of hay, silage and grazing can easily be determined by converting each kind of animal by livestock class to a common unit—the **animal unit**. This can be accomplished by using accepted **animal unit conversion factors**.

Animal Conversion Factor—A number expressing the forage requirements of a particular kind or class of animal relative to the forage requirements for an animal unit.

Leader Notes

Using the Animal Unit (AU) Conversion Table

Formula:

Number of Animals	×	AU Conversion Factor	=	Number of Animal Units (AUs)

Examples:

1 beef cow × 1.0 AU = 1.0 AU
3 yearling cattle × 0.65 AU = 1.95 AUs

Write the questions on the flip chart and give the members time to work them out themselves. After a time, show them how to work it out and give the answers.

Do the following:

10 beef cows × ___ = 10 AU

20 beef cows × 1.0 AU = ___ AU

30 yearling cattle × .65 AU = ___ AU

A calendar year is composed of 12 months. Livestock are either grazed or fed harvested roughage during this 12-month period. The most common practice is to graze livestock for a period of five to six months each year on native and seeded pastures or crop aftermath, and to winter them on harvested forages for six to seven months. Sometimes a longer grazing season may be possible. The amount of grazing possible on winter pastures depends on snowfall depths. Snow restricts availability of forage for grazing. The usual practice is to graze livestock on winter range or pasture and to provide supplemental hay and/or supplemental feeds as dictated by winter conditions.

June

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

1 Animal-Unit Month =
26 pounds dry forage/day
or
780 pounds dry forage/month

The animal unit concept can be used to determine the amount of grazing or harvested forage required for the livestock herd. The concept is based on **months grazed** or **months fed harvested forage.** If an animal unit is grazed or fed harvested forage for one month, then one **Animal-Unit Month** of forage is required. If an animal unit is maintained for five months, then five different animal-unit months of forage are required.

Animal-Unit Month—The amount of feed or forage required by an animal unit for one month. Abbreviation: AUM

The usual approach is to determine the animal-unit months of grazing and harvested forage required. For example, in Kansas approximately five animal-unit months of grazing and seven animal-unit months of harvested forage are required for each animal unit in the herd. In other words, five different months of grazing and seven different months of harvested forage are required for each animal unit in the herd.

Hand out Activity Sheet 5, Livestock and Forage Inventory. Show computations on flip chart.

Activity Sheet 5 provides an example of how to inventory the livestock on a farm or ranch and how to inventory the grazing and harvested forage required to maintain that livestock. Determine the number of animal units in the herd (column 3), animal-unit months (AUM) grazing required (column 5), and animal-unit months (AUM) hay required (column 7) for

each class of animal in the herd. Column totals are provided to check your computations.

The animal unit concept is also used to determine the animal-unit months of grazing and hay available to satisfy the needs as determined in Activity Sheet 5. This requires a knowledge of the animal-unit month carrying capacity for native and seeded pastures and the yield of harvested forage on your farm or ranch. Your county Extension agent and district soil conservationist have the necessary information to assist in developing a grazing and forage management plan for your farm or ranch.

Hand out Activity Sheet 6, The Animal Unit Concept Questions, to each member as a review.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What is your understanding of the value of the animal unit concept?
2. Why do you think the animal-unit month (AUM) is important?

Process:

3. Why is it important to calculate the amount of forage needed for your herd?
4. What effect would the weather have on forage requirements?

Generalize:

5. An opportunity cost is an expense you give up in order to do something different. What would be the opportunity cost to use a pasture (pick a specific pasture) for hay instead of grazing it with cattle?
6. At what other times have you found it necessary to pre-plan? Discuss.
7. What planning tools are available for these special times?

Apply:

8. What factors would you need to consider to use the Animal Unit Concept if you ranched in the Southwest states? The Northwest states?

GOING FURTHER:

1. Inventory the livestock on your farm. Then, determine the animal-unit months of grazing and hay required for your farm.
2. Ask your parents to contact the local Soil Conservation District and request a grazing and forage management plan for your farm or ranch. Go with your parents to the district office to review the plan when completed. If changes are needed on your farm or ranch to improve livestock grazing and forage supplies, work to make these changes in cooperation with your parents. When the plan is complete write a story about your family's grazing and forage management program. Include in your story information concerning your program before and after implementing the new plan.

REFERENCES:

Author:
This lesson was modified from original material in *Grasslands . . . Grazing Management,* by Duaine L. Dodds, Fargo, North Dakota, North Dakota State University, Cooperative Extension Service, with adaptation by:
James P. Adams, Extension Specialist, 4-H Youth Programs,
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Activity Sheet 5, Livestock and Forage Inventory

	1	2	3	4	5	6	7
Livestock	No.	Equiv.	Animal Units	Months Grazed	Total AUM Grazing	Months On Hay	Total AUM Hay
		Col 1 × 2		Col 3 × 4		Col 3 × 6	
Beef Cows, 2 yrs +	100	1.0	_____	5	_____	7	_____
Yearling Cattle	20	.65	_____	5	_____	7	_____
Bulls	10	1.3	_____	5	_____	7	_____
TOTALS	XXX	XXX	126	XXX	630	XXX	882

Livestock Inventory = Columns 0–3

Grazing Needs Inventory = Columns 4–5

Forage Needs Inventory = Columns 6–7

THE ANIMAL UNIT CONCEPT

BEEF, LEVEL IV

Activity Sheet 6, Animal Unit Concept Word Match

Match the words on the right with the correct statement on the left.

780	1. _____ Abbreviation for animal unit.
AUM	2. _____ A mature, 1,000-pound cow and calf.
0.65	3. _____ The animal unit conversion factor for yearling cattle.
AU	4. _____ Approximate animal unit equivalent of three yearling cattle.
animal unit	5. _____ The number of animal-unit months of grazing required to graze an animal unit six months.
26	6. _____ Abbreviation for animal-unit month.
50	7. _____ The number of months grazing normally provided by a pasture rated at a carrying capacity of 1 AUM.
1	8. _____ Animal unit equivalent of 50 mature cows.
6	9. _____ The approximate pounds of dry hay required for a mature cow for one month.
2	10. _____ The approximate pounds of dry hay required for a mature cow for one day.

THE ANIMAL UNIT CONCEPT

BEEF, LEVEL IV

Leader's Key, Activity Sheet 6, Animal Unit Concept Word Match

Match the words on the right with the correct statement on the left.

780	1. AU	Abbreviation for animal unit.
AUM	2. animal unit	A mature, 1,000 pound cow and calf.
0.65	3. 0.65	The animal unit conversion factor for yearling cattle.
AU	4. 2	Approximate animal unit equivalent of three yearling cattle.
animal unit	5. 6	The number of animal-unit months of grazing required to graze an animal unit six months.
26	6. AUM	Abbreviation for animal-unit month.
50	7. 1	The number of months grazing normally provided by a pasture rated at a carrying capacity of 1 AUM.
1	8. 50	Animal unit equivalent of 50 mature cows.
6	9. 780	The approximate pounds of dry hay required for a mature cow for one month.
2	10. 26	The approximate pounds of dry hay required for a mature cow for one day.

THE ANIMAL UNIT CONCEPT

BEEF, LEVEL IV

Handout 12, Animal Unit Conversion Factors

Kind of Animal	Animal Unit Conversion Factor
Dairy cows	1.3
Beef cows, 2 years and over	1.0
Calves, over 3 months	0.3
Yearling cattle	0.65
Bulls	1.3
Ewes	0.2
Yearling sheep	0.1
Rams	0.25
Horses	1.5

Words to Know

Animal Unit—A mature, 1,000-pound cow and calf, or the equivalent based on an average daily forage consumption of 26 pounds of dry matter per day.

Animal Unit Conversion Factor—A number expressing the forage requirements of a particular kind or class of animal relative to the forage requirements for an animal unit.

Animal-Unit Month—The amount of feed or forage required by an animal unit for one month.

Securing Uniform Grazing

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Basic grazing terminology
- Basics of grazing distribution
- Grazing distribution plan for a pasture

ABOUT THEMSELVES:

- What good management practices mean in member's lives
- Various problem-solving tools, techniques, practices

Materials Needed:

- Activity Sheet 7, Grazing-Review Questions
- Leader's Key, Activity Sheet 7, Grazing-Review Questions
- Handout 13, Words to Know
- Paper and pencils for each member
- Flip chart or chalkboard, pens or chalk

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Native grasslands require that a forage be properly used if long term productivity is to be maintained. Proper forage use requires that livestock graze all areas of the pasture uniformly. This is called **grazing distribution**. Distribution was accomplished in pioneer days by "driving" the livestock to unused areas. This was called herding.

Grazing Distribution—The dispersion of livestock grazing over the entire pasture or grazing unit.

Sacrifice Area—A portion of the native pasture which is intentionally overgrazed to obtain optimum use of the grazing unit.

Problem Area—An area of native pasture difficult to manage due to its size, shape, location, topography or other limiting factors.

Grasslands often have some areas closely grazed and others undergrazed. A well-managed grassland will usually have no more than 5 to 10 percent of the grazing area closely used. These areas will normally occur around watering facilities, trails and shade or resting areas. These are referred to as **sacrifice areas.** Occasionally grasslands may include areas which are difficult to manage due to lack of available water, roughness of the landscape, or location in relation to the main grazing unit. These areas are referred to as **problem areas**.

Leader Notes

Begin this lesson by providing a skillathon situation with a drawing of a pasture with grazing problems. Let small groups of members attempt to solve the problems through group discussions.

Write these terms on the flip chart with definitions. Refer to Handout 13, Words to Know, for assistance. Give to members as a summary.

Uniform grazing distribution can be complicated by the **grazing habits** of livestock. For example, cattle prefer to graze the low-lying lands —valley bottoms, flat bottom meadows, or draws. Sheep and horses seem to prefer the higher, upland areas.

Pasture **stocking rates** influence grazing distribution also. Under light stocking, livestock graze only the choicest plants and will usually return to graze the regrowth. Heavy stocking will cause overuse of forage, which will cause lower forage production due to changes in the plant cover.

Another cause of uneven grazing distribution is **season of use**. Some grassland plants grow best during the spring when temperatures are cool; others enjoy the warmer temperatures of late spring and summer. If a grassland composed of a high percentage of cool-season grasses is grazed only in late summer, animals will graze the choice, young, warm-season grasses closely before grazing the more mature plants.

PLANT MATURITY

Plant maturity can have a major influence on grazing distribution. Some grassland plants become very coarse, stemmy and low in nutritive value as they mature. Vegetation composed of a high percentage of these plants will usually be undergrazed, resulting in close use of other more palatable grassland vegetation.

Uneven grazing distribution is caused primarily by grazing habits of livestock, topography of the area, and composition of the vegetation. The goal of the livestock manager is to encourage uniform and proper use of the grassland by manipulating grazing livestock.

Through the years a number of practices have been used effectively by livestock producers to encourage uniform grazing use by livestock. The practices used on a particular grazing unit will vary. The most commonly used practices include uniform distribution of water developments, placement of salt, mineral, and supplement feeders, and fencing. Other practices such as burning, mowing, weed and brush control, and fertilization are used less extensively but are very specific practices for unique situations. Several practices are designed for areas with year-long grazing and rough topography.

SALTING

Grazing livestock usually require a salt and phosphorus mineral mixture. Salt requirements vary depending on the species of livestock. Sometimes livestock obtain their salt requirements from **salt licks,** areas where the soil contains high levels of salt. Water may also have a high salt content, reducing normal consumption in certain pastures.

Salt Requirements

	Pounds per year
Beef cows	25 to 30
Ewes	10 to 12
Horses	30 to 40

Salt and mineral mixtures, if needed by livestock and properly located, usually will draw livestock into lightly used areas of the grazing unit. Studies have shown that livestock movement is generally from water, to grazing, to salt, to grazing, and then back to water. To avoid holding

livestock near watering facilities too long, establish salting grounds up to ½ mile from water. This will permit livestock to use more forage in lightly grazed areas of the pasture. Salting locations should be changed periodically to obtain uniform grazing throughout the pasture. Usually one salting location is provided for each 40 to 50 head of cattle. A new salt location should be within sight of the previous location. Salting is one of the easiest and most economical grazing distribution tools and should be used more widely by livestock producers.

PASTURE FLY CONTROL

Fly control on pasture is a common practice. Usually oilers and/or dust bags are located near water. This practice tends to hold livestock near water too long. Pasture fly control devices should be located within sight of the salting grounds. If adequate use is not made of the insect control devices when they are placed near salt, place them as far as possible from water to obtain effective use.

WATER DEVELOPMENTS

Water availability often determines the type of grazing system used on farms and ranches. Water developments vary depending on local conditions, but usually consist of wells, ponds or dugouts, or springs. Occasionally, pipelines are used to distribute water to deficient areas. Properly spaced watering facilities aid in distributing grazing evenly.

Water Requirements

	Gallons per day
Cattle	12 to 15
Horses	12 to 15
Ewe-Lamb Pairs	1 to 1.5

More watering facilities are required on rough, broken lands than on gently rolling landscapes. Cattle should not have to travel more than ¼ to ½ mile from forage to water in gently rolling areas. Sheep and horses may travel longer distances. If watering facilities are not properly located, livestock will repeatedly graze forage near the easiest access to water or the closest watering facility, and will cause deterioration of the grassland area. In steep, rough rangeland areas, access to watering places should be controlled. Watering facilities may be closed in high-use areas to encourage grazing elsewhere, or once an area has been properly grazed the watering facility may be closed to encourage grazing in lightly used areas of the grazing unit.

How Far Livestock May Travel to Water

Landscape	Distance
Steep, rough	¼ to ½ mile
Level or gently Rolling	1 mile or less

FENCING

Fences are sometimes used to change the pattern of livestock movement on grasslands. Occasionally, the topography of an area will cause livestock to continually graze a certain area. Open-ended fences called **drift fences** are built to change animal's movement patterns in order to move them to areas receiving limited grazing. A drift fence may be quite short, but long enough to force cattle out of a valley or drainage area to a higher, lightly grazed grassland area.

ROTATIONAL GRAZING

Rotational grazing systems require dividing the grazing unit into pastures of similar sizes and/or carrying capacities. A grazing system of this type will influence grazing distribution throughout each unit because greater numbers of livestock are concentrated on a smaller area during a portion

of the grazing season. Each unit is grazed relatively close before livestock are moved to the next pasture. If possible, plan grazing units with easy access to water, with similar vegetation, and with no natural barriers, such as rivers and streams, which might restrict livestock movement to all parts of the pasture.

BURNING AND MOWING

Burning and mowing are grazing management tools used to accomplish similar results. Fire can be dangerous but can accomplish the desired result quite rapidly if used with care. Fire and mowing are used to remove unpalatable old forage growth, thereby permitting cattle to graze the lush, new growing shoots before they become coarse and unpalatable. This practice changes the use pattern on burned or mowed areas by drawing livestock to new growth. The total size of the burned or mowed area should be large enough and/or spaced in such a way that grazing is not encouraged in the usually high-use areas near water, salting grounds, etc.

FERTILIZATION

Nitrogen fertilization of relatively small areas of native grassland can improve livestock grazing distribution, especially if used in combination with salting and water development facilities. Studies have shown that livestock will return to fertilized grass more frequently than to unfertilized grass. This is due to improved forage quality. The more frequent grazing increases forage use and improves grazing distribution on the surrounding unfertilized grassland. The size of the fertilized area should be about 15 to 20 acres, large enough to prevent overuse due to concentrated grazing. In addition, do not locate fertilized area too close to water or salting grounds, or continued overuse will usually result. Carryover effects of fertilization may influence grazing distribution for several years following application.

WEED AND BRUSH CONTROL

Weed control in pastures is a practice which improves forage production. It may improve grazing distribution by improving the quality of the herbage available for grazing. Herbicides should be used with great care and according to label instructions.

SUMMARY

Give members Activity Sheet 7, Grazing-Review Questions for a summary. Hand out paper and pencils. Have members draw either a pasture their family owns or make up a pasture. Remember to include water sources and shade as well as topographical features such as hills, rocks and draws. Then let them make a grazing distribution plan for their pasture. Have each member present their plan to the group and show their picture. Ask questions and make suggestions for their plan.

You may need to use several grazing techniques to accomplish your goal of having a uniformly grazed grassland. Now let’s design our own grazing distribution plan. Remember the practices to encourage uniform grazing.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What new grazing terms did you learn from this lesson? Why is it significant to have an understanding of this terminology?

2. What management practice do you use most to secure uniform grazing? Which practice is least effective for you? Why?

Process:

3. Have you ever been involved in solving a grazing distribution problem? If so, share your learning.
4. What role does cost and environmental concerns have on grazing management practices?

Generalize:

5. What are the long term consequences of your failure to manage grasslands well? Consider environmental and financial consequences.
6. How do you decide which practices to use? And when?
7. What problem solving and management techniques work for you? Why?

Apply:

8. Who can you talk to that can help you improve your management of natural resources, money or time. List and discuss. Record them for personal use later.
9. What management practices, or tools are available to you for problem solving? List and discuss.

GOING FURTHER:

1. Observe techniques for securing uniform grazing distribution on your farm or ranch throughout the community. Make a special effort to observe salting and watering practices. Are water facilities uniformly spaced? Is salt fed away from water? Be an example for your community—implement one or more grazing distribution techniques on your grazing unit.
2. Prepare a display of grazing distribution techniques. Exhibit it at your County Fair. You may even wish to post your display at the local farm supply store.
3. Collect, press, mount and label five additional grasses for your collection.

REFERENCES:

Author:
This lesson was modified from original material in *Grasslands...Grazing Management*, by Duaine L. Dodds, Fargo, North Dakota, North Dakota State University, Cooperative Extension Service, with adapation by:
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SECURING UNIFORM GRAZING
BEEF, LEVEL IV
Handout Sheet 13, Words to Know

Drift Fence — An open-ended fence used to alter the normal movement of livestock.

Fertilization — The application of commercial plant food such as nitrogen, phosphorus and potassium to grass to improve production and forage quality.

Grazing Distribution — The dispersion of livestock grazing throughout a grazing unit or pasture.

Herbicide — A chemical used for killing undesirable plants in grassland.

Herding — Tending livestock on the range, primarily to control their grazing pattern.

Palatability — The characteristics of a particular forage, plant or plant part which governs an animal's acceptance or rejection over other forages, plants or plant parts.

Problem Area — An area difficult to manage due to its size, shape, location, topography or other factors.

Proper Use — The degree and time of use of current year's growth which will either maintain or improve its health and vigor.

Sacrifice Area — A portion of a grazing unit that is intentionally overgrazed to obtain efficient use of the entire management area.

Salt Ground — An area where salt is placed for use by livestock.

Salt Lick — Areas containing unusually large quantities of salts in the soil, where animals consume soil to obtain salt.

Stocking Rate — The area of land that has been alloted to each animal unit for the grazing period.

SECURING UNIFORM GRAZING

BEEF, LEVEL IV

Activity Sheet 7, Grazing-Review Questions

1. Uniform use or dispersion of livestock grazing throughout the grazing unit or pasture is called _____.
2. An area overgrazed intentionally is called _____.
3. Uniform grazing distribution is complicated by livestock _____, pasture _____ rates, season of _____, and_____ maturity.
4. Three common grazing distribution techniques are _____, _____, and _____.
5. Cattle should not have to travel more than _____ from forage to water on level land.
6. Areas containing unusually high levels of salt are called _____.
7. The estimated annual salt requirement for a mature beef cow is _____ pounds per year.
8. Beef cows consume an estimated _____ gallons of water per day.
9. An open-ended fence used to alter livestock movement is called a _____.
10. A grazing distribution tool that improves forage quality and production is _____.
11. List several ways to eliminate unwanted plants in grassland.

    _____.
12. An area where salt is placed for livestock use is called a _____.

SECURING UNIFORM GRAZING

BEEF, LEVEL IV

Leader's Key, Activity Sheet 7, Grazing-Review Questions

1. Uniform use or dispersion of livestock grazing throughout the grazing unit or pasture is called grazing distribution.
2. An area overgrazed intentionally is called sacrifice area.
3. Uniform grazing distribution is complicated by livestock grazing habits, pasture stocking rates, season of use, and plant maturity.
4. Three common grazing distribution techniques are fencing, placement of salt, mineral & supplements, and uniform distribution of water developments.
5. Cattle should not have to travel more than 1/4 to 1/2 mile from forage to water on level land.
6. Areas containing unusually high levels of salt are called salt licks.
7. The estimated annual salt requirement for a mature beef cow is 25 to 30 pounds per year.
8. Beef cows consume an estimated 12 to 15 gallons of water per day.
9. An open-ended fence used to alter livestock movement is called a drift fence.
10. A grazing distribution tool that improves forage quality and production is fertilization.
11. List several ways to eliminate unwanted plants in grassland.

    burning; mowing or use of herbicides.
12. An area where salt is placed for livestock use is called salt ground.

Introduction to Balancing a Feed Ration

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Five basic steps to balance a beef ration
- Characteristics of good rations
- General feeding recommendations for steers and heifers
- Importance of measuring feed by weight
- Beginning principles of balancing feed rations

ABOUT THEMSELVES:

- Value or need for adjustments in everyday living situations
- Food energy needs at different times of the year, life, or specific activities

Materials Needed:

- Several 5-pound samples of feedstuffs (corn, oats, SBM) and feed rations
- One 1-pound coffee can
- One small set of scales
- One paper sack (lunch size) per member
- Activity Sheet 8, Ration Balancing Worksheet
- Handout 14, Nutrient Requirements of Beef Cattle
- Handout 15, Nutrient Content of Feedstuffs

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

A member may have an outstanding beef project with excellent facilities, but may not succeed because he/she has a poor knowledge of what makes a balanced ration for beef cattle. A member must realize that the nutritive value of feeds and needs of different age classes of beef animals vary widely. A poor animal can't be made good by feeding, but feeding programs and rations can give different types of animals the best possible chance of growing and finishing properly.

A **ration** is the feed received by an animal for a 24-hour period. A **balanced ration** contains the proper amount of nutrients required by an animal for a 24-hour period.

What is the difference in the terms **ration** and **balanced ration**? Group discussion and/or definition of ration and balanced ration.

TYPES OF RATIONS

Animals are fed for different reasons at different times of the year. Therefore, to meet their requirements, different balanced rations are prepared. Rations are prepared for several reasons. Can you name the reasons or type of rations?

Group discussion or listing of type of rations.

Maintenance
Growth
Finishing

Leader Notes

Lactation
Reproduction

Rations are needed for maintenance, growth, finishing, lactation, and reproduction.

Maintenance rations are formulated to maintain the animal at its present weight and size. These rations are usually high in roughage and fiber, and contain small amounts of protein, minerals and vitamins.

Growing rations are fed to encourage growth of young calves and animals being developed for breeding stock. These rations are relatively high in protein, energy, minerals, and vitamins.

Finishing rations are designed to allow beef animals to put on a desired finish. These rations contain large quantities of energy (carbohydrates and fats) with an ample supply of protein, minerals and vitamins.

Lactation rations are needed by milking cows. This type of ration must meet the requirements for body maintenance and production. Since milk is the primary objective, rations for its production must be high in protein, energy and minerals.

Reproduction rations must provide an adequate supply of protein, energy, minerals and vitamins. Reproducing animals, or animals in their gestation period, must receive adequate levels of these nutrients to prevent fertility problems or low calf crops.

There are several “rules of thumb” which may assist a beef project member in developing rations for project animals.

A steer is considered on full feed when he consumes about 2½ to 3 percent of his body weight. This suggests that a steer that weighs 1,000 pounds might consume 25 to 30 pounds of feed per day. The steer ration should be high in concentrates and low in roughages. This feeding program will vary because of:

1. Age and size of steer
2. Feeds available
3. Degree of finish on steer
4. Final weight and finish desired
5. Days left before slaughter

A beef heifer is fed a growing ration to provide a 1- to 2-pound gain per day. Any ration will promote fat deposition if fed in excess. Generally, 2 percent of the animal’s body weight is an adequate level to feed. Therefore, a 1,000 pound heifer might consume 20 pounds of feed each day. Young heifers may need more grain and protein supplement due to limited feed capacity. As heifers increase in size, more roughage or bulk can be fed and still maintain the same rate of growth and development.

Have members use coffee can to measure out 1-pound amounts of each feedstuff and weigh on scales.

A common problem for most feeders is not understanding the different weights of feeds and consistency in measuring. The “old” coffee can is a valuable measuring instrument if you know what your feed weighs. Can you measure out exactly one pound of each item with the coffee can?

The amount of feed that can be packed into a coffee can varies due to the bulk of the ration. Oats are very bulky and may require more than one can to get a pound, while corn or milo may only half fill a can and weigh 1 pound.

BALANCING A RATION

The way to balance a ration is to take the nutritional requirements of a specific animal and try to find the kinds and amount of feeds needed to meet the requirements.

Pass out Handouts 14 and 15, Nutrient Requirements of Beef Cattle and Nutrient Content of Feedstuffs.

To balance rations, a table giving the nutrient requirements of various classes of beef cattle is needed.

Use Activity Sheet 8, Ration Balancing Worksheet to have each member or group of members balance a ration.

Balancing rations is not hard if it is done one step at a time.

Use the following procedure to balance a ration or to determine if the ration being fed is adequate:

Step 1. Select the animal for which a ration is to be balanced. Find the nutrient requirements in Handout 14. Fill in the information requested in Step 1 of Ration Balancing Worksheet.

List these steps on chalkboard or filp chart as they are discussed. Use a specific example before asking each member to do an example for their calf.

Step 2. Next, list the feed and the nutrient content of the feed as requested in Step 2 on worksheet. Use Handout 15, Nutrient Content of Feedstuffs.

Crude protein is the total amount of protein contained in a feed, both digestible and non-digestible.

Generally, an animal will digest about 70 to 80 percent of the crude protein that is eaten.

TDN is the **Total Digestible Nutrients** that an animal is capable of digesting. TDN indicates the amount of energy that is supplied to the animal from the feed that is eaten. TDN consists of protein, fiber, nitrogen-free extract, and fat.

Step 3. Next, write down the amount of feed required by the animal and multiply this figure by the percent of each nutrient found in the feed selected. This gives the amount of nutrients that the feed can furnish the animal.

Step 4. Now check to see if the amount of nutrients found in Step 3 is equal to the amounts given in Step 1. If the amount of nutrients in the feed is greater than the requirements, then the animal's needs will be met using the selected feed. If the requirements are greater than the pounds of nutrients in the feed, then a different feed or an additional feed is needed. Select a feed that has a larger amount of the nutrient that was low. Go back and figure the ration again to see if the new feed will meet the animal's requirement.

Only in unusual cases will one feed meet the nutritional requirements plus the other characteristics of a good balanced ration. The majority of rations are a combination of different feeds in proportional amounts. For example, instead of an 800-pound steer being fed 18.6 pounds of corn, he might be fed 13 pounds of corn, 2 pounds of cottonseed meal and 3.6 pounds of prairie hay. (members may want to figure the nutrients found in this ration.) Instead of multiplying the feed by 18.6, multiply each feed nutrient percent by the pounds of that feed that is being fed.

Example: Corn – multiply feed nutrient percent by 13
Cottonseed meal – multiply nutrient percents by 2
Prairie hay – multiply feed nutrient percents by 3.6.

Remember that the figures used are averages. If it is suspected that the feeds are of a lower than average quality, have a sample analyzed at a feed testing laboratory. Use these figures to balance the ration. Remember that the performance of the animal gives the best evaluation of how well the ration is balanced.

Characteristics could be listed on chalkboard or other writing surface.

Moldy or bad feed could be shown.

CHARACTERISTICS OF A GOOD BEEF RATION

1. A good beef ration **must** be **nutritionally balanced**.
2. Feeds should be palatable (agreeable to taste) and succulent (fresh and appealing). Mold, insect damage or disease and exposure to rain lower both the palatability and succulency of feeds. Beef cattle will eat more of a good tasting, fresh ration, thus increasing production.
3. Should contain a variety of feeds. This usually makes the feed more palatable and also makes it easier to balance the ration.
4. Should be bulky (feeds such as chopped hay, ground oats, beet pulp).
5. A slightly laxative ration usually improves efficiency.
6. Should be suited to the individual animal.
7. Should be as **economical** as possible without lowering nutrient value.
8. Should be properly mixed. Micro-nutrients and additives such as antibiotics, or drugs which control livestock parasites are very potent and can be harmful and dangerous if not properly mixed or added at levels higher than recommended.

SUMMARY

Rations for beef animals are needed to serve five basic functions: maintenance, growth, finishing, lactation and reproduction. The rations must be developed to satisfy the basic functions and the animal's nutrient needs. It is important to know all of the characteristics of a good ration. Knowing these characteristics will aid in developing an economical ration that will supply the correct nutrients as well as improve eating habits and health. Also, a member must remember that when measuring out feeds, weight differences do exist. The successful producer watches the animals and knows when adjustments in rations are needed

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What was the most difficult/easiest nutrient to balance in a ration? Why?
2. What ration adjustments did you make to "balance" the ration?

Process:

3. What nutrient is the most important for each of the five types of rations? Why?
4. Why does a breeding heifer require a different ration than a steer?
5. What adjustments or techniques can you use to produce a balanced ration in the most economical manner possible?

Generalize:

6. How do you make adjustments or changes in other 4-H projects to meet new needs or avoid problems?

Apply:

7. How can you apply what you learned about making adjustments and changes to new situations?

GOING FURTHER:

1. Visit feed store and select feed for different purposes.
2. Develop a ration for growing beef animals.
3. Visit feedlot and other cattle operations and find out content of ration.
4. Develop rations for different types of cattle.
5. Check ration being fed at home to see if it has all of the characteristics of a good ration.

REFERENCES:

Feeds and Feeding, Ninth Edition, Frank B. Morrison, Morrison Publishing Company, Ithaca, New York, 1958

Kansas Beef Cattle Handbook, Kansas Cooperative Extension Services, Department of Animal Sciences and Industry, Kansas State University

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INTRODUCTION TO BALANCING A FEED RATION

BEEF, LEVEL IV

Handout Sheet 14, Nutrient Requirements of Beef Cattle[1]

Body Weight (lbs)	Average Daily Gain	Feed Intake[2] (lbs)	Crude Protein (lbs)	TDN (lbs)
Growing–Finishing Steer Calves and Yearlings				
400	2.0	11.0	1.41	7.4
600	2.0	15.0	1.57	10.1
800	2.0	18.6	1.72	12.6
1000	2.0	22.0	1.85	14.9
Growing–Finishing Heifer Calves and Yearlings				
400	1.5	10.2	1.17	7.0
600	1.5	13.8	1.32	9.5
800	1.5	17.2	1.46	11.8
1000	1.5	20.3	1.59	13.9
Pregnant Yearling Heifers (Last Third of Pregnancy)				
700	1.4	15.8	1.40	9.6
800	1.4	17.4	1.50	10.4
900	1.4	19.0	1.60	11.3
Dry Pregnant Mature Cows (Middle Third of Pregnancy)				
800	0.0	15.3	1.10	7.5
900	0.0	16.7	1.20	8.2
1000	0.0	18.1	1.30	8.8
1100	0.0	19.5	1.40	9.5
1200	0.0	20.8	1.40	10.1
Dry Pregnant Mature Cows (Last Third of Pregnancy)				
800	0.9	16.8	1.40	9.2
900	0.9	18.2	1.50	9.8
1000	0.9	19.6	1.60	10.5
1100	0.9	21.0	1.60	11.2
1200	0.9	22.3	1.70	11.8
Cows Nursing Calves, Superior Milking Ability (First 3 to 4 Months After Calving)				
800	0.0	15.7	2.20	12.1
900	0.0	18.7	2.40	13.1
1000	0.0	20.6	2.50	13.8
1100	0.0	22.3	2.60	14.5
1200	0.0	23.8	2.70	15.2

[1]Adapted from *Nutrient Requirements of Beef Cattle,* Sixth Revised Edition, National Research Council, 1984
[2]Expressed on a dry matter basis

INTRODUCTION TO BALANCING A FEED RATION

BEEF, LEVEL IV

Handout Sheet 15, Nutrient Content of Feedstuffs[1]

	Dry Matter (percent)	Crude[2] Protein (percent)	TDN[2] (percent)
Roughages			
Fescue hay	88.5	10.5	54
Brome hay	90.0	10.3	55
Alfalfa hay	89.2	17.1	58
Prairie hay	92.0	5.8	51
Concentrates			
Corn, shelled	86.5	9.9	91
Corn, ear	87.0	9.3	90
Barley	88.1	13.3	81
Oats	89.5	13.5	77
Grain sorghum (Milo)	87.0	10.1	84
Protein Supplements			
Cottonseed meal	92.5	44.3	74
44% Soybean meal	89.0	51.5	81
49% Soybean meal	89.8	56.7	84

[1]From *United States–Canadian Tables of Feed Composition,* Second Rev., 1972, National Academy of Sciences.
[2]Expressed on a dry matter basis

INTRODUCTION TO BALANCING A FEED RATION

BEEF, LEVEL IV

Activity Sheet 8, Ration Balancing Worksheet

Step 1. Record nutritional requirement information on animal for which the ration is to be balanced. Obtain information from Handout 14.

Description of Animal	Feed Intake (dry matter)	Crude Protein	TDN

Step 2. Use Handout 15 to select a feed from one of the categories and record name and nutrient content.

Name of Feed	Crude Protein (%)	TDN (%)

Step 3. Determine pounds of nutrients supplied by the selected feed. Multiply the amount of feed required by the animal (from Step 1) by the percent of crude protein and TDN found in the feed. (Remember the percents need two decimals plus any extra decimals in the particular feed content.) Answer equals the pounds of nutrients supplied by the feed.

Name of Feed	Lbs Crude Protein	Lbs TDN

Step 4. Check to see if the amount of nutrients in the feed in Step 3 meets the requirements for the animal listed in Step 1 when fed by itself. If the feed does not meet the requirements, then a different or additional feed is needed. Select a feed from another category. Figure the ration again to see if the feed will meet the requirements.

Heifer Selection and Management for Good Reproductive Performance

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Criteria for selection of replacement heifers for good reproductive performance
- Management needs to ensure that heifers perform as expected

ABOUT THEMSELVES:

- Their decision making skills
- The importance of prioritizing

Materials Needed:

- Activity Sheet 9, Heifer Management Worksheet
- Leader's Key, Activity Sheet 9, Heifer Management Worksheet
- Chalkboard, optional

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Today, we will discuss the things that producers and members need to be aware of when selecting heifers for replacements. The most important thing is to select heifers that assure us of performing as expected. What do we expect from a replacement heifer?

1. We want a heifer that reaches sexual maturity early enough to allow her to **calve by the time she is 2 years old**. Calving later than 2 years of age is very costly and serves to reduce income.
2. In order for her to calve at 2 years of age, she must be bred by 15 months of age. Thus, she must **reach sexual maturity prior to 15 months of age**.
3. She should weigh about 65 percent of her mature weight by 15 months of age. This will ensure a high percentage of sexually mature heifers.
4. She must **rebreed**, after calving, **within 80 to 90 days.** Otherwise she becomes a late conceiver when compared to her herd mates. These late conceivers are the most unproductive and undesirable cows in the herd.

Basically, these four things are what we need for good reproductive performance in a replacement heifer.

Leader Notes

Give each member a copy of Activity Sheet 9, Heifer Management Worksheet. Divide members into pairs or small groups. See if they can answer questions A and B before beginning the lesson. Use chalkboard or newsprint to write main points.

Create a cow-herd scenario with a specific heifer selection problem or need for replacements. Ask small groups of members to discuss and suggest a solution.

FACTORS AFFECTING THE ONSET OF SEXUAL MATURITY

There are at least three factors which affect the onset of sexual maturity (puberty).

1. The **weight** of the heifer will influence the onset of puberty. Heifers that are heaviest in the herd will reach sexual maturity first. Lightweight heifers will reach puberty last.
2. **Age** of the heifer also influences the onset of puberty. The oldest heifers in the herd will reach puberty sooner than their younger herd mates.
3. Heifers that are fed properly and gain at least 1.25 to 1.75 pounds a day will reach puberty early, while those not gaining that amount will be slow to reach puberty. Thus, **average daily gain** is a factor. The proper target weight for heifers at 15 months of age is about 65 percent of the expected mature weight.

Therefore, the best heifers to select as replacements are those that are heaviest and oldest compared to their herd mates. They must be fed either through hand feeding or proper grazing to gain at least 1.25 to 1.75 pounds per day prior to their first breeding season. Producers who use these methods of selection and management can expect pregnancy rates in excess of 90 percent. Those not using these methods often see less than 70 percent pregnancy rate in their replacements.

GETTING THE HEIFERS REBRED AFTER FIRST CALVING

One of the most difficult things a manager faces is rebreeding of first-calf heifers. These animals have a problem when compared to rebreeding in older cows. The **first-calf heifer is still growing**. Obviously, this makes her different from an older cow who has already reached her mature size. Because first-calf heifers are still growing, they need special care after calving. First, they need more feed than an older cow. This does not say that older cows do not need feed, but just that they need somewhat less than the first-calf heifer. Thus, sort first-calf heifers away from the rest of the herd and put them in a separate pasture. When fed together, older cows push younger cattle away from feed. Sorting cattle and feeding the younger ones separately will solve this problem.

Provide the first-calf heifers with the best pasture available. Generally, the best pasture can be defined as the one with the most grass of the highest quality. Many times a producer will plant a special grass for this pasture so that good grazing is provided all year. Most producers plant rye grass, oats or wheat for heifers calving in the fall or winter. Heifers calving in the spring generally do not need this kind of pasture during the winter and will do well on spring growth of native grasses. Always keep a good supply of feed on hand in case pastures are in poor shape due to hard winters or dry summers. Regardless of when these heifers begin calving, they may need extra feed that has been stored away for extreme weather conditions.

Under extreme weather conditions heifers may lose weight and fat cover regardless of how well they are fed. If this happens, stringent measures should be taken to help the heifers overcome this stress. Research has shown that the stress of weight and fat loss will prevent a heifer from rebreeding. There are two options to overcome this.

1. Use limited nursing.
2. Use early weaning.

Either method will essentially guarantee that a heifer rebreeds. When using either of these methods, the calf will not get its full milk requirement. In these cases the calves must be fed additional feed to compensate for less milk.

One other criterion that influences a heifer's ability to rebreed after calving is the amount of fat she is carrying at or near calving. Make sure that prior to calving, all heifers are in good flesh. Their ribs should not show, nor should they show after a heifer calves. Heifers that maintain this degree of fat cover will rebreed quickly. Not only that, a higher percentage of heifers in acceptable flesh will rebreed compared to heifers who are in poor flesh (ribs showing). To ensure good flesh at calving, the heifers may need extra feed beginning at least 60 days prior to calving. Waiting later than this to feed may result in insufficient weight gain.

Finally, follow a good health program. Make sure that the heifers have their necessary vaccinations for things such as brucellosis, vibrio, lepto, and other things that a veterinarian recommends.

SUMMARY

Good reproductive performance in heifers can be accomplished through proper selection. Select only the oldest and heaviest heifers in the group. Make sure that they gain 1.25 to 1.75 pounds per day after weaning. This helps ensure the occurrence of puberty by 13 to 15 months of age. At 13 to 15 months of age all heifers should weigh about 65 percent of their expected mature weight. Breed the heifers at 15 months so that they can calve by two years of age. Sixty days prior to calving, check all heifers visually for fat cover. Feed the thin ones so that their ribs are no longer showing. Sort first-calf heifers away from older cows and provide the necessary feed after calving, either through hand feeding or through planted winter grasses, such as rye grass, oats, or wheat. Heifers that do not respond to this kind of care may have to be put on a limited nursing schedule or have their calves weaned early. Follow a good health program with vaccinations that your veterinarian recommends.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What are some characteristics to consider when selecting a replacement heifer?
2. What are the most economically important traits in beef heifer management? Why?
3. How many of the factors affecting puberty did your group identify?

Process:

4. What problems have you experienced when feeding or selecting replacement heifers? Why?
5. What has been the most significant factor in getting heifers rebred after first calving? Why?

Generalize:

6. What impact on your livestock program would result if your breeding plans do not occur? What kind of adjustments would you need to make in your breeding program? (i.e., culling, buying a bred heifer)
7. What type of breeding guarantee should you get when purchasing breeding heifers?

Apply:

8. What might you do differently in the future as a result of this discussion? Why?

GOING FURTHER:

1. Study performance records on different breeds to learn about first-calf and rebreeding problems.
2. Attend cow-calf clinics and other beef cattle information days.

REFERENCES:

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HEIFER SELECTION AND MANAGEMENT FOR GOOD REPRODUCTIVE PERFORMANCE

BEEF, LEVEL IV

Activity Sheet 9, Heifer Management Worksheet

A. List four expectations of replacement heifers.

1.

2.

3.

4.

B. What three factors affect the onset of sexual maturity?

1.

2.

3.

C. Give the solution for the following problems that are encountered when trying to rebreed heifers after first calving.

Problem: First-calf heifers are still growing.

Solution:

Problem: High percent of heifers that are not in good flesh do not rebreed.

Solution:

HEIFER SELECTION AND MANAGEMENT FOR GOOD REPRODUCTIVE PERFORMANCE

BEEF, LEVEL IV

Leader's Key, Activity Sheet 9, Heifer Management Worksheet

A. List four expectations of replacement heifers.

1. Calve by 2 years of age
2. Reach sexual maturity prior to 15 months of age
3. Rebreed within 80–90 days
4. Weigh 65 percent of mature weight by 15 months of age

B. What three factors affect the onset of sexual maturity?

1. Weight
2. Age
3. Average daily gain

C. Give the solution for the following problems that are encountered when trying to rebreed heifers after first calving.

Problem: First calf heifers are still growing.

Solution: Feed heifers more under stressful times.
1. Use limited nursing
2. Use early weaning

Problem: High percent of heifers that are not in good flesh do not rebreed.

Solution: 1. Be sure all heifers are in good flesh prior to calving
2. Provide extra feed for at least 60 days prior to calving

The Cow's Estrous Cycle and the Process of Fertilization

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Sexual nature of the cow
- Process of fertilization

ABOUT THEMSELVES:

- Importance of various cycles
- Importance of sequence and timing in their lives

Materials Needed:

- Activity Sheet 10, Reproductive Definitions Worksheet
- Leader's Key, Activity Sheet 10, Reproductive Definitions Worksheet
- Handout 16, Major Reproductive Organs of the Cow
- Handout 17, Reproductive Definitions
- Chalkboard or writing surface

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

ESTROUS CYCLE

Unlike wild animals, cows are not seasonal in their sexual nature. For instance, in deer, mating generally occurs during the cold months of the year, and at no other time. However, cows will mate at any time during the year, except shortly after calving. It is at this time that the cow must recover from calving before she is able to rebreed. This recovery period takes about 40 to 60 days. Undue stress, such as poor nutrition, will lengthen this period. Thus, proper nutrition is necessary to overcome a lengthy delay in recovery after calving.

Give members Activity Sheet 10 as a pre-test. Let them work together after a few minutes.

What happens after the cow has calved? First, she must expel the placental membranes which usually takes no longer than 12 hours. Generally, the membranes are expelled within minutes after calving. Next, her uterus must return to its original size by expelling fluids and old tissues. This takes about 30 to 40 days. Then, the cow is ready to resume her normal 21-day estrous cycle. Normal cycles may range from 18 to 24 days.
The estrous cycle is characterized by heat periods (that time when she accepts the bull) at regular 21-day intervals. The heat period, itself, lasts for about 14 hours (range of 8 to 24 hours). This is the only time within the 21-day cycle that the cow will allow the bull to mate. If she mates, but does not conceive, she should be back in heat again 21 days later. This 21-day period of cyclic activity continues until she finally conceives, and when she does, heat periods stop. The cow will not mate again until after the calf is born.

As discussion evolves, describe the estrous cycle on chalkboard or other writing surface. Use Handout 17 as a reference and give each member a copy at the end of the lesson.

The reasons why the estrous cycle is 21 days long are very complex. Years of intensive research have been spent in determining the interactions involved in the cow's estrous cycle. The entire 21-day cycle revolves around hormone stimuli which, are cyclical in nature. Any malfunction in hormone production due to stresses such as disease and poor nutrition can upset the cow's estrous cycle and prevent her from breeding. Obviously, this is undesirable, so producers should take care of their cows so that these stresses are avoided. This can be accomplished through good management practices such as vaccinations against disease and feeding cows properly.

SUMMARY

Remember that cows are not seasonal in their sexual nature. After calving, the cow needs a 40 to 60 day recovery period in order to resume her 21-day estrous cycle. This cycle is characterized by heat periods which occur at 21-day intervals. If she conceives, heat periods stop, and the cow will not rebreed until after the calf is born. Keep in mind that disease and poor nutrition will upset the 21-day estrous cycle and prevent a cow from breeding. Good management will ensure that these problems are overcome.

FERTILIZATION PROCESS

Give members Handout 16, Major Reproductive Organs of the Cow. (Giving members a blank copy for them to label would enhance the learning experience.)

See if members, working in small groups, can outline or trace the fertilization process.

Discuss the outlines until process is correct and understood.

Now that we understand the estrous cycle of the cow, we should discuss what happens during fertilization. This process (fertilization) involves the union of sperm from the male with an ovum (egg) from the female. At mating, the male deposits semen (sperm-rich fluid) into the vagina of the female. The sperm cells migrate up the female reproductive organ to the oviduct where fertilization occurs. On its way to the oviduct, the sperm cells are partially separated into two groups: normal and abnormal cells. The group that reaches the oviduct is comprised mostly of normal cells. The first sperm cells reach the site of fertilization in the oviduct in less than five minutes. Once in the oviduct, the sperm cells undergo a six to 10 hour period of adjustment called capacitation. Unless capacitation is complete, the sperm cells cannot fertilize the egg.

At this point, the egg has not yet arrived at the site of fertilization. It generally does not get there until 24 hours after the cow initially exhibits heat. Therefore, the sperm cells spend time waiting for the egg to arrive. This is rather fortunate since the sperm need time to undergo capacitation.

Where has the egg been during all this? The egg has been sitting in a follicle on the ovary, waiting to be released. Release (ovulation) occurs about 24 hours into the heat period. Once ovulation occurs, the egg is quickly swept into the infundibulum, into the oviduct, and in a matter of minutes reaches the site of fertilization. There the sperm cells are waiting to unite with it. Even though millions of sperm cells are there waiting, only one does the actual fertilization. The waiting sperm cells surround the egg and attack it with chemicals which allow them to penetrate the wall of the egg. Once a single sperm penetrates deep enough, the egg reacts and does not allow any other sperm to penetrate the egg. In a sense

the door is closed behind that single entering sperm cell. Thus, the act of fertilization is completed. Sperm cells that did not enter the egg will die and be absorbed by the walls of the oviduct.

The result of fertilization is a new embryo which, after about 6 days, reaches the uterus and develops into a new calf. This development period is called gestation and lasts about 285 days.

SUMMARY

Sperm from the bull migrate to the site of fertilization and undergo a period of maturation called capacitation. This period lasts six to 10 hours. About 24 hours into the heat period, the egg is released and is quickly swept into the infundibulum and eventually into the oviduct. Once there, it is surrounded by millions of sperm cells, of which, only one is allowed to penetrate. Sperm cells which do not penetrate will die and be absorbed into the oviduct walls.

Discuss each term defined on Handout 17, Reproductive Definitions. Give each member Activity Sheet 10 again as a post-test or final review.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What information about a cow’s estrous cycle and/or the fertilization process was new to you?
2. Why is it important to understand the cow’s estrous cycle in your planning?

Process:

3. What problems may upset the estrous cycle and prevent a cow from breeding?

Generalize:

4. What are the economic and management implications of knowing about a cow's estrous cycle?
5. What other cycles impact livestock production? (weather, market cycles, etc.)

Apply:

6. What is the significance of each cycle that affects you as a livestock manager?
7. How will this discussion of cycles help you in the future?

GOING FURTHER:

1. Start a notebook for beef cattle materials. If the members continue to work with and raise cows, these materials will be beneficial.
2. Observe and record dates of a cow’s estrous cycle.

Leader Notes

REFERENCES:

Animal Reproduction — Principles and Practices, by A. M. Sorensen, Jr., McGraw-Hill Book Company

Author:

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THE COW'S ESTROUS CYCLE AND THE PROCESS OF FERTILIZATION

BEEF, LEVEL IV

Activity Sheet 10, Reproductive Definitions Worksheet

Fill in the blanks.

The cow's estrous cycle lasts for _____ days.

The 8 to 24 hour period that a cow will accept the bull for mating is called _____.

If a cow conceives after mating, the heat periods _____, and the cow will not rebreed until after calving.

A cow must recover from calving before she can rebreed. This recovery period may be lengthened by stresses such as _____.

The union of a sperm cell with an ovum is called _____.

Before sperm cells can fertilize an egg, the cells must undergo a period of maturation called _____.

The process of egg release is called _____.

The egg is released from a structure called the _____ .

Once ovulation occurs, the egg is captured by the _____ and is swept into the _____.

THE COW'S ESTROUS CYCLE AND THE PROCESS OF FERTILIZATION

BEEF, LEVEL IV

Leader's Key, Activity Sheet 10, Reproductive Definitions Worksheet

Fill in the blanks.

The cow's estrous cycle lasts for __21__ days.

The 8 to 24 hour period that a cow will accept the bull for mating is called the heat period.

If a cow conceives after mating, the heat periods stop, and the cow will not rebreed until after calving.

A cow must recover from calving before she can rebreed. This recovery period may be lengthened by stresses such as poor nutrition .

The union of a sperm cell with an ovum is called fertilization.

Before sperm cells can fertilize an egg, the cells must undergo a period of maturation called capacitation.

The process of egg release is called ovulation.

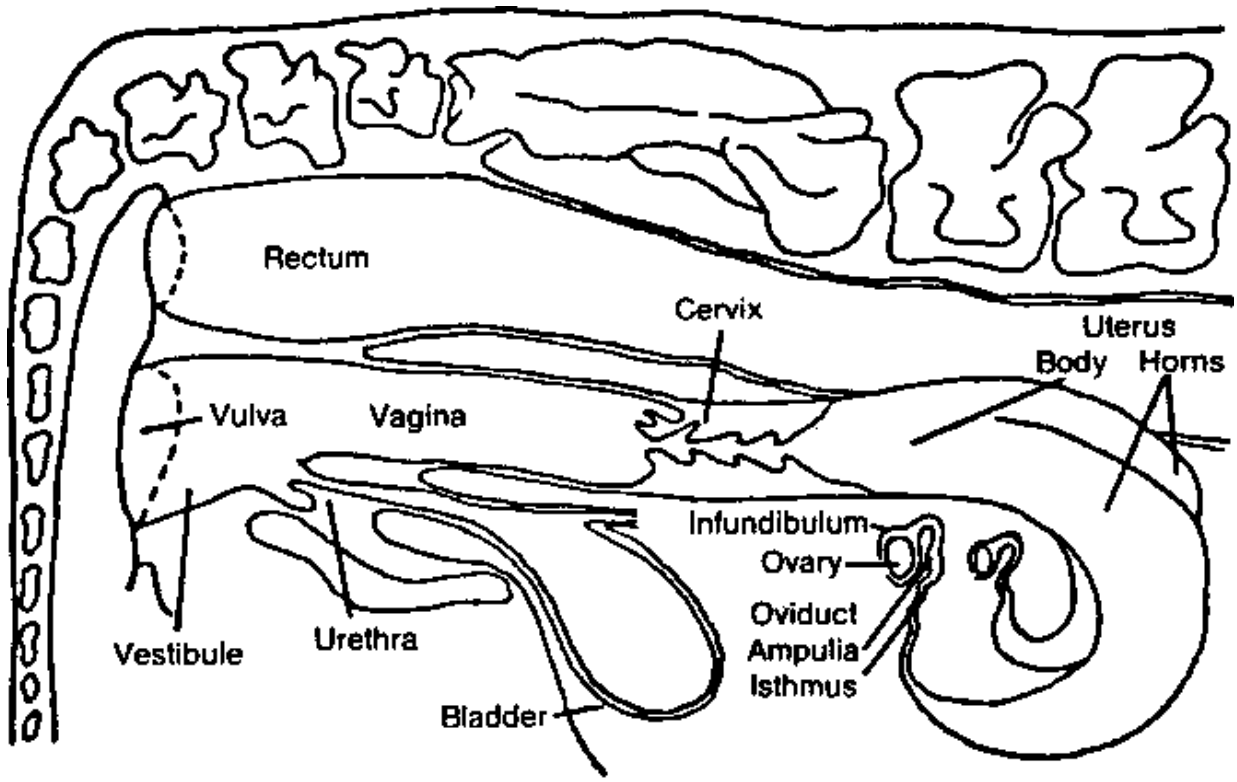
The egg is released from a structure called the ovary.

Once ovulation occurs, the egg is captured by the infundibulum and is swept into the oviduct.

THE COW'S ESTROUS CYCLE AND THE PROCESS OF FERTILIZATION

BEEF, LEVEL IV

Handout 16, Major Reproductive Organs of the Cow



THE COW'S ESTROUS CYCLE AND THE PROCESS OF FERTILIZATION

BEEF, LEVEL IV

Handout 17, Reproductive Definitions

Capacitation — maturation period that sperm cells must undergo after they enter the female reproductive tract. Only capacitated sperm cells can fertilize an egg.

Cervix — portion of the female reproductive tract that can sift or sort sperm cells based on physical character (normal versus abnormal). It also secretes a heavy mucus which plugs the reproductive tract during pregnancy to protect the embryo.

Conceive — term to indicate that fertilization has occurred.

Estrus cycle — time elapsed between two heat periods (estrus). Average length for the cow is 21 days.

Fertilization — the union of one sperm cell with an ovum (egg).

Follicle — clear, blister-like structure on the ovary where the egg is produced.

Heat — period of sexual receptivity (also called estrus) lasting about 8 to 24 hours. It is during this period only that a cow will accept the bull. These periods occur at 21-day intervals. If fertilization occurs, heat periods stop and the cow will not rebreed until after calving.

Hormone — chemical substance produced by a gland. This chemical affects the function of some organ other than the gland where it was produced.

Infundibulum — cup-like structure that captures the egg after it is released from the follicle.

Ovary — female reproductive gland which produces eggs and hormones for reproduction. A comparable structure in the male is the testicle.

Oviduct — long slender tube on the reproductive tract where fertilization occurs. Acts as a transport for the embryo from the site of fertilization to the uterus.

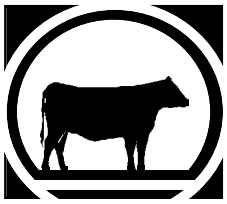
Ovulation — the process of egg release from a follicle on the ovary.

Ovum — another name for the egg.

Semen — sperm-rich reproductive fluid from the male.

Sperm — a single cell unit from the male necessary to fertilize an egg.

Vagina — a portion of the female reproductive organ which acts as the receptive chamber for the male reproductive organ during mating.



Pregnancy Detection

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Parts of the female reproductive tract
- Procedure for palpating for pregnancy
- Why accurately detecting pregnancy is important to the beef cattle producer

ABOUT THEMSELVES:

- Importance of planning ahead for major decisions

Materials Needed:

- Plastic or rubber gloves
- Lubricant — liquid soap, mineral oil, petroleum jelly
- Handout 18, Working Chute
- Handout 19, Major Reproduction Organs
- Handout 20, Beginning Palpation Procedures
- Handout 21, 45-Day Pregnancy
- Handout 22, 90-Day Pregnancy
- Handout 23, 150-Day Pregnancy
- Handout 24, 210-Day Pregnancy

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

In an effort to make a profit, beef cattle producers must strive for a high calf crop percent and heavy weaning weights. Cows producing one calf every 12 months and cows calving early in the calving season are two ways to maximize cow-calf performance. Being able to identify the non-pregnant cow can greatly enhance profit potential.

The pregnancy detection procedure should be inexpensive, highly accurate, and conducted at the ranch by ranch personnel. One inexpensive way that ranchers can check for pregnancy is to observe signs of estrus (heat) after the breeding season is over. The problem associated with estrus detection as a pregnancy detection procedure is that it is very time-consuming and not very accurate. Pregnancy detection by palpation is more accurate and also is inexpensive when done by ranch personnel. Anybody can learn the proper technique of palpating for pregnancy but it requires experience, practice, and a thorough knowledge of the cow's reproductive system.

The secret to accurate pregnancy detection by palpation is practice. Once the basic procedure and technique is learned, practice is necessary to become accurate and efficient at pregnancy detection.

FACILITIES AND SUPPLIES

Facilities are very important when checking for pregnancy. It is important for cattle not to develop an uncomfortable attitude toward the working facilities. The facilities used for palpation are very similar to those used for artificial insemination. On most ranches the same facilities are used for both activities.

Pass out Handout 18, Working Chute.

A working chute that is long enough to hold a minimum of three cows is necessary. The most time consuming activity during pregnancy detection is getting the cows into the chute. Therefore, having three or more cows in a working chute or alley reduces that time frame.

A gate should be located in the working chute just behind the cow that is to be palpated. This may at first seem like a luxury item. It, however, doesn't take very long at climbing a fence to change one's mind. This gate should swing all the way across the alley and be able to latch securely. This prevents cows from coming up behind the palpator and possibly causing an injury.

The working chute should be wide enough so the cattle can stand normally and quietly. A head gate is not necessary; however, a bar behind the cow to hold her in the working chute is. Cutting gates can be arranged according to one's need for cow separations.

Safety precautions are necessary for both the palpator and the cow. To protect the palpator it is necessary to have a bar or chain behind the cow that is to be palpated. A gate in front of the next cow that is to be palpated is also an important safety item. Protection of the cow includes keeping chutes in good repair and restraining cows so they cannot jump out, turn around or turn over. A dirt floor in the working chute and protective shade are also safety considerations.

Show supplies.

The only supplies needed for the pregnancy detection process are plastic or rubber sleeves and a lubricant. The plastic sleeves are relatively inexpensive, and they protect the palpator's arm and hand against disease and eliminate irritation. Some plastic sleeves are very thin and are designed to be used only once. Other sleeves, however, are somewhat thicker and can be used on many cows before discarding.

Many different lubricants can be used. Liquid soap, mineral oil, and petroleum jelly are just a few. Mild liquid soap, however, should be diluted with water which makes it a good, inexpensive lubricant. Mineral oil and petroleum jelly are excellent lubricants but are very expensive. The purpose of a lubricant is to make the entry through the anus into the rectum as easy as possible without discomfort to the animal or palpator.

REPRODUCTIVE TRACT

To accurately determine pregnancy, palpators must insert their hand into the cow's rectum, locate the reproductive tract through the rectal wall, and determine whether a condition of pregnancy exists. Since the procedure is performed using only the sense of touch, the palpator must know where all the reproductive organs are located and how they feel at different stages of pregnancy.

Pass out Handout 19, Major Reproductive Organs of the Cow.

Vulva — The vulva is the external portion of the female reproductive tract and consists of two lips or labia. The vulva serves as the entrance to the internal organs and also allows for passage of urine.

Ask members to name and discuss purpose and function of each part before sharing the text. Cover labels on diagram to see if members can properly identify each part.

Vestibule — The vestibule is the general passageway to the urinary and reproductive tracts. It extends inward from the vulva for about four inches to where the urethra opens into its ventral surface from the bladder.

Vagina — The vagina is the tube that lies between the vestibule and the cervix. The bull deposits sperm in the vagina during mating. The vagina is normally 12 inches long.

Cervix — The cervix is the organ that separates the vagina from the uterus. It is composed primarily of connective tissue with longitudinal folds or annular rings. The cervix's primary function is to prevent unwanted organisms and substances from entering the uterus. During estrus, however, it dilates and produces large amounts of mucous (clear discharge). The cervix is usually about three inches long, but its size may vary with age and breed. For example, a heifer usually has a smaller cervix than a mature cow. The cervix is an important organ in palpation and is usually easy to locate because it has a hard, gristly feel.

Uterus — The uterus lies on the floor of the pelvis directly in front of the cervix. The uterus consists of a body and two uterine horns that coil downward. The uterus contains the fetus during pregnancy. It has two layers—a muscular inner layer and a mucosal lining. From the mucosal lining protrude about 70 to 120 structures called caruncles that allow for attachment by the fetal membranes during pregnancy. The location and feel of the uterus will depend upon the stage of pregnancy and the age of the cow.

Oviducts — Two small tubes that extend from the uterine horns to the ovaries are called the oviducts. At the end of each oviduct a funnel-like structure is present that partially surrounds the ovary and receives the egg. Fertilization normally occurs in the oviduct.

Ovaries — The ovaries are the oval or almond-shaped organs at the ends of the oviducts that release eggs and secrete hormones. Each ovary consists of an inner segment and an outer segment. The inner segment is composed of blood vessels, nerves, and connective tissue; the outer segment is the site of the primordial follicles, which are the immature eggs surrounded by a layer of cells. The ovaries are suspended in the body

cavity by ligaments attached to the top of the abdominal cavity. In a cow they are about ½ inch wide, ¾ inch deep, and 1 inch long and should feel firm.

PALPATION PROCEDURE

As the cow is being restrained in the working chute, the palpator should:

1. Put the sleeve on — either hand may be used, but many palpators use their left hand. The sleeves, however, are interchangeable. The sleeve is put on and pulled all the way to the shoulder. A rubber band can be placed around the upper arm to help hold the sleeve in place. Lubricant is squeezed on the front and back sections of the gloved hand up the sleeve.

Pass out Handout 20, Beginning Palpation Procedure.

2. The covered, lubricated hand should be shaped like a wedge by bringing the fingers together and pushing into the anus and rectum. The free hand may be used to grasp the tail for leverage. As the hand goes through the anus, form a fist to push aside fecal matter and straighten the folds of the rectum. Insert fist and arm into the rectum up to the elbow. With arm in elbow deep, the cow's rectum will usually relax. The hand is then opened and the search for the reproductive tract begins.

Rectal contractions may occur which may make palpation very difficult. These contractions will subside. These contractions should not be fought, but should be allowed to pass.

Puncturing the rectum rarely occurs, but it can happen. Many times following palpation, blood is observed on the gloved hand. This is due to the lining of the rectum being damaged. There is no cause for great alarm; however, special attention is always required in carefully manipulating the rectum.

3. Once the arm is in the rectum about elbow deep, feel downward — not forward. The rumen and kidneys are located forward and can be palpated but will not help in the determination of pregnancy.

The open and early pregnant uterus will be located on the floor of the pelvis. The pelvis, which is bone, will not move and is a good beginning point of identification immediately after entering the rectum. As pregnancy progresses, the uterus will become larger and drop over the edge of the pelvic rim or girdle. The other landmark to locate inside the cow is the cervix. The cervix is a gristle-like structure which resembles the feel of a turkey neck. Unlike the pelvis, the cervix is not bone and will move depending on the stage of pregnancy. Once the cervix is located, the uterus is the next structure. Once again, reach down, not forward, to locate the uterus.

DETERMINING STAGES OF PREGNANCY

Non-Pregnant Stage

Use Handout 20, Beginning Palpation Procedure, to discuss the non-pregnant stage.

A non-pregnant reproductive tract of a heifer is much different than a non-pregnant reproductive tract of a cow. A heifer's non-pregnant tract will usually be located within the pelvis and be rather small. Sometimes, the reproductive tract of a heifer is not located on the floor of the pelvis, but along the side wall of the pelvis. Therefore, one might have to search

along the pelvis wall to find a heifer's non-pregnant reproductive tract. The non-pregnant tract of a cow, however, is larger than that of a heifer. It is usually located on the pelvic floor and may even extend over the rim of the pelvis. Many times it is necessary when palpating a cow's extended reproductive tract to actually pick it up and pull it toward you to determine pregnancy. When palpating the non-pregnant uterus there will be an absence of embryonic fluid and tissue.

45 Days Pregnant

Pass out Handout 21, 45-Day Pregnancy.

One must use extreme caution when palpating a cow or heifer that might be less than 45 days pregnant. Too much handling of the fetal tissue might cause the fetus to abort. This stage of pregnancy, therefore, requires additional palpation experience. The location of the uterus that contains a 45-day-old fetus will be approximately the same location as a non-pregnant uterus. A slight enlargement of one horn, however, can be determined. A fluid-filled feeling is also noticeable. This is because after the fertilized ovum has moved into the uterine horn and begun to develop, it is surrounded by a sac filled with fluid. This sac causes an enlarged area in the horn. It is called the embryonic vesicle. Once skills have been developed at palpating a 45-day pregnancy, one can also feel the fetal membranes by slipping them through the fingers. The fetus at this stage is only 1 inch long.

90 Days Pregnant

Pass out Handout 22, 90-Day Pregnancy.

The uterus will be located over the pelvic rim due to the increase in fluid and fetal weight. The fetus is about 6½ inches long or about the size of a rat. At this stage of pregnancy, the palpator must locate clues other than the fetus itself to determine pregnancy. The displacement of the uterus is one clue that would indicate pregnancy. A second clue to determine pregnancy at this stage is the presence of cotyledons. Cotyledons are ¾ to 1 inch in diameter and are the connection between the fetal tissue and the uterine tissue. A palpator must reach down over the pelvic rim to locate the cotyledons. They will feel much like marbles. The cotyledons on the fetal membrane attach themselves to the caruncles that line the uterus. The caruncles serve as waste and nutrient exchange between the fetus and the cow. The uterine artery is the main blood supply from the cow to the developing fetus.

150 Days Pregnant

Passout Handout 23, 150-Day Pregnancy.

The uterus will be very heavy and pulled deep into the abdominal cavity. The cervix will be located at the rim of the pelvis. The fetus will be 12 to 16 inches long (about the size of a cat) and very difficult to reach. The cotyledons, however, will be larger and easier to locate. Once again, the palpator must reach downward over the pelvic rim to palpate the cotyledons.

200 Days Pregnant

Pass out Handout 24, 200+ Days Pregnancy.

At this stage of pregnancy the fetus may be large enough to palpate. The fetus can be as large as 24 to 32 inches long. The cervix at this point of pregnancy may be bent over the pelvic rim.

Leader Notes

SUMMARY

Anybody with the desire to learn the technique of pregnancy detection can do so. The ability to determine pregnancy in cows is not limited to one's age, background or whether one is a boy or a girl. One does need, however, the initial training in pregnancy determination to learn the basic ideas. Once that has been achieved, practice is what makes an individual good at palpating cows for pregnancy. Pregnancy testing cows by palpation is an inexpensive, highly accurate procedure that can be conducted on the ranch by ranch personnel.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What facilities and supplies are needed for pregnancy checking cows? List and discuss why needed.
2. What safety precautions should be used during pregnancy checking?

Process:

3. Why is a knowledge of the anatomy of the bovine reproductive tract necessary for pregnancy detection?
4. Why is early pregnancy detection important in beef production?
5. What might be the pitfalls of assuming, but not proving, pregnancy in a heifer?

Generalize:

6. What are the economic consequences of using pregnancy detection? Of not using pregnancy detection?

Apply:

7. If you or your family own a cowherd how will what you have learned help in future management?
8. Why is it important to plan ahead for major decisions?

GOING FURTHER:

1. Observe pregnancy testing demonstration.
2. Receive further instruction and training and learn technique of palpation for pregnancy.
3. Use breeding records as an aid in pregnancy diagnosis.
4. Plan to attend a palpation clinic sponsored by your county Extension agent.
5. Accompany and work with someone who is pregnancy checking cattle.
6. Visit someone who uses ultrasound pregnancy checking devices.

REFERENCES:

The Stockman's Handbook, Ensminger, M. E., The Interstate Printers and Publishers, Inc., Danville, Illinois

The Bovine Estrous Cycle: Dynamics and Control, T. R. Troxel and D. J. Kesler, University of Illinois, Cooperative Extension Service, Urbana-Champaign, Illinois

Fertility and Sterility, H. D. Hafs and L. J. Boyd, Hoard's Dairyman, Fort Atkinson, Wisconsin

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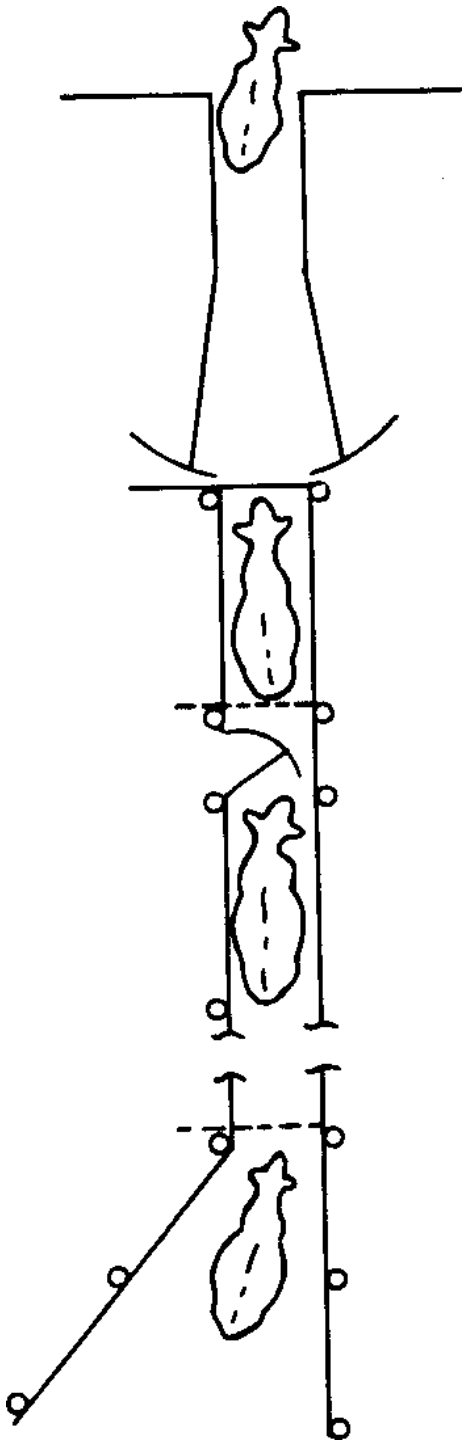
PREGNANCY DETECTION

BEEF, LEVEL IV

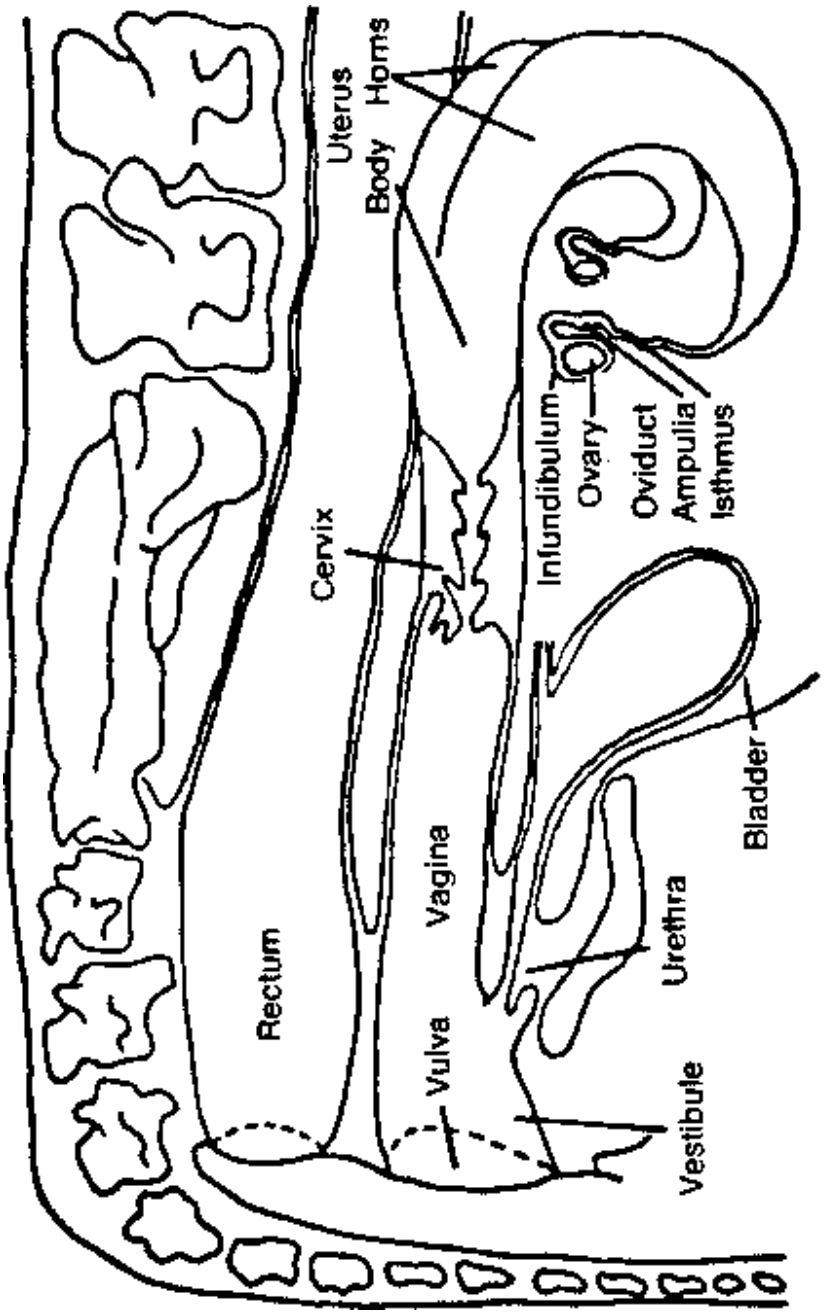
Handout 18, Working Chute



PREGNANCY DETECTION

BEEF, LEVEL IV

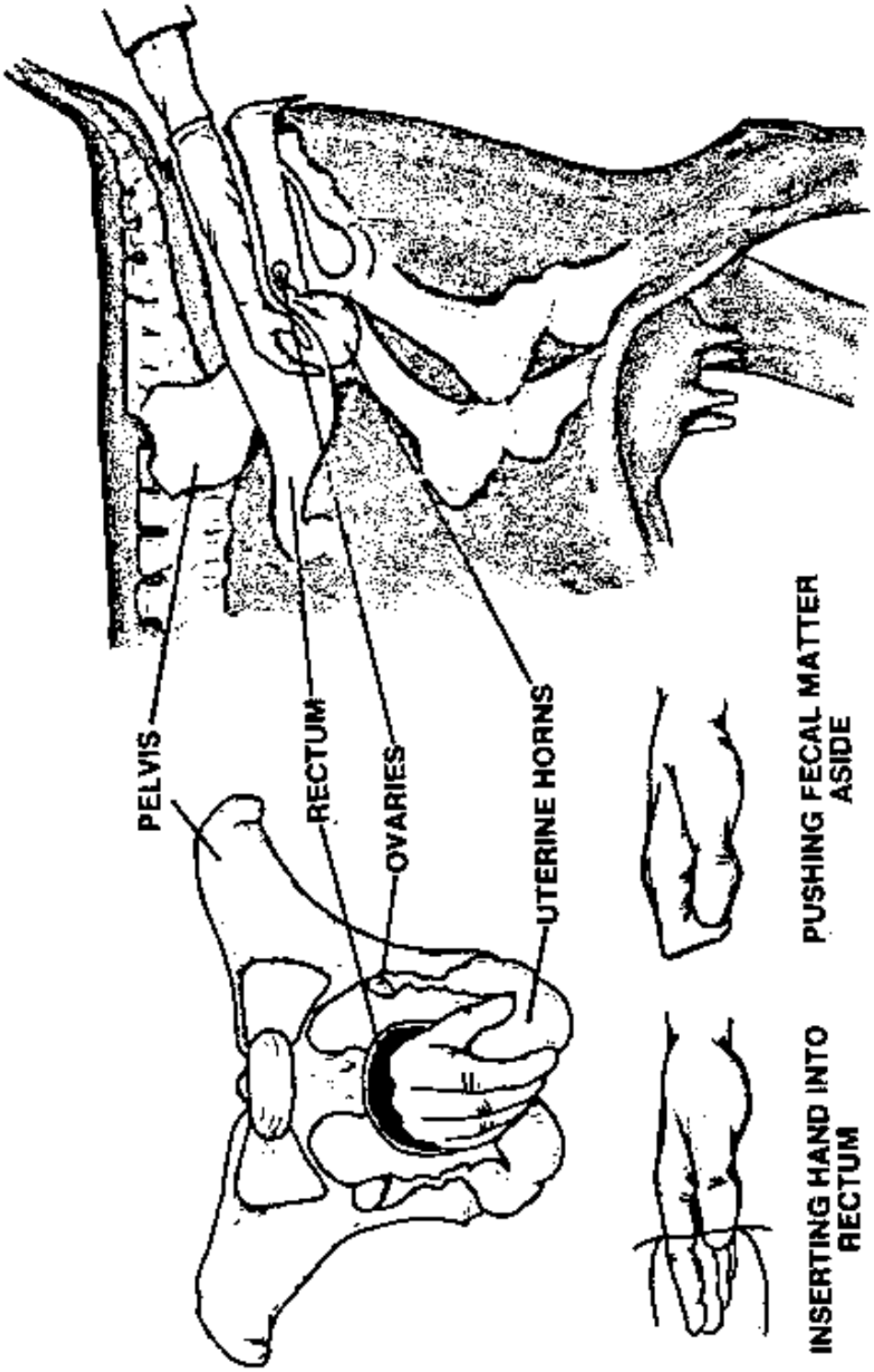
Handout 19, Major Reproductive Organs of the Cow



PREGNANCY DETECTION

BEEF, LEVEL IV

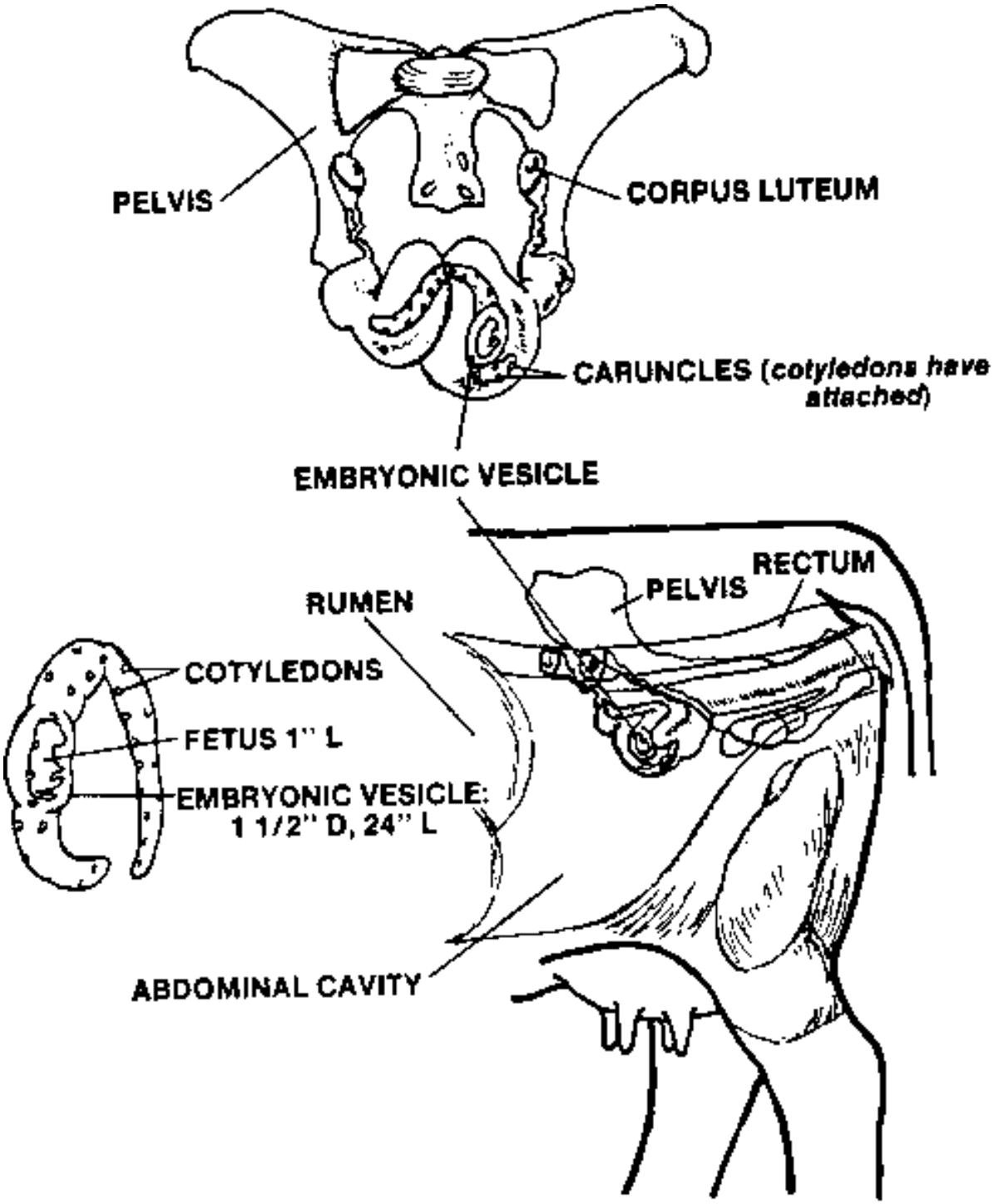
Handout 20, Beginning Palpation Procedure



PREGNANCY DETECTION

BEEF, LEVEL IV

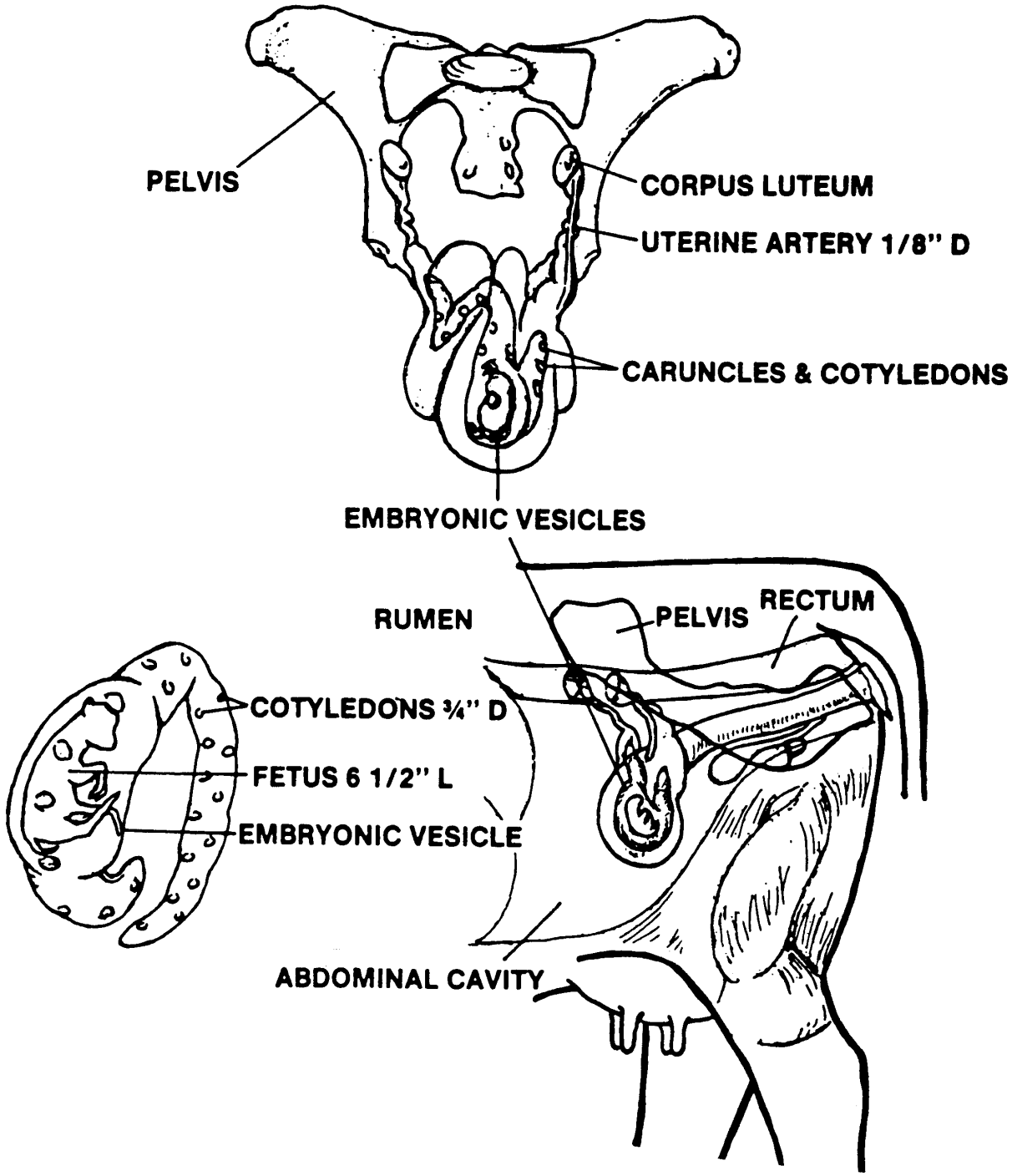
Handout 21, 45-Day Pregnancy



PREGNANCY DETECTION

BEEF, LEVEL IV

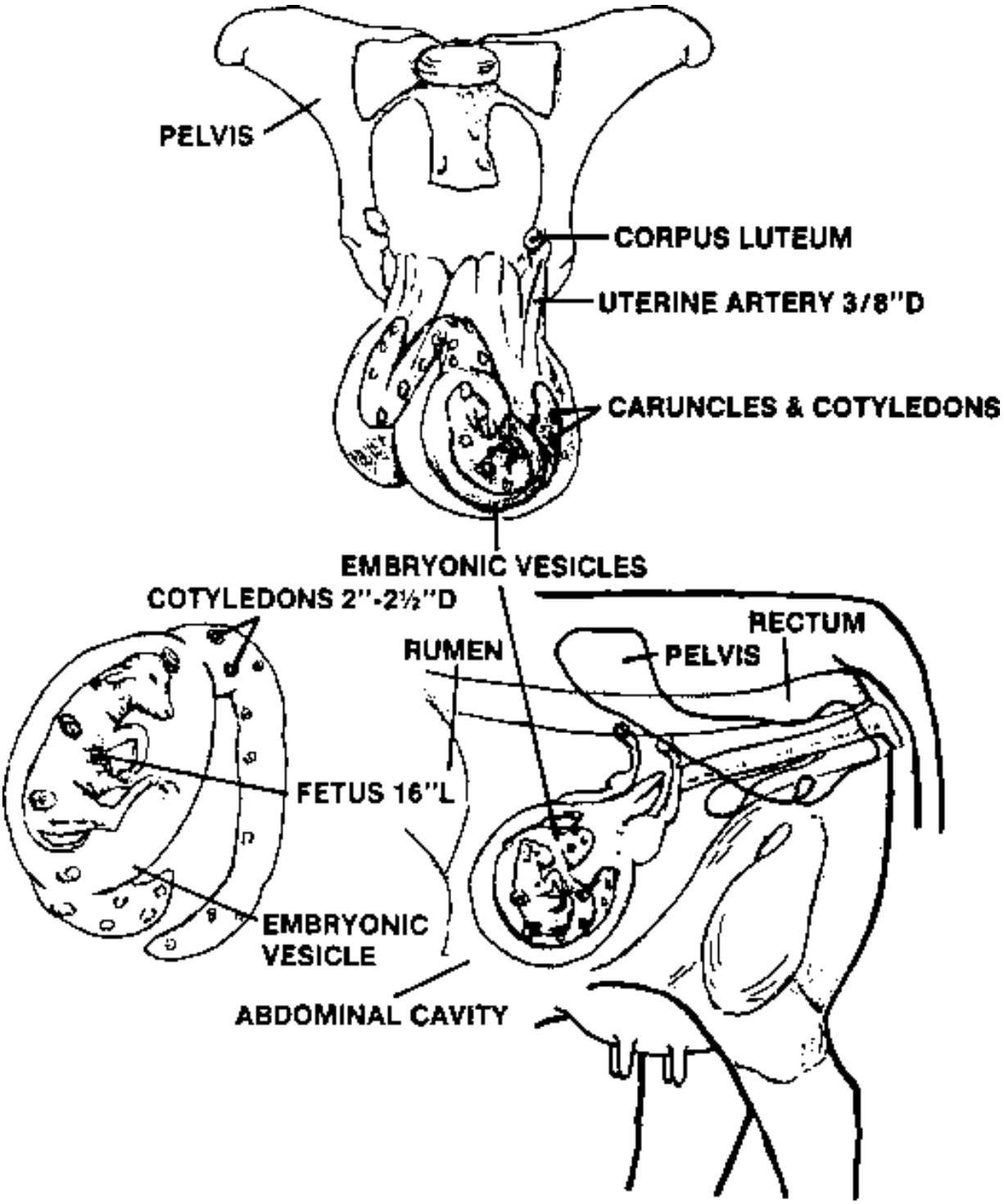
Handout 22, 90-Day Pregnancy



PREGNANCY DETECTION

BEEF, LEVEL IV

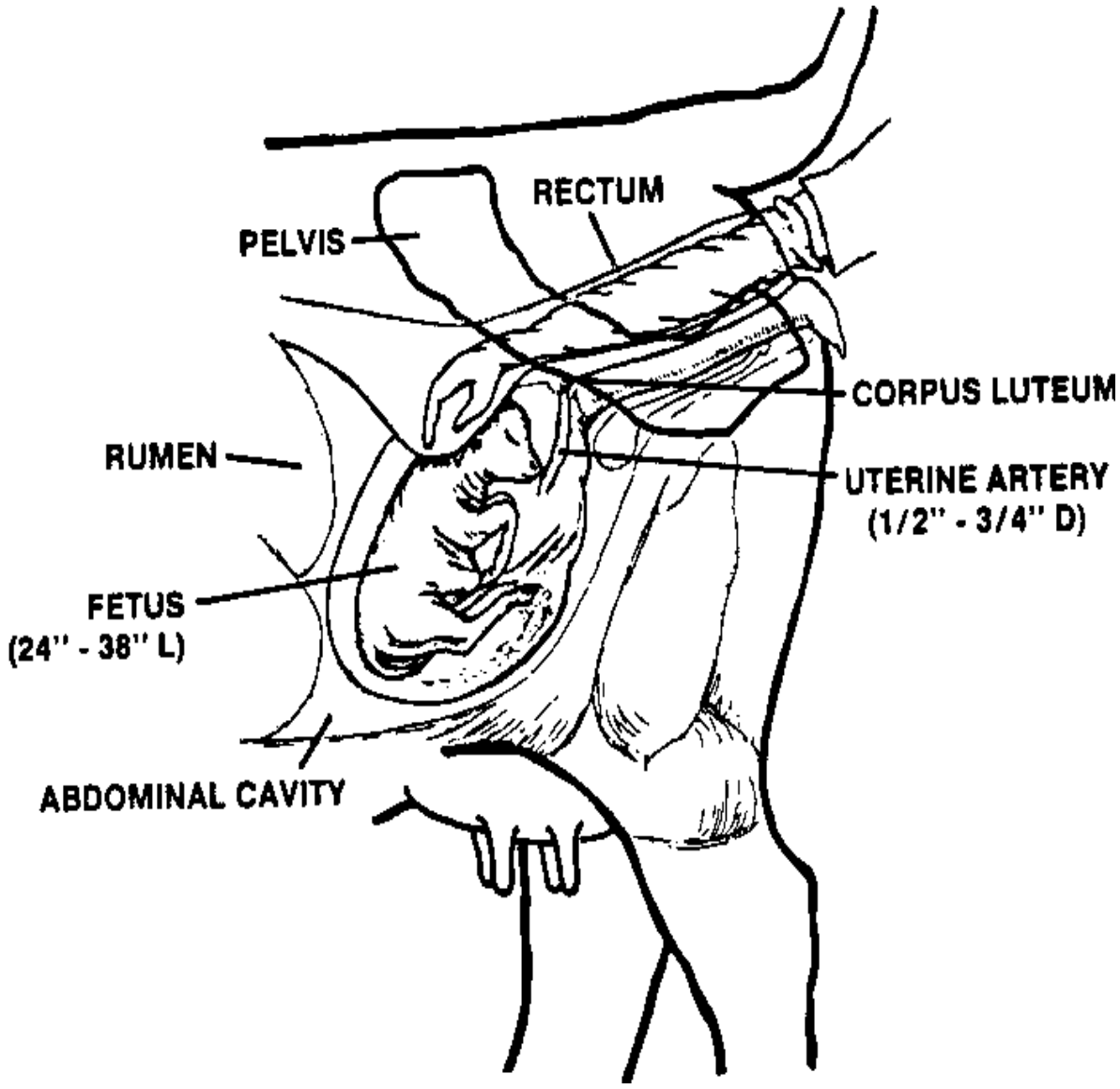
Handout 23, 150-Day Pregnancy



PREGNANCY DETECTION

BEEF, LEVEL IV

Handout 24, 210-Day Pregnancy



Assisting in Difficult Births

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Normal calving process
- When a cow or heifer may be experiencing a difficult birth
- How to assist a cow or heifer during a difficult birth
- Management practices that reduce animals with calving problems

ABOUT THEMSELVES:

- Importance of understanding the birth process
- The value of being prepared for potential emergencies

Materials Needed:

- Activity Sheet 11, Difficult Births—Worksheet
- Leader's Key, Activity Sheet 11, Difficult Births—Worksheet
- Handout 25, Difficult Births—Definitions
- Handout 26, Birth Presentations (2 pages)

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Leader Notes

Beef heifers calved at 2 years of age experience difficult calving (dystocia) much more frequently than do mature cows (approximately 45 percent versus 5 percent). Most dystocia is due to high birth weight of the calf and/or small pelvic area of the dam. Injuries received during difficult birthing may cause death of the calf which will reduce both the calf crop and the profit margin.

In order to decrease calf and cow losses from dystocia, one must be able to decide when, what, and how assistance is to be given, or if a veterinarian needs to be contacted to perform a Cesarean section. Attempting to aid the cow at the wrong time with the wrong equipment may be just as harmful as not helping a cow with a simple dystocia problem.

THE NORMAL CALVING PROCESS

The member must be able to recognize the normal calving process before he or she can recognize abnormal calving. As cows and heifers approach the time of calving, the udder and abdomen become distended. The vulva becomes enlarged and flabby, and the area between the tail-head and pinbones becomes loose and sunken. Normal birth occurs in three stages:

Divide members into small groups. Have each group outline, describe or diagram the normal calving process. Have each group share their process.

STAGE 1

The cow may show signs of uneasiness and may kick at her stomach. She is alert and may otherwise behave normally. The uterine muscles begin to contract about once every 15 minutes, which starts the birth process and

See how many items on Handout 25, Difficult Births—Definitions, that members can explain and discuss before giving them a copy.

Show an illustration of a normal presentation of a calf using Handout 26, Birth Presentations.

also dilates (enlarges) the cervix. These uterine contractions will become more frequent and more intense as labor progresses. The calf is usually right side up, forelegs in the birth canal, with its head resting between legs. The first stage lasts two to three hours in a cow, and four to six hours in a heifer. Appearance of the feet or a water sac in the vulva marks the beginning of stage two, and ordinarily birth will occur within 30 minutes to four hours later. If a cow is moved or excited during the first two stages, she may delay calving.

STAGE 2

Stage two of labor (the delivery stage) is more intense. It may last up to four hours or longer in heifers. The cow becomes unaware of her surroundings and concentrates on uterine contractions. The stage begins with the movement of the calf's head into the birth canal. Each uterine contraction forces the head into the cervix, and will complete the dilation of the cervix. The cow may be lying or standing, but she will be straining for prolonged periods in her efforts to push the head of the calf through the birth canal. Once the feet and legs appear, do not hurry the process and chance tearing the vulva. Extra time is required to dilate and stretch the tissues of the vulva. The calf's life is not in danger, and it can survive for up to eight or 10 hours if delivery does not progress beyond this point. However, calving should be completed within two to three hours once the feet or water bag first appear.

After the head appears, the rest of the calf's body is generally passed quickly without much effort. Mucus and fluid will flow from the calf's mouth and nostrils, cleaning the respiratory passages for normal breathing. Within an hour, the calf should be standing and licked dry by the cow. It is necessary for the calf to suckle the cow shortly after birth to receive colostrum (first milk) that is rich in nutrients and antibodies.

STAGE 3

Also called the membrane expulsion stage, stage three is the final stage of labor where fetal membranes are passed. These tissues should be passed within one-half hour to 12 hours after birth.

If retained for longer than 12 hours, infection may occur and antibiotic treatment will be required.

A careful examination of the cow is probably the most critical step in assisted deliveries. Care should be taken to be as sanitary as possible and to use liberal amounts of lubricant with a rubber sleeve. An examination should be made if no progress is evident for two to three hours after appearance of water sac or feet.

First, examine the cervix. If the cervix is not dilated, either you are interfering too soon, or there may be a more serious problem requiring professional help. The cervix begins dilation from the inside out, and at complete dilation, the cervix is 6 to 7 inches wide.

Next, check for signs of life in the unborn calf. If alive, pinching or pulling the leg, eye, mouth, or anus will elicit movement. Absence of vital signs, sloughing of hair and/or foul odors may indicate a dead calf.

Finally, determine the presentation, position and posture of the calf. In many situations, one only needs to "rearrange" the calf in the uterus, and delivery may take place without force. Pulling a calf should **only** occur when the calf is in a normal presentation (forward or backward), posture and position.

Excess force should never be used. Forcing a large calf through a small pelvis generally results in death of the calf and injury, paralysis or death of the cow. The only safe procedure for removal of a calf too large for the pelvic opening is Cesarean section (Refer to figures 1 to 8 for specific abnormal presentations).

Show and discuss Figures 1 to 8 on Handout 26, Birth Presentations.

If assistance is required, first attach obstetrical chains to the calf's front legs. Use a double loop on each leg positioned so that one pulls from the back, not the front of the legs. Never use fence stretchers, tractors, trucks, or other brutal extremes of force. A mechanical calf puller is the only safe method.

Show this equipment if available.

Traction on the calf in early stages of assistance should always be straight backward when the calf has entered the birth canal, and then downward once the calf begins passing through the birth canal.

If the pelvic opening is small, pull alternately on each leg to allow the shoulders of the calf to pass through separately. Pull or apply pressure during a contraction, and rest between contractions. Conversely, when manipulating a calf to a more desirable position prior to pulling, move the calf between contractions and rest during the contractions.

Occasionally, the hips of a calf encounter difficulty passing through the pelvis (called hiplock). Rotate the calf's body slightly to get a different angle for the hips to pass through the pelvis.

ASSISTANCE POST DELIVERY

Once the calf is on the ground, make sure its nostrils and mouth are cleared of mucus or fluid and the calf is breathing normally. If the calf continues to have trouble breathing, lift it by the rear legs and shake or swing back and forth. Mouth to nostril respiration may be used if all else fails.

The fetal membranes are usually expelled by the cow within 12 hours. **do not** manually remove the placenta. If the placenta is retained, treatment with a broad spectrum antibiotic is necessary until the cow has cleaned. Retained placentas occur even in healthy herds. Vitamin A, phosphorus and selenium deficiencies increase the incidence of retained placentas.

Leader Notes

MANAGEMENT TO DECREASE INCIDENCE OF DYSTOCIA

List Dystocia Management Tips

- Check heifers three to four times daily.
- Give assistance when needed.
- Meet nutritional demands of growing heifers.
- Select herd bulls utilizing current genetic information on calving ease.

Dystocia may also be reduced by selecting herd sires from breeds and with birth weight genetic information, such as EPDs (expected progeny differences), that will allow their successful mating with heifers. The management program for raising replacement heifers should be designed to produce a heifer of adequate size and weight through carefully planned nutritional and breeding programs.

SUMMARY

It is often difficult to decide exactly when to give assistance during calving. Knowing the normal birth process and being aware of the causes of dystocia (difficult calving) is a necessary first step in making these decisions.

It is also important to realize that attempting to aid a cow at the wrong time with the wrong equipment may be just as harmful as not helping.

DIALOGUE FOR CRITICAL THINKING:

Pass out Activity Sheet 11, Difficult Births—Worksheet, as a review.

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What are the indications of a normal calving process? What are the indications of a difficult birth? Discuss.
2. What steps can you take to be prepared for calving difficulties?

Process:

3. What experiences have you had or not had in deliverying calves?
4. What symptoms might indicate that assistance from you or a veterinarian may be needed?
5. What are some ways to prevent calving difficulties before heifers are bred?

Generalize:

6. What resources are available to you if you encounter a difficult calving problem?

Apply:

7. How might what you've learned in this lesson be applied to other 4-H projects?

GOING FURTHER:

1. Members may visit a large animal veterinary clinic that routinely handles dystocia problems. Equipment used, such as stalls, lubricants, and sleeves, would be of interest to see and touch.
2. Members could visit ranches where special attention is given to heifers and/or cows during the calving season. Facilities, equipment and management practices should be noted.
3. Members could observe a normal calving process.

REFERENCES:

Animal Reproduction, Principles and Practices, A. M. Sorenson, Jr., ISBN #0-07-059670, 1979, McGraw-Hill
Kansas Beef Cattle Handbook

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Cooperative Extension Service
Kansas State University
Manhattan

ASSISTING IN DIFFICULT BIRTHS

BEEF, LEVEL IV

Activity Sheet 11, Difficult Births—Worksheet

1. _____ is another term used to describe calving difficulty.
2. The major factor responsible for calving difficulty in beef heifers is _____.
3. A calf should only be pulled when in the normal _____ , _____ and _____ for delivery.
4. A _____ _____ is the only safe procedure for delivery of a large calf and a too-small pelvic opening.
5. Smooth muscle contractions in the uterus enlarge or dilate the _____ to allow for passage of the calf.
6. If the _____ is retained for longer than 12 hours, antibiotic treatment is necessary to prevent infection.
7. An examination should be made of the cow and fetus if no progress is evident for _____ hours after appearance of the feet or fetal membranes.
8. Lack of movement and/or foul odors may indicate that the calf is _____ .
9. List and define the three stages of the normal calving process.
10. True or False. Close selection of replacement heifers and bulls for breeding may help reduce incidence of calving difficulty.

ASSISTING IN DIFFICULT BIRTHS

BEEF, LEVEL IV

Leader's Key, Activity Sheet 11, Difficult Births—Worksheet

1. Dystocia is another term used to describe calving difficulty.

2. The major factor responsible for calving difficulty in beef heifers is high birth weight .

3. A calf should only be pulled when in the normal presentation , posture and position for delivery.

4. A Cesarean section is the only safe procedure for delivery of a large calf and a too-small pelvic opening.

5. Smooth muscle contractions in the uterus enlarge or dilate the cervix to allow for passage of the calf.

6. If the placenta is retained for longer than 12 hours, antibiotic treatment is necessary to prevent infection.

7. An examination should be made of the cow and fetus if no progress is evident for 2 to 3 hours after appearance of the feet or fetal membranes.

8. Lack of movement and/or foul odors may indicate that the calf is dead .

9. List and define the three stages of the normal calving process.

   Stage 1. Cow is uneasy, uterine contractions begin and cervix dilates. Feet or water sac in the vulva at end of stage 1.

   Stage 2. Delivery stage. Calf is born.

   Stage 3. Membrane expulsion stage. Fetal membranes are passed.

10. True or False. Close selection of replacement heifers and bulls for breeding may help reduce incidence of calving difficulty. TRUE

ASSISTING IN DIFFICULT BIRTHS

BEEF, LEVEL IV

Handout 25, Difficult Births - Definitions

1. **Dystocia** — difficult or prolonged labor. In cattle, caused by high birth weight or small pelvic area, mainly seen in heifers.

2. **Cesarean section** — surgical removal of a fetus.

3. **Vulva** — exterior opening of the female reproductive tract.

4. **Uterus** — major part of the reproductive tract of the female. Area where the fetus grows and develops.

5. **Cervix** — portion of the female reproductive tract that connects the vagina and vulva to the uterus, and secretes a heavy mucus which plugs the reproductive tract during pregnancy to protect the embryo and fetus from germs.

6. **Vagina** — a portion of the female reproductive tract which acts as the receptive chamber for the penis during mating.

7. **Ovary** — female reproductive gland which produces eggs and hormones for reproduction. A comparable structure in the male is the testicle.

8. **Uterine contractions** — contractions of the smooth muscles of the uterus to enlarge the cervical opening to allow passage of calf during birth.

9. **Amnion** — fetal membrane filled with fluid that immediately surrounds the fetus. The amnion protects the fetus from injury during pregnancy. Amnionic fluid may help lubricate the birth canal.

10. **Birth canal** — part of the reproductive tract of the cow that passes through the pelvis. A small pelvis or birth canal is a major factor in dystocia.

11. **Placenta** — fetal tissues that attach to the uterus and enable the fetus to receive nutrients from the blood supply of the cow. The placenta is attached to the uterus until after birth is completed and usually passes out of the cow within 12 hours after birth.

12. **Presentation of the calf** — the direction of delivery, either frontwards, backwards or crosswise.

13. **Position of calf** — how calf is lying, either upside down or right side up.

14. **Posture of calf** — the position of the head and legs of the fetal calf.

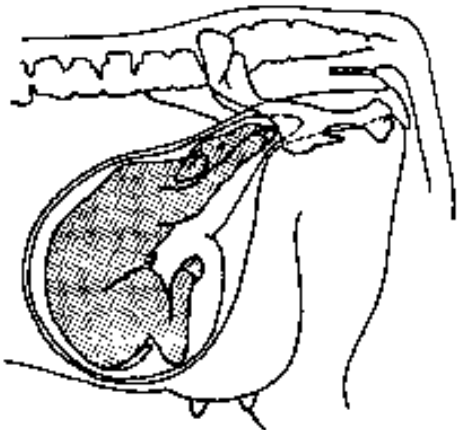
15. **Water sac** — fetal membranes containing fluid that protrude from the vulva during labor before the calf is expelled.

ASSISTING IN DIFFICULT BIRTHS

BEEF, LEVEL IV

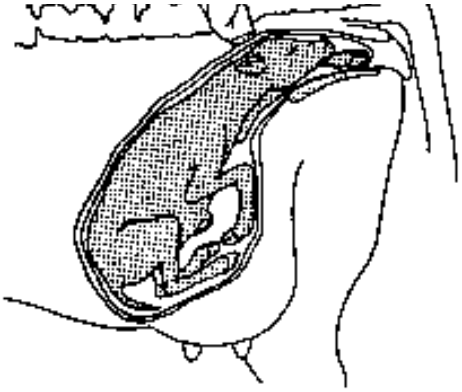
Handout 26, Birth Presentations

Normal Presentation

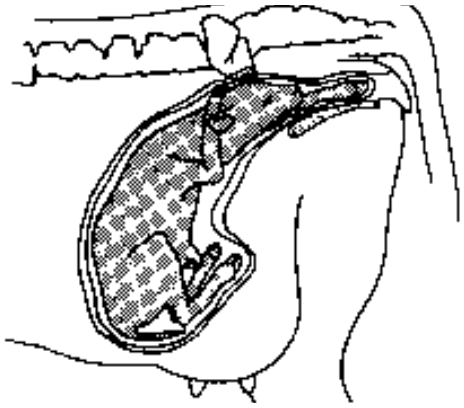


Abnormal Presentations

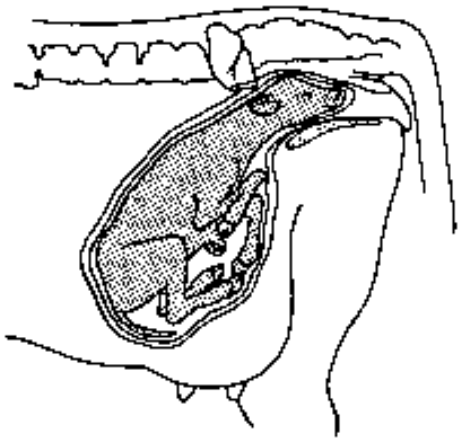
1. Head first with one or both legs bent backwards.

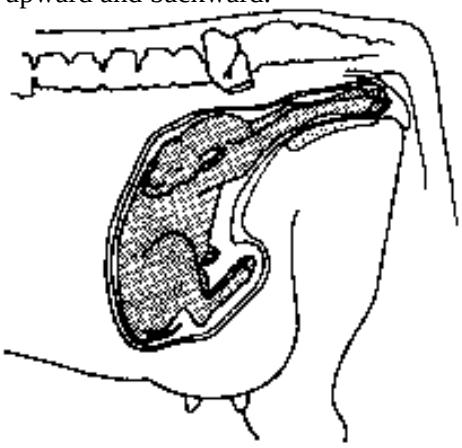


2. Head and foot first with one leg crossed over the neck.



3. Front feet first with the head twisted upward and backward.





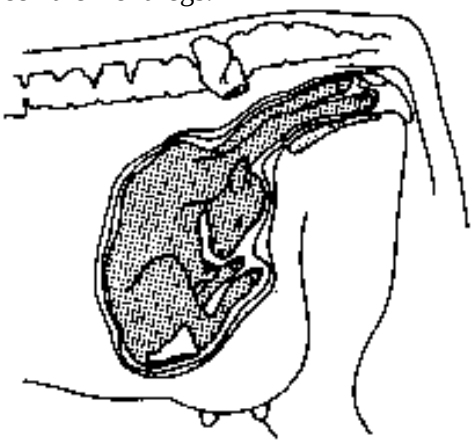
ASSISTING IN DIFFICULT BIRTHS

BEEF LEVEL IV

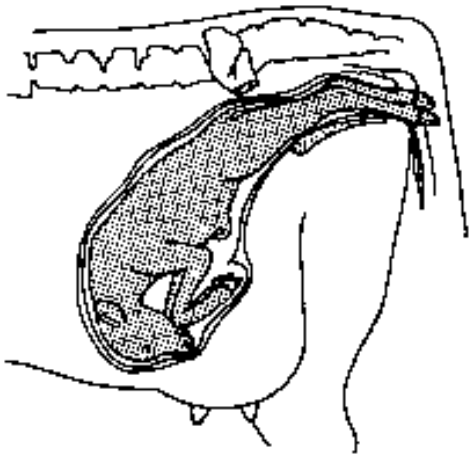
Handout 26, Birth Presentations, *continued*

Abnormal Presentations, continued

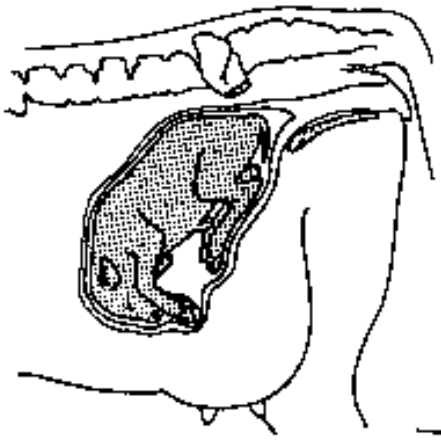
4. Front feet first with the head turned down between the front legs.



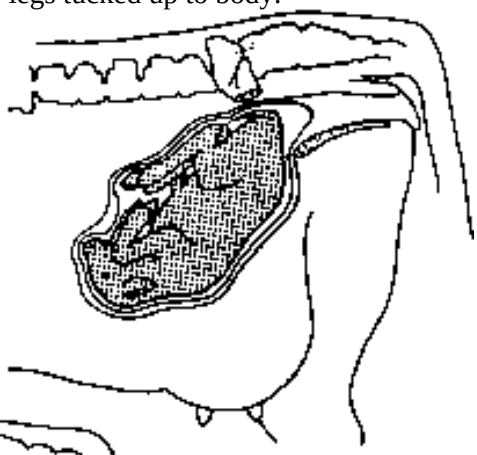
5. Backward presentation with rear feet first.



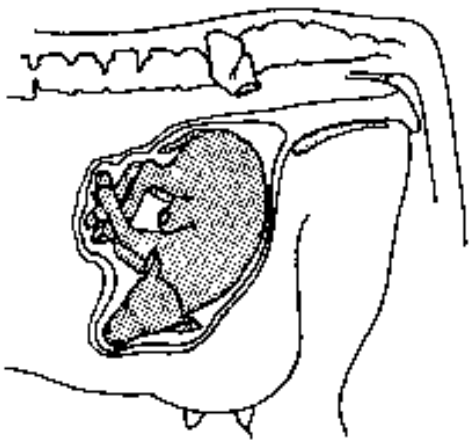
6. Breech presentation - calf backwards with rear legs tucked under the body.



7. Calf upside down and backwards with rear legs tucked up to body.



8. Back of the calf is presented first.



Determining Live and Carcass Prices for Market Steers

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Calculate carcass value
- Calculate live cattle prices
- Calculate carcass price

ABOUT THEMSELVES:

- The value of budgeting, saving, or estimating long-term purchases
- The value of comparison shopping

Materials Needed:

- Flip chart or chalkboard
- Pencils and paper for each member
- Calculators (optional) for each member

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

QUALITY GRADE

Quality grades are intended to relate market desirability to cooked palatability and thus, consumer acceptance. There are eight USDA quality grades: Prime, Choice, Select, Standard, Commercial, Utility, Cutter and Canner. Quality grading of beef carcasses is determined by subjectively scoring maturity or physiological age of the carcass and marbling or the amount of visible flecks of fat within the lean of the ribeye muscle.

Review Level III lesson on Determining Shrink and Dressing Percent for Market Steers.

There are five levels of maturity, designated as A, B, C, D and E. Maturity A and B are the young cattle designations eligible for the grades of Prime, Choice, Select and Standard. Maturity levels C, D and E are only eligible for the grades Commercial, Utility, Cutter and Canner.

There are nine degrees of marbling that correspond to the USDA quality grades that range from very abundant to traces. Maturity and marbling are evaluated and combined to determine the final quality grade.

List points on flip chart or chalkboard.
Quality grade:

1. Maturity
2. Marbling

YIELD GRADE

In 1965, the USDA adopted a grading system for estimating **cutability**, which is defined as the percentage of carcass weight in boneless, closely-trimmed retail cuts from the round, loin, rib and chuck (The higher-valued wholesale cuts). Cutability is based on four carcass measurements. These measurements include fat thickness opposite the ribeye muscle, ribeye area, percentage of internal fat and hot carcass weight. For

List points on flip chart or chalkboard.
Cutability:

1. Fat thickness
2. Ribeye muscle area
3. Percent internal fat
4. Hot carcass weight

industry purposes, the USDA developed a system of numerical grades called yield grades which merely reflect cutability values. The grades are designated 1, 2, 3, 4 and 5. Each yield grade corresponds to an expected cutability value, with a yield grade 1 carcass yielding 52.3 percent or more of trimmed retail cuts, whereas a yield grade 5 should yield 45.4 percent or less of the same cuts. For this lesson, you will not need to calculate quality or yield grades; however, it is important that you understand all the variables that are involved in determining the value of your animal.

PRICE DETERMINATION

Now that we are aware of two important variables involved in determining the value of your animal, some simple arithmetic should give us an idea of what goes into determining the price a cattle buyer will pay for your animal.

CARCASS VALUE

Use a current market example if desired.

This is the easy part because carcass prices are reported daily by the USDA Market News Service. Look in a newspaper, livestock magazine, or listen to a livestock market report on the radio to learn these prices. The prices are usually reported for either Choice grade or Select grade cattle and for yield grade 3 and better, or yield grade 4 cattle. An example would be Choice, YG 3s are valued at $127.00 per hundred pounds. Example:
Quoted market prices:

Choice, YG 3	$120.00 per cwt ($1.20 per lb)
Select, YG 3	$115.00 per cwt ($1.15 per lb)
YG 4	deduct $20.00 per cwt ($.20 per lb) This price is based on the difference between YG 3 and YG 4 carcass prices.

Let members figure these values after giving one example on the chalkboard or flip chart.

Quoted market price per lb × carcass wt = carcass value

Steer 1. Choice, YG3 = $1.20 × 600 lb = $720.00
Steer 2. Select, YG3 = $1.15 × 700 lb = $805.00
Steer 3. Select, YG4 = $ .95 × 500 lb = $475.00
Steer 4. Choice, YG4 = $1.00 × 800 lb = $800.00

LIVE CATTLE PRICES

Review dressing percent from Level III lesson, Determing Shrink and Dressing Percent for Market Steers.

To determine the live price, we simply multiply the carcass price per 100 pounds by that animal's dressing percent divided by 100. The simple examples assume the by-product value equals the costs of processing the cattle to carcass.

Again let members figure values after an example.

Carcass price per cwt × dressing percent ÷ 100 = live cattle price per cwt

Steer 1. $120.00 × 60.0% dressing percent ÷ 100 = $72.00 per cwt
Steer 2. $115.00 × 63.0% dressing percent ÷ 100 = $72.45 per cwt
Steer 3. $ 95.00 × 59.0% dressing percent ÷ 100 = $56.05 per cwt
Steer 4. $100.00 × 65.0% dressing percent ÷ 100 = $65.00 per cwt

You can determine carcass price if you know the live price and a good estimate of the dressing percent. This is the way packer buyers price cattle. To determine carcass price from live price, you simply divide the live price per hundred pounds by the dressing percent.

Live price per cwt ÷ dressing percent × 100 = carcass price per cwt

Steer 1. $72.00 ÷ 60.0% × 100 = $120.00 per cwt carcass
Steer 2. $72.45 ÷ 63.0% × 100 = $115.00 per cwt carcass
Steer 3. $56.05 ÷ 59.0% × 100 = $ 95.00 per cwt carcass
Steer 4. $65.00 ÷ 65.0% × 100 = $100.00 per cwt carcass

Let members try this a few times before giving answers.

Now let's take this one step further and determine the price a packer buyer would pay for a pen of cattle. For this example let's say the pen consists of 100 head of cattle. The buyer estimates that 60 percent of the cattle will grade Choice and 40 percent will grade Select. Furthermore, he or she estimates that 4 percent of the cattle will be yield grade 4s and that the average dressing percent for this pen is 62 percent. We can now calculate the live price which the buyer will pay from the following quoted carcass prices:

Outline this problem step by step on the flip chart or chalkboard for members to follow.

Make up another similar problem and let small groups work together on solutions.

Choice, YG 3 = $125.00
Select, YG 3 = $120.00
YG 4 = $–20.00

Choice, 60% × $125.00 = $ 75.00
Select, 40% × $120.00 = $ 48.00
YG 4, 4% × $–20.00 = $ –8.00
$115.00 average carcass price

Average carcass price × dressing percent ÷ 100 = average live price per cwt.

$115.00 × 62.0% ÷ 100 = $71.30

Hopefully, we have fulfilled our objectives and you are aware of what is involved in determining the price that will be paid for your steer or heifer. Furthermore, we hope that you will be spurred to keep abreast of daily carcass and live cattle price quotes.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What price was the most difficult to figure? Why?
2. Which pricing system (live or carcass) is most common in your area? Why?

Process:

3. Why is it important to know the difference between live and cattle carcass prices?
4. What differences do you find in determining live and carcass prices between selling a pen of feedlot cattle versus selling your steer at the 4-H auction?
5. What role does quality play in determining cattle prices?

Generalize:

6. What are the risks and benefits of other livestock buying and selling methods?
7. What genetic and management factors should you consider to receive optimum value for your investment?

Apply:

8. How does determining prices affect plans and choices you make for the future?

GOING FURTHER:

1. Ask a livestock buyer to visit about the calulations they make when buying a pen of cattle.
2. Study for and participate in a meat judging contest.
3. Ask a meat science graduate to explain quality and yield grading in detail.
4. Ask someone to discuss the concept of "value-based marketing."

REFERENCES:

"Beef Carcass Evaluation," LI-680 and 681, *National Meat Science Series*, from National 4-H Council

Numerous meat judging bulletins and slide show sets from Kansas State University Cooperative Extension Service or National Live Stock and Meat Board

"Beef Pricing Card—I," from Extension meat specialist, Animal Sciences and Industry, Kansas State University

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Cooperative Extension Service
Kansas State University
Manhattan

Cattle to Carcass, The Slaughter Process

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Steps in standard slaughter process
- Common terminology used to identify the steps in the slaughter process

ABOUT THEMSELVES:

- Importance of quality standards in food processing
- The significance of food safety in their lives

Materials Needed:

- USDA Farmers Bulletin #2263, 1977, on *Beef Slaughtering, Cutting, Procesessing, and Cooking on the Farm,* for each member (optional)

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

In 1993, the state of Kansas produced over 4.5 billion pounds of total red meat. Moreover, 167 livestock packing plants in the state slaughtered 6,232,200 head of cattle in 1993, ranking Kansas as the second cattle slaughtering state in the nation. The slaughter process that converts cattle into carcasses is not an easy task to comprehend. However, it is important for all those involved with the live animal production side to have some knowledge of all the steps involved in the process of raising a calf to its ultimate use as food. Therefore, the objective of this lesson is to familiarize yourself with the steps involved in the slaughter process and to gain an appreciation for this process. All livestock to be sold for meat must be inspected for wholesomeness by government meat inspectors. This involves viewing all animals antemortem (before slaughter) and postmortem (during and after slaughter) for signs of abnormality or unhealthiness. Various laws from 1906 and 1967 to the present govern how this is done.

It is not uncommon for people to have difficulty dealing with some aspects of animal slaughter, so please do not feel embarrassed to feel that way.

The slaughter process can be divided into nine steps. It is the purpose of this lesson to explain and identify the slaughter process. Therefore, it will be simpler to handle each step separately.

Leader Notes

Plan a field trip to a processing plant or order copies of the reference listed under “materials needed” for each member.

Be prepared to discuss questions in a sensitive way. Discuss the need for the slaughter process, and how people in our society deal with the use of animals for food.

Leader Notes

STEP 1, RENDERING THE ANIMAL UNCONSCIOUS

In 1958, the U.S. Congress passed the Federal Humane Slaughter Law. This law required that all meat slaughtering facilities humanely render an animal unconscious and insensitive to pain prior to shackling, hoisting or exsanguination. There are several methods of "stunning" an animal unconscious, but the most commonly used method is the Captive Bolt Stunning Method. The Captive Bolt is a compression gun that may penetrate the skull. They are made with long or short handles. These guns use a .22 or .28 caliber blank and operate on the forehead or behind the poll.

STEP 2, EXSANGUINATION OR STICKING

Upon rendering the animal unconscious, the animal is shackled and hoisted up on a high rail. After the animal has been hoisted, an incision is made through the hide only, between the point of the brisket and jaw. A knife is then inserted in front of the brisket at a 45°angle and the carotid arteries and jugular veins are severed. This procedure is known as **exsanguination**, or more commonly referred to as "sticking." The blood is caught in a large vat or a special draining system to be used later as either a protein source for animals or in pharmaceutical production.

STEP 3, RODDING THE WEASAND

"Rodding the Weasand" refers to the process that separates the esophagus from the trachea and the small muscles that are attached to these two structures. This process allows the abdominal cavity organs and contents, and the esophagus to be pulled out of the body separately from the thoracic cavity organs (primarily the heart and lungs) without breakage during the evisceration step. This process involves using a metal rod, with a handle on one end and several loops on the other end, which is threaded onto the esophagus and forced upward towards the rumen, thus separating the esophagus and trachea.

STEP 4, HEADING

The next step in the slaughtering process is the removal of the head from the carcass. This is more commonly referred to as "heading." This process consists of opening the hide from one side of the poll to one nostril, then continuing the opening from the stick through the center of the jaw and removing the hide from the face and head. After the head has been skinned-out; grasp the jaw in one hand and remove the head by cutting through the larynx and the first cervical vertebrae, which is designated as the Atlas joint.

The government inspector gives special attention to glands and structures of the head.

STEP 5, SHANKING OR LEGGING

The removal of the hide on the hind and foreshanks must occur prior to opening up the hide. This process is called "legging" or "shanking." This step removes sources of contamination like manure and dirt from the hooves. At this point, the foreshanks are removed about one inch below the knee and the hindshanks are removed about 1 inch below the hock

joint. An incision between the Achilles's tendon and bone is made and a stainless steel trolley is inserted in the hock region to raise the carcass to the rail for further steps.

STEP 6, HIDE REMOVAL

Today, most hides are removed mechanically; however, there is still some knife work involved prior to "pulling" the hide off the carcass. First, an animal must be "rumped." This consists of opening the hide in an M configuration on the belly side of the hind legs. At this point, the slaughterer will ream the bung and tie off the bung for ease of evisceration. After "rumping" the animal, an incision is made on the midline from the brisket to the rear. The hide is then skinned or pulled from the belly. This process is commonly designated as "bellying" the carcass.

Upon completion of these two steps, the hide is placed into a mechanical hide removal apparatus and the hide is removed from the neck to the rump. Mechanical hide pullers can be made to pull the hide up or down. Hides can then be salted or sold wet to leather processors. Some packing plants are tanning their own hides and receiving higher prices from leather processors.

STEP 7, EVISCERATION

After the hide has been removed, the sternum or brisket is split with a saw. A knife is inserted into the abdominal cavity with the blade leaning upward and the slaughterer's fist protecting the intestines and rumen. The belly cavity should be opened using one continuous motion.

With the completion of this process, the fat and membrane surrounding the bladder is loosened from the backbone and the ureters that connect the kidneys to the bladder are cut. The kidneys and kidney fat remain in the beef carcass. Then the liver is loosened from the attachment to the backbone. Following the liver removal, the esophagus is pulled through the diaphragm to allow the abdominal viscera to fall freely out of the abdominal cavity. The organs from the abdominal cavity are referred to as the **viscera** and consist of the rumen, reticulum, omasum, abomasum, small and large intestines, liver, kidneys, spleen, pancreas, and urinary bladder. The membrane separating the abdominal cavity from the thoracic cavity is called the diaphragm, and consists of the diaphragm muscle and the membrane joining the muscle. A cut is made through the membrane only and the organs that lie in the thoracic cavity are removed. The organs from the thoracic cavity are called the **pluck** and consist of the heart, lungs and trachea (windpipe).

The government inspector gives considerable attention to these organs, other tissues, and several lymph glands throughout the carcass.

STEP 8, SPLITTING

Upon completion of the evisceration step, the carcass is ready to be separated into two equal weight sides. Splitting the beef into sides is done by sawing through the exact center of the backbone. This can be accomplished by using a special meat hand saw; however, the common industry practice is to use an electric-powered beef-splitting saw.

STEP 9, CARCASS WASH

Finally, any traces of blood should be washed from both the inside and outside of the carcass. Cold or lukewarm water is used to wash the carcass. Carcasses are then stamped with the government inspection stamp that indicates the carcass is wholesome for human consumption. Carcasses are then rolled into the cooler, which is commonly referred to as the "hot box." A thorough chilling during the first 24 hours is essential, otherwise heat will escape slowly and microorganisms cause the carcass to "sour." A desirable temperature for cooling warm carcasses is about 33° to 34°F (1°C). After the 24 hour chilling period, carcasses are ready to be ribbed, graded and fabricated into wholesale and retail cuts ready for your grocer's display case and ultimately your plate.

These are the basic steps involved in the slaughter process. Most beef packers use variations of these steps. Hopefully, you will get the chance to tour a slaughtering facility and observe the full slaughter process first hand. Therefore, I hope you have gained some awareness of the important process that converts cattle to steak or ground beef on your plate.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. Which part of the slaughtering process was most interesting? Least interesting? Why?

Process:

2. What would be the result if any of these steps were eliminated in the process?
3. Why are government inspectors so important to the process?

Generalize:

4. Who should be responsible for maintaining quality standards in food processing?

Apply:

5. How can you apply what you learned about food processing to food safety?
6. What is the significance of food safety in the beef packing industry?

GOING FURTHER:

1. Investigate job possibilities in meat packing and other industries.
2. Look at Farm and Food Bytes 3, Computer Career Game available through school enrichment projects in your county extension office.

REFERENCES:

Author:
This lesson was modified from original material authored by Jason K. Apple, Graduate Research Assistant, Kansas State University, with adaptation by:
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Leader Notes

Meat Inspection

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Efforts to assure wholesomeness in meats
- Meat inspection methods

ABOUT THEMSELVES:

- Importance of ethical people being employed in the beef industry
- Importance of inspectors and inspection in various aspects of life

Materials Needed:

- Handout 27, Meat Inspection Stamps and Safe Food Handling Instructions
- Chalkboard or writing surface

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Leader Notes

There are approximately 70 known diseases that animals can have and transmit to humans. Among these are anthrax, undulant fever, trichinosis, tuberculosis and several kinds of food poisoning. This makes the inspection of meat important for the general health of the consumer.

Prior to 1900 several federal meat inspection acts had been passed, but none were effective in controlling problems due to lack of enforcement.

Meat inspection began in 1906, when the first significant law was passed in America that regulated sanitation in packing plants. During that same year, Upton Sinclair (*The Jungle*) and other "muckrakers" were writing exposés on packing plant problems. This law also established mandatory after-slaughter inspection at packing houses and procedures for condemnation of unfit animals or meat. Compliance with previous inspection laws had been voluntary but with the passage of the 1906 Act, all meats moving in interstate commerce were subject to compulsory inspection.

We've come a long way since then. We now have many standards for federal and state meat inspection.

PROCESS

All beef animals that will be sold for meat, must be inspected prior to and after slaughter. Before slaughter, each animal is inspected by either a veterinarian or trained person. This is called "antemortem inspection." The inspector looks for obviously diseased or crippled animals, animals

Write "meat inspection process" on chalkboard.

1. Inspection by inspector ("antemortem inspection").

with abnormal body temperature or other symptoms of disease which make them unfit for consumption. Animals found to be unfit are tagged **"U.S. Condemned"** and eliminated for food purposes.

2. "Postmortem inspection" anatomy, physiology, bacteriology, and pathology.

Cattle which pass the "antemortem inspection" are then slaughtered and a second inspection is initiated ("postmortem inspection"). This is the most important inspection in conjunction with the slaughter and processing operations.

Members should be made aware that a USDA Meat Inspector is a possible agriculture-related career.

This inspection is done by persons who have knowledge of anatomy, physiology, bacteriology and pathology of animals so they can easily detect abnormalities in the carcass and initiate proper action.

When an inspector discovers something wrong in a carcass, it is immediately isolated from other carcasses and tagged **"U.S. Retained."** It is then inspected more closely and if it is not acceptable, is tagged **"U.S. Inspected and Condemned."**

"U.S. Inspected and Condemned" parts and carcasses are then rendered inedible to ensure that they are not used for human consumption.

Pass out Handout 27, Meat Inspection Stamps and Safe Food Handling Instructions.

Cattle passing all inspections will be stamped with a **"U.S. Inspected and Passed"** stamp on all wholesale cuts of the carcass.

Prepackaged, processed meat products such as sausage and hamburger are also inspected and stamped, if passed.

Besides inspection of the animal itself, there are other aspects a processing plant must attend to, assuring wholesomeness in its products.

Tour a local plant and see areas listed in these 10 precautions for sanitation and wholesome meat.

These are:

1. Water supply must be adequate and potable. Hot water must be maintained at least to 180°F.
2. Floors of plant must be sloped and drainable to prevent standing water.
3. Plant must be able to dispose of all waste products in an environmentally sound manner.
4. Workrooms must provide adequate light for inspection.
5. Ventilation must be adequate for air exchange.
6. Refrigeration must be less than 40°F. Workrooms must be cold enough to maintain quality of product.

Why might it be bad for these materials to contact meat?

7. Equipment must be free of cracks and away from the wall to facilitate good cleaning. No wood surfaces, copper, cadmium, lead, painted surfaces or porcelain containers may be in contact with meat.
8. Preventive measures to eliminate flies and rodents must be assured.
9. Sewage disposal must meet health standards of the area.
10. Sanitation systems must be maintained and in optimum operating condition.

Refer to "Safe Food Handling Instructions" portion of Handout 27.

Effective in mid-1994, all ground meat products must have a "Safe Food Handling" label to remind consumers of good food safety practices.

SUMMARY

The inspection of meat is an important part of providing beef to the consumer. By being assured of wholesome beef, the consumer is encouraged to purchase beef.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What is the purpose of meat inspection?
2. Why is meat inspection significant?

Process:

3. What problems can happen when food safety and health requirements are not met?
4. What experiences have you had with unsafe or unhealthy food items?

Generalize:

5. Who should be responsible for maintaining safe, high quality meat products after they leave the processing plant?
6. Where else might you encounter quality control?
7. How does quality control effect the consumer?

Apply:

8. What are the implications to the consumer for issues such as imported beef, environmental controls, etc?

GOING FURTHER:

1. Contact a packing plant and see if you can schedule a tour of the facilities.
2. Ask a USDA or state meat inspector to give your group a program on meat inspection.

REFERENCES:

The Consumer's Choice–Lean Meat, manual, county Extension office

Author:

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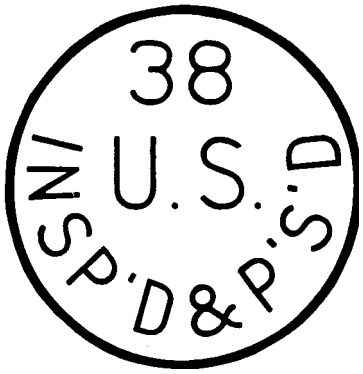
MEAT INSPECTION

BEEF, LEVEL IV

Handout 27, Meat Inspection Stamps and Safe Handling Instructions

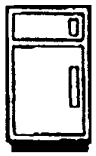
This inspection stamp is put on every carcass. It is only stamped on the major wholesale cuts of the carcass.



This stamp is placed on all **prepackaged** processed meat products such as sausage, hamburger, weiners, luncheon meats.

Safe Handling Instructions

This product was prepared from inspected and passed meat and/or poultry. Some food products may contain bacteria that could cause illness if the product is mishandled or cooked improperly. For your protection, follow these safe handling intructions.



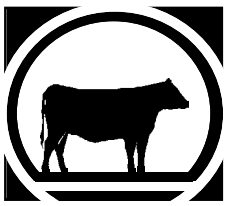
Keep refrigerated or frozen. Thaw in refrigerator or microwave.

Keep raw meat and poultry separate from other foods. Wash working surfaces (including cutting boards), utensils, and hands after touching raw meat or poultry.

Cook thoroughly.

Keep hot foods hot. Refrigerate leftovers or immediately discard.

Adapted from: U.S. Department of Agriculture
Food Safety & Inspection Service
14th Street & Independence Avenue, SW
Washington, DC 20250



Shopping for Beef

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- Identify areas of the carcass from which beef cuts come, tenderness level by area, and recommended cookery methods
- Various meat cut forms
- Differentiate normal fresh, frozen, cooked, and cured meats
- Three variety meats and reasons why they are good occasional alternatives

ABOUT THEMSELVES:

- Their use of safety standards and requirements when purchasing food

Materials Needed:

- Beef retail cut charts, available from the National Live Stock and Meat Board (NLSMB), or complimentary copies from State Beef Council
- Activity Sheet 12, Pre-Post Test Meat Cut Selection Knowledge
- Activity Sheet 13, Meat Cutting Yield Test and Price Comparison
- Leader's Key, Activity Sheet 12, Pre-Post Test Meat Cut Selection Knowledge
- Fresh beef cuts
- Knife, scale, and cutting board
- Packaging materials and labels from various beef products
- One sheet of blank paper for each participant

ACTIVITY TIME NEEDED: 2 HOURS

ACTIVITY

Leader Notes

MEAT BASICS

Knowledge of meat cuts can help us make sound decisions when planning meals, choosing meats at the supermarket and preparing main dishes. Today we will discuss some basics about meat cuts, meat grading, meat safety and packaging.

Ask participants to complete Activity Sheet 12, Pre-Post Test "Meat Cut Selection Knowledge," pre-test.

Meat cut identification can be simplified greatly if we use information already available to us prior to shopping and in the store meat department.

Many people tend to get into ruts and cook a few items over and over. More information about the wide variety of choices available may get us interested in using more of the meat cuts available.

Pass out a blank sheet of paper and a Beef Retail Cut Chart to each participant. Have them estimate and write down how many times in the last month they had beef to eat.

Leader Notes

LEANNESS

Next, have them list the three cuts or forms used most often. (For example, ground meat, lunch meat, roast, steak, stew) Ask them to share with the group. Which cut or form was used most often?

Although not readily apparent from the pictures because all these cuts are very lean and well-trimmed, you could expect older, heavier animals to accumulate more fat. Beef also achieves a more full-bodied flavor with increasing age. Leanness in fresh meats can be assessed visually. Ground beef is usually sold at two or three leanness levels.

The chart provides the species name, the wide variety of cuts (and there are more) the grouping by primal cut area and the standardized, mostly anatomically-based cut names.

Go slowly and point out each.

Tenderness, juiciness, leanness and overall palatability of beef cuts can be estimated by simply knowing some of the basics of beef carcass anatomy and physiology. Here are some basic rules:

1. Generally, muscles that work hard in locomotion or respiration are less tender. Those that provide support (e.g., those along the middle of the back and those along the center section of the hind leg) are more tender.
2. Connective tissue becomes tougher with age of the animal.
3. Fat deposition increases as the animals reach mature size.
4. Within a given animal, individual cuts will differ in leanness. Generally, larger, more active power muscles contain less fat. These are located in the hind portion of the carcass (e.g., round).
5. Marbling (flecks of fat in the muscle) are found in varying degrees in beef. In young beef animals (under 30 months), marbling has more impact on flavor and juiciness than on tenderness.

Use beef chart.

The meat carcass can be divided into six basic areas. These six areas correspond to the major wholesale or primal cuts of a beef carcass.

The simplest way to identify the cuts are through bone shapes. Today, however, many cuts are boneless, but the name of the cut may still reflect the bone location in the carcass.

1. **Arm (humerus) bone—**chuck/shoulder cuts
2. **Blade (scapula) bone—**chuck/shoulder cuts
3. **Rib bone—**rib cuts
4. **T-bone—**loin cuts
5. **Hip (pelvic) bone—**sirloin cuts
6. **Round (femur) bone—**round cuts

Distinctive muscle shapes also provide clues to meat cut identification.

MEAT COLOR

Normal meat color varies depending on specie, age of animal, and possible stress effects. Meat color, also, is affected by exposure to oxygen in the package, nitrite curing, degree of light exposure, cooking, spoilage, and other causes.

MEAT CUTS

Terms commonly used for beef cuts available at retail markets include roasts, steaks, cubes and wafered slices. These words give information about cut thickness or size, and best cooking methods.

Ground beef is available in various fat levels and packaging.

Tenderized cuts and restructured products also are available, usually as a lower-cost alternative to whole muscle meats.

Other options include salted, cured, smoked, and variety meats. During the curing process, nitrite, salt and other optional ingredients are added to make corned beef, pastrami, dried beef and beef sausages. Cured meats have unique flavors, textures, higher sodium content, and longer keeping qualities than uncured counterparts.

Variety meats offer other nutritious, low cost, taste and texture alternatives. They include: liver, heart, tongue, sweetbreads (thymus), kidney, tripe, spleen and brains. Gourmet cooks use special recipes to make these cuts very tasty.

Cuts may be packaged bone-in or boneless but the prices are different. However, the actual cost of edible meat is quite similar whether bone-in or boneless.

Pass out Activity Sheet 13, "Meat Cutting Yield Test and Price Comparison." Either suggest members try this activity at home with the help of their parents or you can do the activity now.

In order to do the demonstration to show cost per amount of lean, weigh a bone-in cut (e.g., round steak), then trim bone and external fat, reweigh and do the calculations shown on the handout. Then, discuss findings.

MEAT GRADES/TERMINOLOGY

Meat **quality** grades may assist shoppers in making buying decisions. **Yield** grades, however, are designed more for pricing purposes within the meat trade, before meat reaches the retail case.

The U.S. Department of Agriculture (USDA) sets standards for **quality** (eating quality/palatability) and **yield** of lean meat in the whole carcass. Animal age and the degree of marbling influence the quality grade. U.S. Prime beef are the most heavily marbled with fat. U.S. Prime, Choice, Select, Standard, Commercial and Utility are the common grades. Consumers are most likely to see Prime on white tablecloth restaurant menus; Choice and Select at retail markets. Of these three grades, Select provides the leanest option of a given cut. These grades are usually found on meat labels. If meat is not labeled, ask the meat department personnel about the grades.

MEAT SAFETY — GOVERNMENT, INDUSTRY AND CONSUMER ROLES

Every animal slaughtered to be sold as meat is visually inspected for healthfulness by a government inspector. At slaughter, animals are examined for signs of disease or injury. Seriously ill animals or parts are condemned and not used for food. Various laboratory tests are also performed on selected animals and products to monitor unseen aspects of meat safety and wholesomeness such as drug residues. Meat processors and retailers follow additional guidelines to assure meat safety.

Leader Notes

Responsibility for meat safety continues into the home. Fresh meat is perishable and must be kept chilled and used within a few days after purchase or it must be frozen if longer storage is desired.
Meat is a nutritious host, so contamination by food spoilage bacteria or disease-causing bacteria should be avoided. In instances where there may be cause for concern, cooking meat so no pink color remains (medium, 155° to 160°F) should kill any commonly found problem-causing bacteria in **non**-cured meat. In **cured** meat, it has been shown that re-cooking warmed up, abused meat can kill a food-poisoning bacteria (Staph aureus), but it's heat-stable toxin will remain to cause food poisoning.
Government inspection and meat plant/retailer quality assurance programs assure wholesome meat to the consumer. But, once you get it home, it is your responsibility to keep it fresh. Odors of meat provide clues as to its freshness and safety. Even when proper refrigeration and packaging are used, fresh meat, as a perishable food, must be sold and used quickly to avoid spoilage. Packaging with modified atmospheres and freezing are sometimes used to extend shelf and storage life.

Show examples, if available.

PACKAGING MEAT FOR CONSUMERS

Meat packaging varies greatly. Characteristics of packaging include: moisture-resistant, oxygen-permeable/impermeable, puncture-resistant, transparent/opaque, heat-sealable, resealable, inexpensive, recyclable, tamper-resistant, rigid, printable.

Packaging types available in retail markets are:

1. Retail fresh meat package
2. Opaque chubs
3. Modified atmosphere packaging (vacuum or CO_2 and N_2 gas flush)
4. Freezer packages
5. Processed meat vacuum packages

SUMMARY

Have members review their answers on the Pre-Post Test "Meat Cut Selection Knowledge," or give them the test again to see what they really retained. Compare pre-post test results.

As you can see, there is a lot more to buying a good cut of beef than just going to the meat case and picking up a package. Consumers today are making more informed decisions and demanding quality products. We have discussed meat cut identification, grading, inspection, and packaging. This information will be useful as you make meat purchases.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.
Share:

1. What types of cuts or forms of meat products do you eat most? Why?
2. What "percent lean" of ground beef do you purchase? Why?

Process:

3. What are some meat cuts that are identified by bone shape?
4. Why is the ability to identify meat cuts important to method of cooking, to tenderness and flavor?

5. What meat safety guidelines and packaging types help maintain meat wholesomeness? How?

Generalize:

6. Why do you think standards or requirements are necessary in the food wholesale and retailing industry?
7. What responsibilities do you have as an informed consumer of food products?

Apply:

8. How will what you've learned about shopping for beef effect decisions you'll make in the future?

GOING FURTHER:

Use other existing charts, pamphlets and models, produced by cooperating trade organizations, health organizations, universities or government agencies if they are judged accurate, and effective on the subject, and help accomplish efficient learning. The National Live Stock and Meat Board, with representation from all segments of the industry, has a longstanding tradition of outstanding resources related to this lesson. Other reputable organizations should be considered as sources if their information has a sound research base. Attribution, in print or spoken, should be given.

REFERENCES:

Materials and Audio-Visual Aids Catalog, National Live Stock and Meat Board (NLSMB)

The Meat Board *Guide to Identifying Meat Cuts,* NLSMB, 06-202, booklet (1983)

Examples of comprehensive cookbooks, meat sections

Meat Identification Slides, slide set, NLSMB, 06-601, sets for sale, or borrow from other educational sources, perhaps the county Extension office, school home economics or vocational–agriculture department

Basics About Beef, NLSMB, 17-208 (1986)

Meat Evaluation Handbook, NLSMB, 06-301 (1987)

Meat Educational Resources Inventory, DES/KSU-ASI(Meat)/5-89

National Live Stock and Meat Board (NLSMB), 444 North Michagan Avenue, Chicago, Illinois 60611

The Consumer's Choice–Lean Meat, Module 3, Unit 2, from your county Extension office

Author:

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Manhattan

SHOPPING FOR BEEF

BEEF, LEVEL IV

Activity Sheet 12, Pre-Post Test Meat Cut Selection Knowledge

	True	False
1. Vacuum packaged beef is bright cherry-red in color.	_____	_____
2. "Support" muscles tend to be less tender than "action" muscles.	_____	_____
3. Meat from old animals is the most tender.	_____	_____
4. Cuts from the shoulder area have the least fat.	_____	_____
5. A beef flank steak is leaner than a shoulder blade steak.	_____	_____
6. Variety meats are fatter than most regular meat cuts.	_____	_____
7. Bright cherry-red beef is definitely fresher or younger than purplish-red beef.	_____	_____
8. Ground round should be leaner than regular ground beef.	_____	_____
9. Curing meat involves the addition of salt and very small amounts of nitrite.	_____	_____
10. Muscles from beef round steak are all equally tender.	_____	_____
11. Cuts with more marbling will have more calories.	_____	_____
12. Trimming away all visible fat can greatly reduce total caloric content of a meat cut.	_____	_____
13. Aged meat means it comes only from old animals.	_____	_____
14. Polyvinyl chloride (PVC) film is bad for meat.	_____	_____
15. Cuts with low degrees of marbling still cannot meet reduced-fat health recommendations.	_____	_____

SHOPPING FOR BEEF

BEEF, LEVEL IV

Leader's Key, Activity Sheet 12, Pre-Post Test Meat Cut Selection Knowledge

1. False — Purple-red in color, due to no oxygen effect yet.
2. False — More tender with less connective tissue.
3. False — Least tender.
4. False — Medium fat.
5. True
6. False — Almost all are less fat.
7. False — Both may be very fresh. Purplish-red (not brown) beef has not been exposed to oxygen (O_2).
8. True
9. True
10. False — Top round and tip are more tender than bottom and eye of round.
11. True
12. True
13. False — Aging refers only to the length of time of refrigerated storage of meat to allow enzymatic tenderization, not the animal's age.
14. False — Keeps meat moist, protects from contamination, allows oxygen to brighten color. Commonly used.
15. False — Depends on degree, but if trimmable fat is removed and not consumed, meat with low marbling levels can meet reduced-fat recommendations.

SHOPPING FOR BEEF

BEEF, LEVEL IV

Activity Sheet 13, Meat Cutting Yield Test and Price Comparisons

Equipment and Materials

1. Sharp knife, steel/stone
2. Cutting board
3. Small scale to weigh meat cut and parts (5 to 20 lbs)
4. Calculator
5. This handout and a pencil
6. Bone-in meat cut with some trimmable fat, such as beef chuck blade steak/roast, beef loin T-bone steak
7. Overhead projector, transparency and marker for group demonstrations.

Cut _____ Date _____

Description _____

Starting meat cut _____ lbs (A) × _____ price per lb (B) = $_____ value (C)

Trim loss (bone, fat, skin, meat juice) _____ lbs (D) or _____ % ((D ÷ A) × 100)

Lean meat (A – D) _____ lbs (E) or _____ % ((E ÷ A) × 100)

Equal value price comparison

Lean meat price per lb = $_____ (C) ÷ _____ (E) lbs lean meat = _____ price per lb (F)

Check yourself new _____ price per lb (F) × _____ lbs lean meat (E) = $_____ value (C)

What price can I afford to pay for a boneless, closely trimmed lean meat cut to compare with a lower-priced bone-in, less finished cut?

Answer_____(F)

Were you surprised by the differences between prices B and F?_____

Optional Exercises

1. **Serving size and number of servings**

   Four to 5 ounces (¼ or 0.25-pound to ⅓ or 0.33-pound) raw, boneless lean meat cooks down to approximately a recommended 3-ounce cooked serving size. Using the 4- to 5-ounce raw weight serving guide, calculate the number of servings this lean meat cut (E) will supply?

   Answer: _____ (G) servings.

2. **Servings per pound**

   Divide the number of servings by the "starting" weight (A) to get average servings per pound. Compare this calculated servings per pound with (G) above.

   Answer: _____ servings per pound.

3. **Cost per serving**

   Finally, to derive cost per serving, divide (C) _____ by (G) _____ = $ _____ per lean serving.

Beef Consumer Considerations

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:

- To select a variety of lean meat cuts/products appropriate for their nutritional needs at different life stages or health situations
- How to fit a week's recommended minimum lean meat servings for a family into a weekly food budget
- Standardized labeling for fresh meat
- Nutritnomic (cost of a nutrient) price comparisons
- Various meat cut alternatives
- The "best buys" of lean, whole muscle cuts and fresh ground meats for various situations
- Reliable sources of information which address meat selection questions and concerns.

ABOUT THEMSELVES:

- The importance of information resources
- The importance of decision making

Materials Needed:

- Activity Sheet 14, Meat Shopping pre-post test
- Activity Sheet 15, Check Your Meat Counter Choices
- Handout 28, Motivations Related to Meat (2 pages)
- Handout 29, Decision Tree for Meat Buying
- Handout 30, Servings of Meat Per Pound
- Handout 31, Meat Buying Aids
- Handout 32, A Buyer's Guide to Cost Per Serving of Meat

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

This lesson is designed to help you fine-tune your meat shopping skills. We will discuss why people eat meat, buying strategies, budget considerations, and cost/value considerations.

LIFE STAGE CONSIDERATIONS

Why do people buy meat?

In India, and other less developed countries, there might be three or four meat choices in an open air market—mutton or lamb, beef regular cut and limited amounts of steak-type meat and chicken. Fat cuts may actually be priced equal to, or higher than lean cuts because calories, and especially fats and oils, are short in supply. In our culture, we face a different

Leader Notes

Ask participants to complete Activity Sheet 14, Meat Shopping pre-test. You may want to collect these and give them a clean sheet for post-test or ask them to take the test again on same sheet.

Pass out Handout 28, Motivations Related to Meat.

problem—ample low-cost food in a convenience-oriented culture. Our challenge often is to match our relatively abundant choices with our moderate needs.

Pass out Activity Sheet 15, Check Out Your Meat Counter Choices. Give participants a few minutes to complete it. Discuss which considerations received the most x's. Share ideas for changing purchases.

Budget Considerations and Buying Strategies
Consumers purchase meat based on taste, convenience; but primarily economic considerations. Lower-cost meats such as less-tender cuts and variety meats will help consumers with **limited budgets** meet their nutritional needs for meat foods, as will consumption of meat alternates.

Consumers with **moderate food budgets** have more options, including purchase of quantities when they are on sale and use of a wider variety of meat products.

Those **without food-dollar restrictions** have the largest array of product options available and may be more likely to use more convenient forms of meats as well as more tender cuts.

You may want to use Handout 29, Decision Tree for Meat Buying, for further discussion of this topic.
Give each participant a copy of Handout 30, Servings of Meat Per Pound. (optional)

At almost any budget level, however, it is possible to consume adequate levels of meat or alternates to meet nutritional needs in the U.S.

It is important to remember that people buy meats or meat alternates for various reasons. Their choices may differ depending on the eating occasion.

Knowing the number of servings to expect per pound of meat can help you decide how much meat to buy for a given meal or dish. Since not all cuts have the same degree of leanness, fat or bone, different numbers of servings are obtained from different cuts. For example: Lean cuts and ground meats yield four servings per pound, whereas spareribs with their large amounts of bone yield only 1½ servings per pound. Some cuts may have more trimmable fat.

Pass out Handout 31, Meat Buying Aids.

Retail meat store labels provide worthwhile information to meat shoppers to aid the decision-making process. Most retailers use the Uniform Retail Meat Identity Standards specifications. This standardized labeling system includes:

a. species name (beef, pork, lamb, veal)
b. primal cut name (leg, loin, shoulder, chuck)
c. retail cut name (tip roast, brisket, T-bone steak)
d. form or processing method, optional
e. recommended cooking method, optional.
f. freshness date to "Sell by," optional

Note the features of the retail cut label on the handout. The meat specie, beef; the primal or wholesale cut, round; the retail cut name, top round steak; the optional feature, recommended method(s) of cookery. You might also note the weight in decimal form, the price per pound, the total amount to pay, the "sell by" date in some stores, and the Universal Product Code (UPC) bar codes for checkout scanning.

Ground meats, particularly ground beef, are relatively low in cost and very popular because they can be prepared quickly in so many ways. They are presented in a variety of package materials, package sizes and lean:fat ratios. Most common lean:fat ratios are **regular,** (70:30%), **lean** (78:22%), and **extra lean** (85:15%). Price-per-pound and weight of cut are also listed on meat labels.

Price-per-pound is the most common way to price meat items. Dividing the price-per-pound by the expected number of servings-per-pound will allow you to compare costs-per-serving of various cuts.

Pass out Handout 32, A Buyer's Guide to Cost per Serving of Meat.

Discuss some examples.

This can be done readily by using "A Buyer's Guide to Cost Per Serving of Meat."

The Meat Nutri-Facts program is another shopping aid you may find in your store. It was developed by the National Live Stock and Meat Board, the Food Marketing Institute, and the American Meat Institute and launched in 1985. Its purpose is to convey nutritive values of meat cuts in the context of a daily diet. Many stores have carried the Nutri-Facts program for some time. Literature and support materials may be available at many stores if you request them.

The Nutri-Facts program points out that a 3-ounce cooked serving of most meat cuts, if closely trimmed, could well fit into the recommended reduced fat diets of all major health organizations. Two 3-ounce cooked servings per day provide a large portion of many essential nutrients. They are low enough in calories to allow considerable flexibility for selecting other necessary foods from the major food groups to meet the other recommended daily needs.

It is important to realize, however, that many cuts provide more than one 3-ounce serving and size of portion will need to be controlled or additional nutritional value taken into account.

SUMMARY

We have discussed reasons for eating meat, budget and buying considerations, and use of certain buying aids. All of these will give you more tools to use in making better informed meat decisions.

Ask members to complete the Meat Shopping Post-Test. Compare their pre- and post test answers. How much did they learn?

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What basic considerations do you use when buying meat?
2. What meat products do you eat most? Why?
3. What determines the cut of meat chosen for special occasions?

Process:

4. When would "servings per pound" or "cost per serving" be a major consideration?
5. What problems do you have when making beef purchase decisions? Why?

Generalize:

6. What did you learn about collecting or using information to make consumption decisions?

7. What did you learn about yourself as a result of this lesson?

Apply:

8. How can you apply what you learned about information resources to future decisions?
9. What criteria can you use to evaluate the validity of information?

REFERENCES:

The Consumer's Choice–Lean Meat, Module 3, available from your county Extension office

Author:

This lesson was modified from original material authored by David E. Schafer, Extension Specialist, Meats, Animal Science and Industry, Kansas State University and Deborah K. Lyons-Blythe, County Extension Agent, Kansas, with adaption by:
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BEEF CONSUMER CONSIDERATIONS

BEEF, LEVEL IV

Activity Sheet 14, Pre-Post Test Meat Shopping

		True	False
1.	Leaner cuts of meat will always be more expensive than fatter cuts of meat.	____	_____
2.	U.S. Choice grade beef has more marbling than U.S. Select.	____	_____
3.	Lean ground beef will usually be leaner than most trimmed whole muscle cuts.	____	_____
4.	Two 3-ounce cooked servings of lean meat per day are still difficult to fit into most health organization recommended diets.	____	_____
5.	Choice of stores to shop for meat should hinge first and foremost on advertised meat prices compared to other stores.	____	_____
6.	For best economical and nutritive values, a meat shopper should compare foods on a lowest cost per gram of protein or other important nutrient basis.	____	_____
7.	The recommended serving size for lean meat is a 3-ounce raw portion.	____	_____
8.	The most economical way to buy meat is to buy only boneless, closely trimmed cuts with no waste regardless of price per pound.	____	_____
9.	Information typically found on meat labels includes: calories, price-per-ounce of protein, cut weight, price, and cut name.	____	_____
10.	U.S. Government meat inspection service inspects all retail stores.	____	_____

BEEF CONSUMER CONSIDERATIONS

BEEF, LEVEL IV

Leader's Key, Activity Sheet 14, Pre-Post Test Meat Shopping

Note: Do not give out until after post-test

1. False — Usually, U.S. Select grade cuts will be the same or lower priced than U.S. Choice cuts. Although fat content may not differ greatly if they are equally closely trimmed of external fat, marbling differences will keep Select cuts slightly leaner.

2. True — To be graded U.S. Choice, one degree more marbling is required than for Select, approximately 1.8% more fat on a raw, lean basis.

3. False — Whole muscle cuts at any marbling level, closely trimmed of external and seam fat, will almost always be leaner than lean (78:22 lean to fat ratio) ground meat.

4. False — Meat is quite nutrient-dense with high amounts of protein, heme-iron, zinc and several B vitamins for its caloric content, and if closely trimmed is sufficiently low in fat and cholesterol to meet national health organization recommendations.

5. False — Advertised meat prices should be only one of several important considerations on where you choose to shop for meat and other food.

6. True — Cost per unit of a major nutrient is the most economical way to buy food. A balance of foods is still required to meet all nutrient needs on a daily basis.

7. False — A 3-ounce **cooked** portion which comes from a 4- to 5-ounce **raw** portion.

8. False — Many times the most economical cuts still contain some bone or fat, because to remove it requires costly labor. Experience with cutting yields, or using your cost-per-serving table will tell you which is the best buy.

9. False — Only cut price, weight and name are typically given on meat labels.

10. False — Local and state health officials have the responsibility of inspecting retail stores.

BEEF CONSUMER CONSIDERATIONS

BEEF, LEVEL IV

Handout 28, Motivations Related to Meat

People have eaten meat since our ancient beginnings. Yet, who eats which kinds, where and how much, is a continuing drama played out differently in every country and every home. With ample food choices in the U.S., we now deal with a new issue in the panorama of food history, namely can we eat too much for our own good? Health and its relationship to the foods we eat, particularly meat, has been a "hot" topic since the early 1970s. Some aspects of the topic go back to biblical times and earlier. Personal and cultural motivations toward food and meat are a fact of life. Motivation has been described as "the tendencies one has to organize his/her behavior." To help each of us evaluate our motivations relating to meat and our way of life, a brief checklist of common motivating factors has been developed. Some of us may be comfortable with our motivations. Others of us may be ready to shop around for some new motivations in our food choices. Look at the following list of motivations, and indicate those where you think meat plays a role in your life.

1. To **look good** and fit
   a. To have a robust, ruddy look
   b. To be thin and pale
   c. To be trim and muscle-toned
   d. Some combination of the above

2. To **be healthy** and **feel good**, hopefully for a long life
   a. Energetic, not anemic—iron needs, especially heme iron
   b. Bone strength and tooth health—calcium needs
   c. Physical strength and activity—in balance with caloric intake to maintain desirable weight
   d. Heart and circulatory health—limit fat intake to 30 percent of calories and saturated fats to 10 percent of calories or less. Dietary cholesterol-serum cholesterol relationships with HDL-LDL variations

3. To observe certain **religious traditions, special seasons**
   a. Eat certain special foods on certain days of significance, e.g., Thanksgiving, Christmas
   b. Abstain from all food, or certain foods for a day, a week, several weeks, or permanently, e.g., Hindus—beef, Muslims and orthodox Jews—pork, Roman Catholics—red meat on Fridays during Lent

4. To observe certain **cultural traditions**
   a. Eat meat from only certain accepted species
   b. Abstain from eating meat of certain other species except in life-threatening circumstances

5. Because **peers** (friends) **do/do not eat certain foods**
   a. New recipes, or unique means to prepare **may** overcome previous resistance

6. **Variety,** just a change of taste, texture, flavor, color, nutritive value

7. **Special celebrations**, e.g., birthdays, anniversaries, weddings, graduation, new job or promotion, confirmation
   a. The "urge to splurge"

8. **Impress** boss, business associates, clients, friends

BEEF CONSUMER CONSIDERATIONS

BEEF, LEVEL IV

Handout 28, Motivations Related to Meat, *continued*

9. **Death, disease of family member,** friend, or acquaintance
10. Doctor, dietitian/nutritionist **advice after health trauma**, physical examination or lab tests
11. **Economize,** to buy the most good taste or nutritive value for the least money
12. To find **foods** that kids and **all family members will like** to eat, so as to minimize complaints
13. To be **known as** a good cook, a gourmet, a **great host/hostess**
14. To produce **works of art through food** choices and arrangement, to have fun with food
15. To **avoid pain or discomfort**, e.g., tough chewing, gassy feeling, hard texture, or large particle-size
16. To **save time, to reduce work or cleanup mess.**
17. To **continue eating habits** learned in childhood.

Prepared by: David E. Schafer, Extension Specialist, Meats, Department of Animal Sciences and Industry, Kansas State University, Manhattan, Kansas,1989

BEEF CONSUMER CONSIDERATIONS

BEEF, LEVEL IV

Activity Sheet 15, Check Your Meat Counter Choicess

People purchase meats and other foods for a variety of reasons, including nutritional value, economic value, convenience and taste.

List the meats you ate over the past two days and put **one** x for each meat item to indicate **the most important reason** for each particular meat choice.

Day 1 Meals Eaten	Meat or Meat Alternate	Nutrition Benefit	Cost/Value	Convenience	Taste
_____	____	____	____	____	____
_____	____	____	____	____	____
_____	____	____	____	____	____
_____	____	____	____	____	____
Day 2 Meals Eaten					
_____	____	____	____	____	____
_____	____	____	____	____	____
_____	____	____	____	____	____
_____	____	____	____	____	____
Total number of x's:					
_____	____	____	____	____	____

Are these purchases in line with your nutritional goals? Do they support Dietary Guidelines?

Are these products in line with your cost/value goals?

Are they in line with your wants/goals/needs for convenience? Taste?

How would you change any of these purchases to better meet your goals?

BEEF CONSUMER CONSIDERATIONS

BEEF, LEVEL IV

Handout 29, Decision Tree for Meat Buying

1. Whether to buy?

   a. Personal, family and cultural values
   b. Food enjoyment
   c. Nutrition concern

2. When to buy?

   a. Upon need
   b. Short-term planning, cook immediately and keep surplus in refrigerator
   c. Longer term planning; buy fresh to freeze at home, buy already frozen, canned, dried, fermented, and/or cured and smoked to extend storage life. Buy ahead for reasons of:
      — good prices; either on sale, seasonally, or market going up
      — convenience or emergencies, having some on hand for future use

3. Where to buy? Choice of store?

   a. Grade(s) of meat offered
   b. Type of cuts and variations presented
   c. Sanitation/cleanliness-neatness
   d. Prices, specials
   e. Service, good personal interaction with market people
   f. History of product reliability

4. How to buy?

   a. Price basis
   b. Nutritive value
   c. Combination of above, cost per serving or cost per 20 grams protein
   d. Taste/expected taste, tenderness; reliability of eating satisfaction

5. What to buy?

   a. Cookery method to be used
   b. Meat cut label or customer knowledge of identification
   c. Form of product
   d. Occasion for use

Prepared by: David E. Schafer, Extension Specialist, Meats, Department of Animal Sciences and Industry, Kansas State University, Manhattan, Kansas, 1989

BEEF CONSUMER CONSIDERATIONS

BEEF, LEVEL IV

Handout 30, Servings of Meat per Pound

Knowing the approximate number of cooked servings to expect from a given piece of meat helps you judge quantities to buy. A serving is about 3 ounces of cooked, lean meat.

SERVINGS-PER-POUND CHART—BEEF

Roasts	No. of Servings*
Rib Eye Roast	3
Rib Roast	2
Rump Roast, Round	2
Rump Roast, Boneless, Round	3
Tip Roast, Round	4
Top Round	3
Eye of Round Roast	4

Broiling Steaks	
Cubed Steak	4
Flank Steak	4
Porterhouse Steak, Loin	2 ½
Sirloin Steak	3
Rib Eye Steak	3
Rib Steak	2
Rib Steak, Boneless	2 ½
T-Bone, Loin	2
Tenderloin (Filet Mignon) Steak	3
Top Loin Steak	2
Top Loin Steak, Boneless	3
Top Round	4

Pot-Roasts	No. of Servings*
Arm Pot-Roast, Chuck	2
Blade Roast, Chuck	2 ½
Bottom Round Roast	3
Cross Rib Pot-Roast, Chuck	2 ½
Heel of Round	2
Shoulder Pot-Roast, Boneless	2 ½

Braising Steaks	
Arm Steak, Chuck	2 ½
Blade Steak, Chuck	2 ½
Flank Steak	3
Round Steak	3
Tip Steak, Round	3

Other Cuts	
Beef for Stew	4
Brisket	3
Ground Beef	4
Short Ribs	2
Beef Variety Meats (heart, tongue, brains, sweetbreads)	5
Liver, kidney	4

*Number of Cooked Servings (3 ounces) Per Pound from Various Beef Cuts

The Meat Board's Lessons on Meat, 1990

BEEF CONSUMER CONSIDERATIONS

BEEF, LEVEL IV

Handout 31, Meat Buying Aids

Retail store meat cut label

The kind of meat — Beef Round — The primal cut (wholesale)
Cookery method(s), optional — Top of Round Steak — Broil, Panbroil, Panfry — The retail cut
Freshness date, optional — Sell by **date**

Ground meat labeling follows much the same format with the exception that the lean content is to be listed under the ground meat name.

Retail store ground beef label

Ground Beef
Not Less than 85 percent Lean — Lean to Fat Ratio (85:15)

BEEF CONSUMER CONSIDERATIONS

BEEF, LEVEL IV

Handout 32, A Buyer's Guide to Cost-Per-Serving of Meat*

Servings Per Pound (3-ounce retail cut cooked)	**Price Per Pound (in dollars)**											
	1.49	1.99	2.49	2.99	3.49	3.99	4.49	4.99	5.49	5.99	6.49	6.99
1½	.99	1.33	1.66	1.99	2.33	2.66	2.99	3.33	3.66	3.99	4.33	4.66
2	.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50
2½	.60	.80	1.00	1.20	1.40	1.60	1.80	2.00	2.20	2.40	2.60	2.80
3	.50	.66	.83	1.00	1.16	1.33	1.50	1.66	1.83	2.00	2.16	2.33
3½	.43	.57	.71	.85	1.00	1.14	1.28	1.43	1.57	1.71	1.85	2.00
4	.37	.50	.62	.75	.87	1.00	1.12	1.25	1.37	1.50	1.62	1.75
5	.30	.40	.50	.60	.70	.80	.90	1.00	1.10	1.20	1.30	1.40
6	.25	.33	.42	.50	.58	.67	.75	.83	.92	1.00	1.08	1.17

*Adapted from Rawls, Walker and Schafer, 1983

Animal Welfare/Rights

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT

- Defining animal welfare versus animal rights
- Identifying current social values
- Diversity in societal attitudes regarding animal care and use
- Identifying public animal welfare concerns

ABOUT THEMSELVES

- Their feelings concerning basic rights of living beings
- What forms the basis for their moral position
- The importance of team work to solve a problem or develop a program

Materials Needed:

- Flip chart to record and organize ideas (not mandatory)
- Pens, pencils and writing tablets
- Enough room to split into working groups
- Activity Sheet 16, Animal Agriculture School Program
- Activity Sheet 17, Conflict Resolution Role Play

ACTIVITY TIME NEEDED: 2 HOURS (approximate) per activity

ACTIVITY

Leader Notes

Although animal rights is a complex issue, we can simplify its meaning in order to gain a basic understanding of what is meant by the term. Animal rights is a philosophical and political position which challenges our current value system (ethic) with regard to the use and treatment of animals. Ethics are the moral philosophy and principles that identify actions as acceptable or unacceptable and are generally observed by our society.

List and define terms on flip chart.

As a society, we have accepted the use of animals for biomedical research, food, fur, fiber and as companions. Our acceptance of animal use has been based on the potential benefits that each use could yield for humans suffering from disease, increasing the availability of high-quality protein, clothing, and companionship. Along with our acceptance of the use of animals has come the responsibility of providing appropriate and humane care. Humane care includes proper husbandry, health care, alleviation of pain and suffering, and other obligations to the animal while under our care and use. Our current ethic is founded on animal welfare.

List ethics and discuss.

Animal rights is an ethic that differs (by degree) from animal welfare. Animal rights is not about the type or quality of humane care we give animals, but focuses on whether we have the right to use animals and what animals are

actually entitled to as living and "feeling" beings. Animal rights philosophers have proposed alternative ethics that will determine our conduct towards animals: (1) Our current ethic needs to be changed so that animals may gain equal consideration (as humans do) in matters concerning their pain and suffering, (2) As humans we must recognize that animals have inherent value and interests that should not be violated. If accepted, either of these alternatives would end animal agriculture.

CURRENT ETHICS AND FARM ANIMALS

Divide members into small groups and ask them to share their opinions of the ethical treatment of farm animals.

Our current animal welfare ethic allows for us to make judgments with regard to whether the use of an animal is justified based on the potential benefits to humans. This helps us to isolate activities that may be unacceptable. Historically, our society has condoned the use of animal products and by-products to help provide essential nutrients to both human and domestic animal populations. The benefit is perceived to be great enough for continued approval of this practice. In keeping with societal expectations, agriculturists promote husbandry and management practices that take into account the basic needs of the animals raised for food consumption and balance it with fundamental economic considerations that will keep farmers and ranchers in business.

In natural systems, animals exploit both plant and animal systems to ensure their biological fitness. Humans also use plant and animal systems to secure food resources for the benefit of other humans. However, as humans we attach obligations and responsibilities for the provision of humane care and/or conservative use of these systems.

A CHANGING SOCIETY

At the turn of the century most Americans were involved in some aspect of agriculture. Growing up on a farm or ranch afford people the opportunity to develop a strong understanding of natural cycles, land and animal relationships and how food is produced. Today less than 2.7 percent of our population is engaged in production agriculture. Many people do not have the opportunity to interact with the land and animals as farmers and ranchers do. This creates conditions in which the majority of the public are not aware of how their food supply is produced and managed nor have prior experience on which to base decisions. It also allows for the development of a diversity of attitudes about land and animal use because of difference in lifestyle, culture and experience. As a result, agricultural education is becoming more important for people from all segments of our society.

Other factors that can impact our current attitudes go beyond growing up on a farm or ranch. Scientific knowledge with regard to animals continues to evolve. For example, feeding practices change when new information is developed regarding animal nutrient requirements. As new knowledge develops it also brings responsibilities in terms of how that knowledge is applied. New knowledge often presents challenges to existing practice or traditions. Livestock producers have characteristically weighed new information with regard to its possible applications and indications to enhance productivity.

ISSUES OF PUBLIC CONCERN

Typical concerns that are expressed by groups representing animal interests (advocates) and the public are centered on practices that may cause pain, deprivation, and/or long term suffering to an animal. Most questions are welfare oriented. Husbandry procedures such as dehorning and castration have brought questions regarding pain (since these procedures are often performed without the use of anesthetics or analgesics). Overcrowding, isolation, rough handling, transport and slaughter practices are also common concerns. High-intensity production systems also draw curiosity and criticism. The use of new technologies in the production of animals (e.g., gene insertion) and animal products (e.g., growth stimulants) have brought both welfare and human health concerns.

In principle, farmers and ranchers advocate humane care for the welfare of their animals. Historically the public has entrusted them with making appropriate decisions regarding animal care and use. However, the change in scale of many operations have caused concern for the individual care animals may or may not receive and whether current dedication to animal welfare will be compromised for economic efficiency and growth.

LEVELS OF ANIMAL ADVOCACY

There is a wide range of personal attitudes and philosophy with regard to treatment of animals. Animal exploitation (use of animals with no obligations) is at one end of the spectrum and animal liberation (no use of animals) is on the other. Animal advocacy groups (groups who represent the interests of the animal) are generally formed to help consolidate issues, form political coalitions, and achieve certain goals.

Divide group into diads or triads and give each a level of animal advocacy to discuss and define as they see it. Let each small group share with total group before using definitions provided.

The grassroots membership of animal advocacy groups can be identified by: level of concern, philosophy, and orientation toward promoting change. Groups functioning in the U.S. tend to fall into one of four categories (however overlap in philosophy does occur): traditional animal welfare, protective animal welfare, animal rights and animal liberation. The following list provides some characteristics of ideology and educative methods:

Traditional animal welfare advocates approve of the use of animals in a variety of activities. They emphasize the importance of science and education to ensure proper care and use and are supportive of self-regulating bodies and guidelines to provide public assurance. There is an avoidance of the use of legislation to resolve problems except in severe or chronic situations.

The next three levels of animal advocacy are collectively known as the animal protection movement (protective animal welfare, animal rights and animal liberation). Animal protectors tend to exercise the legislative process to provide public assurance, correct welfare problems, and to promote attitudinal changes on how animals are used.

Protective animal welfare advocates (humane societies, animal protection groups, etc.) view themselves as spokespersons for the animals. They

serve as a buffer between animal user groups and the animals. Both the education and legislative processes are used to increase awareness, promote change, seek to discourage unnecessary use, and to provide protection to the animals.

Animal rights advocates tend to support some but not all of the philosophical tenants laid down by rights philosophers. Theoretically, there should be a universal rejection of all use of animals, however, most still advocate pet ownership and a few still eat animal products (exercising consumer preference to "free range" products). Animal rights advocates tend to promote change through endorsement of progressive welfare concerns with goals set toward significant modification or abolition of a practice.

Animal liberation advocates support the abolition of all animal use and do not support animal welfare concepts. To support animal welfare is in fact an indirect endorsement of use as long as the animal is well cared for. Recent discussions within the animal rights community has raised arguments for the separation from animal welfare issues in order to pursue goals in a consistent manner. The re-education of society with regard to their attitudes towards animals is a goal. By changing the criteria that society uses for defining items that deserve moral consideration, liberationists hope to free animals (and groups of oppressed humans) from any type of human exploitation.

LAWS PROTECTING FARM ANIMALS

Abuse, neglect or cruel treatment of animals are activities that are generally not condoned and most states have laws which protect animals from these actions. In addition, there are two federal laws which provide protection to farm animals, the Twenty-Eight Hour Law and the Humane Slaughter Act. The Twenty-Eight Hour Laws set humane standards for farm animal transport by sea or rail and the Humane Slaughter Act sets humane standards for handling and slaughter of livestock.

Traditionally, the animal industries have used the educational process to promote the proper and humane care and use of the animals they produce. The Cooperative Extension Service, Land-Grant University sponsored research and educational events, producer groups and others have voluntarily worked to promote good husbandry and appropriate use of new technology. Even so, some animal advocacy groups want to enact state and/or federal laws to protect the welfare of farm animals. Animals used in biomedical research, teaching and consumer product testing; exhibition animals like zoo animals or marine mammals; animals sold by dealers to the pet trade or laboratories are all covered by the Federal Animal Welfare Act. Farm animals used for food and fiber production are excluded from this federal law.

CONCLUSION

Ultimately, society will decide whether we travel the path toward animal rights or continue to use and refine, our current animal welfare ethic. Livestock producers need to be sure to use the best combination of husbandry practices that benefit their livestock as well as themselves.

Do at least one of the proposed activities before using the Discussion Questions.

They need to continue to demonstrate their ability to determine appropriate care and to make certain they resolve animal welfare problems within the industry. Producers also need to effectively and openly communicate, to the public and others, their dedication to these ideas and to help the public learn more about what producers do. An educated public, with accurate information on agricultural food production systems, will be better equipped to make informed decisions that affect not only livestock producers but society as a whole.

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What are the differences in the terms: Animal rights? Animal welfare? Ethics?
2. What are the levels of animal advocacy? List and discuss each.

Process:

3. What category or level of animal advocacy do you agree/disagree with? Why?
4. Why is there a need for laws to protect animals?

Generalize:

5. What are the public concern issues that have increased the interest in animal welfare/rights? List and discuss why it has become an issue.
6. What did you learn about yourself as you discussed the issues in this lesson?

Apply:

7. What need do you see for this lesson in the future as compared to now and in the past? Why?
8. How will you act differently in the future as a result of this lesson?

REFERENCES:

CRS Report for Congress: Humane Treatment of Farm Animals: Overview and Selected Issues, Becker, Geoffrey, Congressional Research Service Report 92-412 ENR, the Library of Congress, Washington, DC, May 1, 1992

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ANIMAL WELFARE/RIGHTS

BEEF, LEVEL IV

Activity Sheet 16, Animal Agriculture School Program

Leader Notes:
Break members into two groups and ask each group to outline a program that would accomplish the four objectives below. Have each group appoint a spokesperson to present the plan. After presentation of each group's program proposal, have all members discuss the program's merits and shortcomings. Finally, ask the group to collectively design a final program, using the best components of each proposed program.

Situation:
Your group would like to conduct an educational program on animal agriculture for a middle school in a large urban area. Most students attending this school have had little or no contact with agriculture and are from diverse ethnic backgrounds. Plan a program that would accomplish the following:

1. Increase knowledge of food production.
2. Increase knowledge of animal management and production.
3. Increase knowledge of farm and ranch life.
4. Answer questions/concerns students may have with regard to their food supply and/or the welfare of animals used in agricultural production.

ANIMAL WELFARE/RIGHTS

BEEF, LEVEL IV

Activity Sheet 17, Conflict Resolution Role Play

Leader Notes:
This activity is designed to allow members to role play and to experience conflict resolution. Divide the members into two groups: one group will play the role of SEV leaders and the other will be the Ag Day representatives. Ask them to create the negotiating process that both sides must go through in order to develop a plan. The activity should end with a plan that would satisfy the school administration and the rights of both parties to express their position.

At the end of the activity, members should be asked to talk about their feelings regarding persons who interpret what they do as opposite from what the member believes.

Situation: Conflict Resolution Role Play
Within your school there is a variety of students of differing backgrounds. Some come from farms and ranches, others live in rural areas, an increasing number are not agriculturally oriented. A group of students have decided to form a club that promotes ethical vegetarianism (opposed to eating animals) based on concepts of animal rights and other belief systems. Because of their strong belief in their position an active recruitment of fellow students is underway. Posters, guest speakers, films and other activities promoting their viewpoint (many of which are anti-animal agriculture) are utilized. A school-wide conflict between students of differing viewpoints has resulted.

The annual school “Ag Day” is scheduled to be held by students involved in Vo-Ag, FFA and 4-H activities. The club, Students for Ethical Vegetarianism (SEV), has objected to the event saying it violates their rights to be exposed to activities that promote violence against living creatures. They are planning to protest the event. The school administration has asked the student leaders representing SEV and Ag Day to convene and formulate a plan that will allow Ag Day to be held and SEV to express their viewpoint. Come up with a plan that will accomplish what the school administration has requested.

Embryo Transfer in Cattle

Beef, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT

- How embryo transfer can be used to improve beef production efficiency
- How embryo transfer is accomplished

ABOUT THEMSELVES

- The importance of technology in their lives

Materials Needed:

- Chalkboard or flip chart
- Artificial breeding equipment (optional)
- Any embryo collection equipment available (optional)

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Embryo Transfer is: A series of scientific and technical steps in which embryos, or ova, are removed from donor females and subsequently transferred into the reproductive tract of a foster or surrogate mother.

HISTORY OF EMBRYO TRANSFER

1672—Regnier de Graaf first saw rabbit blastocysts
1840—Sheep ova first discovered
1845—Dog ova first discovered
1897—Pig embryos first observed
1911—Cat embryos first observed
1931—Cow embryos first observed
1939—Horse embryos first observed

The first embryo transfer was done at the end of the last century by Walter Heape. Heape transferred embryos between rabbits while studying uterine influences on an embryo's phenotype.

The first successful embryo transfer was reported:

- Sheep and goats in 1934
- Cows in 1949
- Pigs in 1951
- Horses in 1974
- Baboons in 1976
- Humans in 1978

Leader Notes

Use a visual, such as chalkboard or flip chart, to share definition and other key history points.

Leader Notes

The first synchronization of a donor and recipient that produced a calf was done by Willett at the University of Wisconsin in 1951. He used a 5-day-old embryo collected at slaughter, transferred to recipient.

The first synthetic progestational compounds arrived in the 50s, followed by prostaglandins in the early 70s. Embryo transfer, as we know it today, would not be possible without prostaglandins.

The major key to embryo transfer was the development of artificial insemination in the 1930s by the Russians. Frozen semen allowed donors to be worked on-site, without being moved to a different location.

The last 10 years have brought about innovations such as:

- Nonsurgical collections and transfers
- On farm collections and transfers
- Embryo freezing
- Embryo splitting
- Embryo sexing/DNA analysis
- Embryo cloning

The overall production and marketing of breeding cattle has increased in sophistication, whether the breeding cattle have been registered, purebred or crossbred. The buyer of today is more astute and quality conscious than in the past. More breeders are realizing that there is always a market for good cattle, whereas, low-quality cattle tend to fluctuate with the commercial market. Consequently, there is an increase in pressure on purebred breeders to produce a large number of top quality, efficient cattle.

One of the most significant technical developments in reproductive biology in the past 10 years is the commercial application of embryo transfer to the cattle industry. Animal breeders are now able to accomplish in a few years what has previously taken a lifetime of concentrated effort. The potential of a 20-fold increase in production of superior offspring from genetically superior sires and dams provides greater flexibility in a breeding program.

Embryo transfer has become a useful, economically justifiable tool for animal breeders and is an important step in many of the developing technologies; embryo transfer probably does have a role to play in improving the profit potential of the U.S. cattle industry.

Historically, embryo transfer was used to propagate the exotic breeds at the expense of the U.S. cow population. Since the life span of humans relates only to six or seven generations of cattle, the chance of realizing a super bull from an “elite” cow are limited with conventional reproductive methods. However, with embryo transfer it is not unusual to obtain 15 to 25 more calves per year from a fertile donor, thus increasing the opportunities for selection.

Embryo transfer helps to improve efficiency so that identical amounts of animal products can be realized with less energy, feed and land.

ADVANTAGES OF EMBRYO TRANSFER

Put members in small groups and let them discuss embryo transfer advantages and disadvantages before listing and discussing.

- Increase reproductive capacity of a genetically superior heifer or cow.
- Shorten the generation interval between steps in a selection program (produce progeny from prepuberal heifers). Faster genetic progress when selecting from traits that can be recognized in a prepuberal heifer.
- Allows valuable cows and heifers which are not genetically infertile, but infertile due to injury, disease or age, to produce normal offspring.
  - Good candidates: proven brood cows, cycling normally, that are unable to maintain a normal pregnancy, due to disease, injury or age.
  - Poor candidates: infertile heifers—lead to infertile cows.
- Rapid multiplication of a rare breed.
- Used to progeny test for genetic defects (evaluate dams of artificial insemination bulls for undesirable genes).
- Import and export genetics without the disease regulation of live animals.
- Allow additional technological advancements to proceed (sexing of embryos, cloning of embryos, DNA analysis).

PRACTICAL APPLICATIONS OF EMBRYO TRANSFER

Brainstorm practical applications before discussing.

- Leave the donor in embryo transfer for one complete year or all of her life. This applies when the owner can sell at a profit, more embryos or calves than can be produced conventionally.
- Frozen embryos add a very valuable dimension to a breeding and sales program. Frozen embryos can be sold as a confirmed pregnancy. A normal variant is to freeze embryos all year and put them into recipients during the normal breeding season.
- Embryos can be produced and placed into recipients which are either calved out and sold as weaned calves or sold as pregnant recipients.
- The sale of embryo rights is done in a number of contractual ways, amounting to the forward sale of future production in valuable donor cows.

In considering the costs of doing embryo transfer at a facility or on the farm, there are several items to consider:

In small groups, list and discuss each of the costs. Ask members to estimate dollar values and then check the accuracy of their estimates with local resources.

- Collection fees
- Pregnancy fees
- Travel costs per day
- Recipient costs
- Maintenance of donors and recipients
- On-the-farm labor costs and quality

The embryo transfer contract is an important document both from the legal and business point of view. The contract should clearly define costs involved and the responsibilities of the contractor.

WHAT MAKES A GOOD DONOR?

In the search to improve efficiency of production in the cow/calf industry, the "super" cow and the "super" bull are constantly being sought for a planned mating. Ideally, cattle should be selected and their genetics maximized and propagated on the basis of producing a profitable, efficient product. Reasons for purebred breeders enrolling an individual in an embryo transfer program vary from breeder to breeder and donor to donor. True genetic value—the overall ability to transmit desirable traits in cattle is by far the most important long range factor to consider.

SELECTION CRITERIA OF A DONOR

Ask members to brainstorm possible donor selection criteria before discussing. List ideas generated for group discussion

- Genetic superiority (own performance record and production record of progeny)
- Reproduction performance (weaned a top calf every year with a calving interval of 365 days or less)
- Market value of progeny
- Visual analysis (structural soundness, capacity and functional efficiency plus overall breed character)
- Undesirably chosen due to problems becoming or maintaining pregnancy

DONOR MANAGEMENT

- Divide donors according to age, size, dry or lactating and possibly presence of horns (eliminate competition for feed and prevent heavy cows from mounting lighter cows or heifers—may also need different rations).
- Donors should be fed a balanced ration designed to maintain their weight or to gain slightly according to their age and condition. Particular emphasis should be given to minerals. Worm and vaccinate routinely (parasites can be a big problem when cattle are heavily concentrated on pastures).
- Donors should be provided with routine veterinary care and good animal husbandry should be practiced.
- How long should a donor be left in embryo transfer, should be a management decision for the owner. Are the calves being produced making money after costs of the embryo transfer.

WHAT MAKES A GOOD RECIPIENT?

- Good recipient—an open cow whose reproductive tract is capable of receiving an embryo and incubating it to term. She should be able to give birth to the calf without undue difficulty and then nurture the calf in such a manner as to realize its full genetic capability at weaning.
- Heifer versus cows—Heifer pregnancy rates are generally higher than cows (heifer genetics play no part in the embryo—size and structure of resulting calf are to be considered). Cows are generally larger and have more maternal instinct.
- On-the-farm recipients are best if they have been raised on that farm or have been there long enough to have raised at least one calf (immunity to local disease, familiar with management and facilities).

- Best recipient to buy is one that is already pregnant or has a calf at side (indicates good breeding status). Pregnant and wet cows do cost more.

RECIPIENT MANAGEMENT

Large numbers of open cows are most efficiently managed in dry lot situations where nutrition is controlled and labor is minimized. It is much easier to detect heat in small, dry lots compared to open pasture. Also, the nutrition of the dry lot cow is basically the same in summer, winter, rain or shine.

Source of recipients is an important point to consider when purchasing a recipient. The best place to buy recipients is directly from a rancher. The most undesirable place to buy recipients is through an auction barn (cattle are usually there because they are known to be problem breeders and have been exposed to a variety of diseases there.

- A big problem is the pregnancy status of “open” cattle.
- Insist on a negative Brucellosis test at the point of origin.
- Newly arrived recipient should be identified (tags), aborted if bred and vaccinated.
- Recipients are given no more than three opportunities to become pregnant with transferred embryos.
- Never sell or ship a recipient unless she has been pregnancy tested within two or three days prior to selling.

NON-SURGICAL EMBRYO COLLECTION

The following is one of the more popular methods.

1. Donors are generally started on a stimulation program between days nine to 14 of their estrus cycle.
2. Follicle Stimulating Hormone (FSH) is administered intramuscular in decreasing dosages two times daily at 12-hour intervals. FSH is administered for four consecutive days. Dosages range from 14mg to 52mg. Dosages vary with donor size/weight, pedigree and lactational status.
3. Prostaglandin is administered two times on the third day of the FSH shot regime.
4. Estrus should be exhibited by the donor 48 hours after the injection of prostaglandin.
5. The donor should be bred 2 to 3 times at 12-hour intervals beginning at the onset of heat.
6. Donors should be managed exactly the same way for the next seven days while fertilized embryos are developing.
7. Collection process should start with the donor being anesthetized with an extradural anesthesia (3 to 8cc lidocaine).
8. Prep donor by scrubbing rectum and vulva with betadyne soap.
9. Place gloved hand into rectum—place Foley catheter with stylet into the vagina. The catheter is worked through the cervix into the uterine body. Depending on what type of collection (body or horn) being done, the air cuff is inflated in the uterine body or inside the uterine horn. Remove the stylet from the catheter.
10. Flushing media is introduced through the catheter into the uterus until

Since this procedure is lengthy, providing an opportunity for the group to see an actual collection or view a video would be very helpful.

mild distention is felt. Gently manipulate the uterine horn to dislodge embryos from the folds of endometrium.

11. Media is allowed to drain into bowls or filters and flush procedure is repeated until approximately 250cc of media has been cycled. The procedure is repeated on the opposite uterine horn in the case of horn flushes.
12. Embryos are isolated and evaluated for quality and stage of development.
13. Embryos can be frozen for later transfer or transferred fresh.

NON-SURGICAL EMBRYO TRANSFER

1. When the number of embryos to be transferred is known, recipient's heat dates are matched with donor breeding dates in order to satisfy synchrony standards.
2. Recipient is blocked with extradural anesthesia
3. Vulva and surrounding areas are washed clean.
4. Both ovaries are palpated rectally in order to locate the active corpus luteum.
5. The embryos are loaded into a transfer gun which is introduced into the vagina. The gun is worked through the cervix and into the uterine horn that corresponds with the corpus luteum. The gun is placed as deep as the operator can without meeting resistance.
6. Embryo is slowly expelled as the gun is withdrawn.
7. Recipients should be watched closely for return of estrus within the 21-day cycle.

SUCCESS RATES

Industry averages:

Number of transferable embryos per collection	7–8
Fresh embryos being transferred (pregnancy %)	> = 60%
Frozen embryos being transferred (pregnancy %)	> = 50%
Split embryos produce at least one pregnancy/embryo	

DIALOGUE FOR CRITICAL THINKING:

These questions were developed by the state 4-H staff in collaboration with a committee of agents, animal science and human development specialists.

Share:

1. What criteria determine a good embryo donor? Why?
2. What are the major costs of embryo transfer?
3. If you have observed an embryo collection and transfer, what was most or least interesting?

Process:

4. What is the significance of the management of donor and recipient cows?
5. What are some of the difficult aspects of a successful embryo transfer? Why?

Generalize:

6. How could cattle producers in your area use embryo transfer? What would be the main benefits?
7. What breed traits would you consider that might benefit from embryo transfer? List and discuss one trait for each of 10 breeds.

Apply:

8. How might embryo transfer be useful in other 4-H projects?

GOING FURTHER

1. Visit a large animal veterinary clinic, and discuss the instrumentation and procedures involved in doing embryo transfer.
2. If a local slaughtering or locker plant exists in the area, consider retrieving ovaries from cows that have been slaughtered and using them to illustrate the follicles that are present that are used in the recovery of eggs.
3. Visit a producer that utilized embryo transfer in their cattle operation.

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