

# impact

University of Idaho Extension programs that are making a difference in Idaho.

## 4-H youth learn how they will influence the future of drones

### AT A GLANCE

Madison County 4-H youth learn drone flying best practices and how they will influence the future of drones.

### The Situation

As the world becomes more complex, the need to provide 4-H youth with more opportunities to be engaged with STEM programs becomes more critical than ever. STEM education provides youth with the opportunity to use and develop critical thinking and problem-solving skills. In addition, with advances in technology, more jobs require problem-solving and critical thinking skills learned through STEM education.

Drone STEM educational programs provide youth with a unique experience that is challenging and rewarding. Drones are being used to improve crop yields, by law enforcement, photographers and to make dangerous tasks safer. Drones are becoming a popular hobby, and an essential part of many industries as individuals and businesses learn about their potential and look to the sky for fun and profit. Our 4-H youth are in a position to greatly influence the future role of drones for both hobbyists and businesses.

### Our Response

The Madison County advisory committee requested more STEM programs for 4-H youth. University of Idaho Extension, Madison County faculty and staff followed up on this request, obtained a STEM grant and



Aerial picture of 4-H youth waving at a drone taken at Drone School in Madison County. Photo by Lance Hansen.

purchased six drones. Since then, we have obtained \$25,000 in grants to fund our drone program. We currently have 22 drones that ranging in price from \$180 to \$5,000. With the two trainings we have attended hosted by Idaho STEM Action Center, we developed a comprehensive hands-on five-day drone program.

Our drone program covers the following topics: history of drones, drone safety, drone best practices, rules and regulations, mechanics of drone flight, uses of drones in business and video editing.

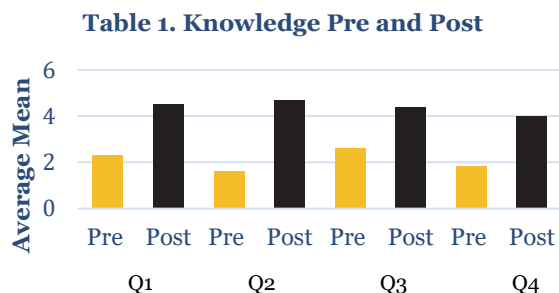
On day one of our program, we teach drone history, drone safety, rules and regulations and drone best practices. On days two, three and four, we fly drones, teach about mechanics of drone flight, uses of drones in business, and have guest speakers share how they

use drones in their careers. The youth learn that a significant limitation of drones is the battery life. The battery charge lasts up to 15 minutes, and each drone has three batteries. After using all the batteries, we discuss what the youth have learned about flying drones. We discuss ideas to improve drone technology. On day five, the youth are taught how to collect the images and videos taken and turn them into short videos.

This program provides 4-H youth with a great STEM learning opportunity that is exciting and fun. The focus of the drone program is to help 4-H youth use problem-solving and critical thinking skills. The topics covered during the program help the youth understand the capabilities and limitations of drones and what they can do to influence the future of drones.

## Program Outcomes

Since the beginning of our drone program, over 40 4-H youth from age nine to 16 have participated. We evaluated the participants and facilitated discussions to assess what they learned over the five-day program. A survey was developed using a Likert scale to measure knowledge before and after the program (see table 1).



Q1. I understand the importance of following best practices when flying a drone?

Q2. According to the FAA rules, I know where I can fly a drone and how high I can fly?

Q3. I am confident flying and operating different kinds of drones?

Q4. I know how to take photos and video while flying a drone?

## FOR MORE INFORMATION

**Lance Hansen**, Extension Educator • University of Idaho Extension, Madison County • 208-359-6297 • lancehansen@uidaho.edu

**Kandee Boice**, 4-H Coordinator • University of Idaho Extension, Madison County • 208-359-6297 • kboice@uidaho.edu

38-21-lhansen-drones-4h • 10/21

The 4-H youth had a significant knowledge and confidence gain after participating in the program. For question one, the participants had an average increase of 2.2 in their understanding of following best practices when flying drones. The participants all understood the importance of following best practices, such as asking permission to fly over neighbors house or around others in a public setting.

On question two, the average participant had a 3.08 increase in their understanding of the Federal Aviation Administration (FAA) rules. Learning about the FAA's regulations and rules helps the youth stop thinking of drones as toys and instead think of them as tools for fun and profit.

For question three, the average skill gain was 1.77 in participant's ability to fly the different types of drones. Flying several different kinds of drones helps them make an educated choice when they decide to purchase their first drone.

Finally, on question four, the participants had a 2.16 average increase in their ability to take photos and pictures while flying a drone. It is incredible to see what the youth created using the photographs and videos taken while flying the drones. When the youth saw the videos and images taken from a bird's eye view, they gained a new perspective of the capabilities of drones.

We asked the participants during our discussions about three topics: drone safety, how drones are used to improve our lives, and how they can influence the future of drones. The youths' response regarding drone safety were, "Keep the drone in your line of sight" and "Survey the area where you are flying to avoid collisions with power lines or trees." When asked how drones are used to improve our lives, the youth talked about how drones are used by search and rescue and by farmers and ranchers to improve crop yield or find lost cattle. When asked how they can influence the future of drones, they all agreed that improving the battery life of the drones would help improve how they can be used in the future by increasing the flight time.