Santa Barbara Girl Scout Earns Gold Award
Natalie McCaffery combines sustainable agriculture with computer science in her project, “Smart Farm”

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Natalie McCaffery was naturally drawn to the world of STEM that utilizes real-life application. She recognized the lack of healthy food choices among young students and their unawareness of where the food that they put in their bodies comes from. Seeking to combine her interests in both computer science and sustainable agriculture, she set out to begin her project, Smart Farm.

With its diverse array of land and ecosystems that allow a wide variety of species to flourish, California is the nation’s primary producer of crops and livestock (13% of the United States’ total agricultural value). According to the California Department of Food and Agriculture, over a third of the vegetables and around two-thirds of nuts and fruits grown in the U.S. come from California. With a growing global population and food demand, agricultural production will only to continue to increase with the help of technological advancements in plant and animal genetic understanding and robotic agricultural equipment.

By creating a program at her school that teaches sustainable agriculture and provides an emphasis on how our agricultural world is changing with breakthroughs in technology, Natalie gave students the opportunity to explore the farming industry that dominates California. Her curriculum has both upper and middle school components, with the intention of promoting healthy eating among her peers and inspiring students to apply what they learn in computer and science classes to the real world.

Collaborating with leadership at Laguna Blanca School, Natalie created and taught her own curriculum with measurable outcomes for the success of the program. At the middle school, she led ten quarter-long terms (2.5 school years) of activity groups with eight to nine students in each session, teaching them farming methods and encouraging students to consider the influence of technology on what we eat. Beginning her freshman year, she started a Farm Club at the upper school that manages three raised gardening beds, builds compost piles, and sustains the project.

In the next phase of her project, Natalie will be building smart farm weather stations powered by Arduino boards to give students experience with components of computer science integrated into agriculture. Arduino is an open-source electronics platform based on easy-to-use hardware and software, and the boards are able to read inputs (sensors, buttons, etc.) and turn it into an output using computer programming.

Natalie worked with the Internet of Things club at her high school to develop a weather station that uses an array of sensors and circuitry on the Arduino board to evaluate a given land plot and its weather patterns to support agriculture. She plans to later implement the stations into her middle school curriculum, which has already directly educated and impacted 80 middle school students through the swoop group program.

“A lot of students from my swoop groups have started their own gardens at home and are always eager to bring me food they’ve grown,” she says. “Seeing students interested in eating the produce and vegetables from our school garden is a step towards a healthier campus.”

Not only did her project address the lack of an agriculture program at her school, but is also defied the stereotype that computer science can only take place in a lab.

“I believe, especially for girls, that computer science is stereotyped as a field that requires sitting in front of a screen all day coding, and I wanted to prove this assumption wrong by teaching students the importance of computer science in the everyday, natural world around them,” Natalie says. “By teaching kids about agriculture and then challenging them with the task to integrate certain technologies into basic farming methods, students were able to discover — on their own — the miracles of interdisciplinary work and brainstorm ways that technology can better our world.

“These students that I’ve worked closely with now have the skills to share knowledge with their peers and encourage others to start gardens, making our community a greener and healthier place. They have been exposed to computer science as a hands-on, nature-driven field and hopefully are inspired to pursue science in their futures. I hope that I have influenced more girls to go into computer science because they have now seen a more worldly application,” she says.

Natalie’s program will be sustained after her high school graduation in 2020 by the Farm Club at her school and the middle school science teacher that will integrate the curriculum into his classes. Her ultimate goal is to modify the curriculum so that it becomes versatile enough for other environments and demographics of society, so that it can be ultimately be applied on a large scale.

Her Girl Scout troop will also be learning how to teach the curriculum, and they will be implementing it into a local community in dire need of nutritional support on an upcoming Belize trip they’ve been planning for the last two years. “Teaching the next generation how to use modern technology to execute fulfilling tasks is a step in the direction of aiding our world’s problems, which in this case is hunger,” she says.

You can visit Natalie's website to learn more about her mission and view blogs that detail her project's activities. She has also organized an Ag-Tech STEM event at MOXI, The Wolf Museum of Exploration + Innovation in Santa Barbara on May 19th, where attendees will experience an abridged version of the curriculum and learn how agriculture and technology combine in a day of innovative learning.

If you are interested in learning more about the Gold Award, you can find more information here!

About GSCCC
Girl Scouts of California's Central Coast serves over 10,200 girls across six counties and is committed to making the Girl Scout Leadership Experience available to girls in ways that impact their lives both in the moment and into the future. Girls participate in troops, individual projects, council events, day camps, resident camps and more. A variety of leadership, outdoor skills, and Science, Technology, Engineering, and Math (STEM) based programs and events provide girls with opportunities to learn and explore in fun and informative ways. To join or volunteer in Santa Cruz, San Benito, Monterey, San Luis Obispo, Santa Barbara or Ventura County, visit: http://www.girlscoutsccc.org.

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