

A SYSTEM OF ATTRACTING NEW STUDENTS



story by AMY BETH GRAVES
photos by DAVE LIGGETT

4-H, FFA programs focus on much needed areas of science, technology, engineering and math (STEM)

Told that he will be a scientist for the next 30 minutes, Andrew Nation is all eyes and ears. He keeps looking at the three test bottles, waiting for the green 4-H balloons on them to rise up and maybe even explode, as he tells his friends excitedly. When he discovers that the balloon is sinking into the No. 2 test bottle and not expanding, he isn't sure what to think. His hypothesis was that the mixture of corn syrup, yeast and warm water would cause the balloon to blow up.

Instructed to gently swirl the contents of his bottle for 30 seconds, he has to control his enthusiasm and not shake it like some of the other students. Told to not touch the bottle or balloon, Nation can't resist. It's hardly any wonder – he's only 8 years old and is doing a "hands-on" science experiment. Finally after about eight minutes, he yells out his observation.

"Wow, look at mine. It's rising," Nation says of the balloon. "It's bigger than an egg."

All around the room, dozens of third-, fourth- and fifth-grade students at Fairlawn High School in Sidney excitedly write about or document their results. After the experiment, the students discuss their results and what they learned, including why some of the No. 3 bottles' test balloons rose and others didn't. Those bottles contained yeast, warm water and crushed up plant material ranging from deciduous leaves to switchgrass to black locust leaves.

"Wow, look at mine. It's rising. It's bigger than an egg."

*~Andrew Nation,
8-year-old student*

"They pretty much got the concept," said Carolyn Belczyk, an Ohio State University Extension educator, of the "Biofuel Blast"

experiment, which was designed to teach how cellulose and sugars in plants can be converted into fuel.

"There's a science component to a lot of 4-H activities, but a lot of kids don't make the connection," said Belczyk, who runs 4-H's Youth Development in Shelby County. "Doing something like this makes it easier for them to make the connection."

Making that science connection has been an integral part of 4-H since its founding in 1902 in Clark County. But with demand continuing to rise for students in the areas of science, technology, engineering and math (STEM) in the United States, both 4-H and FFA are stepping up their efforts to get youths interested in these studies.

"It has been shown that engaging youth in scientific exploration early sparks a lasting interest in the sciences," said Donald Floyd, Jr., national 4-H Council president and CEO.

Last year, 4-H started the One Million New Scientists, One Million New Ideas campaign with the goal of engaging 1 million youths in science, engineering and technology programming by 2013. The "Biofuel Blast" experiment was part of 4-H's National Youth Science Day held nationwide in October.

"New discoveries in biotechnology, genetics, alternative energies and other fields mean that our nation will need more people with an interest and solid education in science, math and engineering," said Bob Horton, 4-H educational



OPPOSITE PAGE Matthew Strunk and Madison Huelskamp are excited to see one of their balloons start to inflate while doing a 4-H "Biofuel Blast" experiment, which taught students how cellulose and sugars in plants can be converted into fuel. **ABOVE** Alivia Meyers, center, and her classmates discuss their observations of the experiment before recording them at Fairlawn High School in Sidney.

FOR MORE INFORMATION



4-H is a nonformal, educational youth development program offered to individuals age 5 and in Kindergarten to 19. Youth are involved in hands-on, experiential learning that allows learning by doing. All 4-H programs focus on active involvement and quality experiences that stimulate lifelong learning of values and skills. Visit ohio4h.org



FFA is a youth organization that is a part of agricultural education programs at middle and high schools. Student members are engaged in a wide range of curriculum and FFA activities, leading to more than 300 career opportunities in agriculture. Visit ohioffa.org



L to R: Meghan Bell, Kyle Sturgill and Madison Huelskamp start working on their experiment while listening to directions from Ohio State University Extension educator Carolyn Belczyk.



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to prepare them for the demands of feeding more than 6 billion people and prepare them to deal with a growing nation that has less acreage," said Katy Endsley, program manager for Ohio FFA.

Horton said having youths do interesting hands-on STEM programming has been shown to motivate children to pursue a career in science as adults.

For third-grader Andrew Nation, the "Biofuel Blast" experiment sparked his interest in science. On a form about the experiment, he circled the first choice on whether the activity increased his interest in science — "A lot! I think I'd like to be a scientist when I grow up." ○

"I think I'd like to be a scientist when I grow up."

design and science education specialist for OSU Extension. "One look at the statistics tells you we must begin now. Currently only 18 percent of U.S. high school seniors are considered advanced or proficient in science."

Horton pointed out that statistics by the National Science Foundation showed only 32.4 percent of U.S. students are pursuing undergraduate degrees in science and technology compared with 63.3 percent in Japan and 56.2 percent in China.

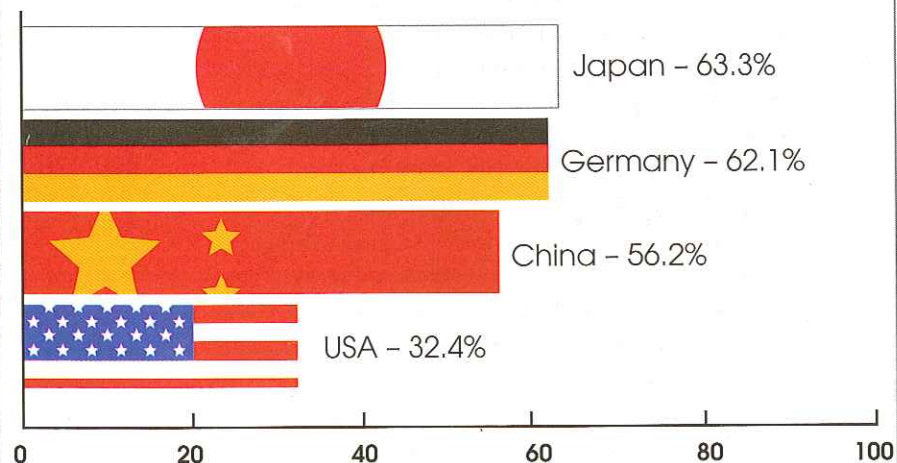
In August, Ohio FFA chapters participated in two STEM-oriented events sponsored by the Monsanto Co. Youths toured a Monsanto research farm, learned about future technology for agriculture and visited Monsanto's Mobile Technology Unit, an 18-wheeler that can run on biofuels and has more than 1,000 square feet of exhibit space to showcase innovations

in plant breeding and biotechnology.

"We are trying to prepare students to be future leaders of agriculture. It's crucial that we integrate STEM into what they're learning because we need

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Students pursuing undergraduate degrees in science and engineering:



Source: National Science Foundation's Science and Engineering Indicators