
Title: Agri-Science Lessons at Senior 4-H Camp

Summary: Over 320 high school students expanded their knowledge about agriculture and science by participating in six lessons during the 2022 Senior 4-H Camp.

Situation: According to the United States Department of Agriculture Economic Research Service, the United States continues to suffer from declining farm operations. Peaking at 6.8 million U.S. farms in 1935, the U.S. was estimated to only operated approximately 2.01 million farms in 2021. A 2021 Michigan State University Food Literacy and Engagement Poll noted that 41% of respondents (n = 2001) say they never or rarely seek information about where their food was grown or how it was produced. Furthermore, a study conducted by ORC International on behalf of Land O'Lakes, in 2016 revealed that only 3% of college grads surveyed (n = 1020) and 9% of people born between 1982 and 2000 said they had thought about an ag career or would consider it. American Farm Bureau claims the average American is now at least three generations removed farming operations and farm/ranch families make up less than 2% of the U.S. population. With the United Nation's Department of Economic and Social Affairs projecting the world population to exceed 9.8 people in 2050, there is a critical need for today's youth to be knowledgeable about food and fiber production. Engaging youth in agricultural learning experiences is critical building awareness, strengthening food systems, and providing potential employment opportunities for the youth in the future.

Response: Senior 4-H Camp is a long-standing program within Georgia 4-H. High-school aged youth gather at a 4-H facility for a week-long experience which includes traditional camp activities (such as high ropes and canoeing) with workshops to engage youth in real-world content. As a way for high school students to expand their knowledge about agriculture and science, under the leadership of Georgia 4-H science specialist Kasey Bozeman, we developed, implemented, and evaluated six agriculture-science lessons during the 2022 Senior 4-H Camp. Campers were divided into teaching groups and participated in two 75-minute sessions each morning. Through a rotation system, every camper participated in all six activities. Lessons were taught by UGA Extension faculty, staff, volunteers, and counselors. Agri-science lessons and activities included:

- a) agricultural engineering where students learned about agricultural tools and advancements and built miniature grain elevators,
- b) dairy science where students learned about the physical and chemical changes associated with dairy product production and created ice-cream and cottage cheese
- c) plant biotechnology and selective breeding where students played a probability game to selectively breed the wild mustard plant
- d) agricultural technologies where students discussed the use of drones, global positioning systems, computers, and robotics within agriculture and coded robots
- e) beef cattle production where students learned basic information about operating a successful beef cattle farm and demonstrated their knowledge through a series of mystery games, and
- f) agricultural economics where farmers had to buy various energy credit types (hydro, coal, nuclear, etc.) to operate their farm and learn about the impact of renewable and non-renewable energies.

Results/Impact: Three-hundred twenty-seven high school youth and thirty-seven adults participated in 2022 Senior 4-H Camp. Evaluation data collected from youth participants suggested students developed a deeper understanding of agriculture and considered this as a potential career field. Over 86% of youth (n = 296) were able to correctly categorize agriculture operations energy sources. Nearly 85% (n = 295) of youth learned new computer science terminology. Over 75% of youth (n = 255) were able to successfully use new plant breeding terminology.

One 4-H'er noted, "by understanding how different inventions advance agriculture, it lets us understand how things work." After being asked about the importance of incorporate technological practices into modern agricultural operations, another youth shared, "maximizing efficiency in a resource-struggling world while increasing production for the growing product use and food consumption is important."

Multiple adult instructors shared their positive perspective of the program. One adult leader commented, "I love all thing plants, but I was unsure how exciting a plant genetics course would be to campers on summer break. However, almost every group was engaged and asking questions throughout the lesson. It was inspiring to see how much the students wanted to share their knowledge about plants and how plant breeding has changed the world." Another instructor shared, "teaching a science class at senior camp ended up being my favorite part of the week. Campers were incredibly engaged, learned a lot, and applied their knowledge to real life scenarios. It's the best kind of learning kids can experience."

A South Georgia mother also noted the impact of the science classes on her son: "I am also extremely grateful for his engagement in the "Energy Bartering" activity...I was delighted to see his face light up as he described both supply-side and demand-side of economics...[my son] has expressed some interest in economics, but I am hopeful that such exposure will help further his curiosity."

