K-STATE Research and Extension

Making a Difference

2019-2020

Youth Development Program Focus Team

Kansas 4-H Virtual STEM Learning Experiences

Situation

COVID-19 caused K-State Research and Extension and Kansas 4-H to quickly adapt programming to virtual environments. This virtual programming blurred county lines and encouraged agents and staff to collaborate on various projects, including some Science, Technology, Engineering, and Mathematics (STEM) learning experiences.

There is currently an increased national emphasis on STEM in education. There is also an increasing need for STEM professionals and a scientifically literate society. These needs provided the impetus for 4-H on the national level to enhance, elevate, and expand science-related projects and programs. The current goal of the 4-H Science program is to provide developmentally appropriate, high quality learning opportunities that: (a) foster quality science learning, (b) promote science literacy, and (c) generate interest in science-related education and careers.

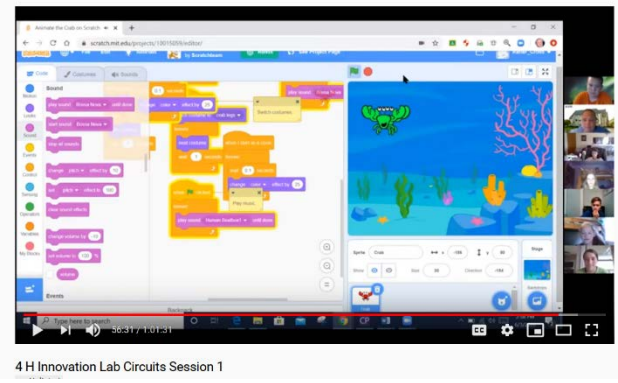
What We Did

Nine Extension Units (10 counties) came together to offer a six-week STEM experience during the summer through the 4-H Innovation Labs. Each week included a one-hour session led by Extension Agents for each session. The first session was for second through fifth graders and focused on Environmental Science and Technology. A second session for this area of interest was added due to high interest from this age group. Each week focused on a different area: water cycle, junk robot building, wind energy, owl pellet dissection, rocketry and Mars rover, and powerful pollinators. There was a total of 100 youth registered for these sessions.

The other session focused on Computer Programming and Computer Circuits and was for youth sixth grade and up. Week one focused on programming including what it is and and how it is used. The remaining five weeks focused on programing using the Circuit Playground device. Youth had the opportunity to showcase their programs during each session. A total of 45 youth participated in this session.

Breakout rooms were utilized to allow collaboration in all sessions, which allowed for youth to learn from each other and work together.

4-H Innovation Lab Session #6, Powerful Pollinators



4 H Innovation Lab Circuits Session 1

Screenshots from a couple of the virtual STEM sessions, Powerful Pollinators using small microscopes to look at and identify flower parts and learning basic coding skills with the older participants.

Outcomes

Two evaluations were sent to each participant. One evaluation was a requirement for the Google grant, which helped off-set the cost of this six-week STEM experience. Another evaluation was to gather specific ideas on what the participants learned throughout the six weeks.

The Google evaluation yielded a response rate of 37%. Some key findings, which were self-reported by the participants include:

- 46.3% Willing to work harder at things that are difficult.
- 55.5% I get to figure things out for myself.
- 55.5% I get to teach others what I have learned.
- 61% I am encouraged to plan for my future.
- 61% I want to learn all I can about the topic of this program.
- 64.8% I am passionate about the things I do in this program.
- 70% This program gives me the opportunity to explore something I really care about.
- 92.6% It's okay to make mistakes.

Environmental Science and Technology (41% response rate)
The most popular class session was junk robotic building followed by rocketry and Mars rover. Participants were asked what they learned while participating in the 4-H Innovation Lab. Some responses were:

- *"I learned that owls eat food and basically throw up a hair ball. I learned that the water cycle keeps going around. I learned it took a lot of tries to get my things built right and to work (wind wagon and rockets)."*
- *"I learned about bee types, and how to tell the difference between a fly, bee, and wasp."*
- From a parent – *"My kids learned so much in all the classes. The robot was their favorite. They learned more about the space tech projects. They loved the mars rover landing ideas and how to do things themselves."*
- From a parent – *"This was the best thing my kids had the opportunity to participate in since we had no face to face meetings. But in our rural area our kids would of never had this opportunity like some bigger counties. We would love more programs like this for all the youth to participate in. Opening these programs up to all the state was great. I hope Kansas 4-H will continue to offer programs like this so small towns can participate in these big programs."*

Computer Programming and Computer Circuits (13% response rate)
The most popular lessons included programming for the siren, music, magic wand, and temperature. No qualitative data was yielded from participants through the evaluation.

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