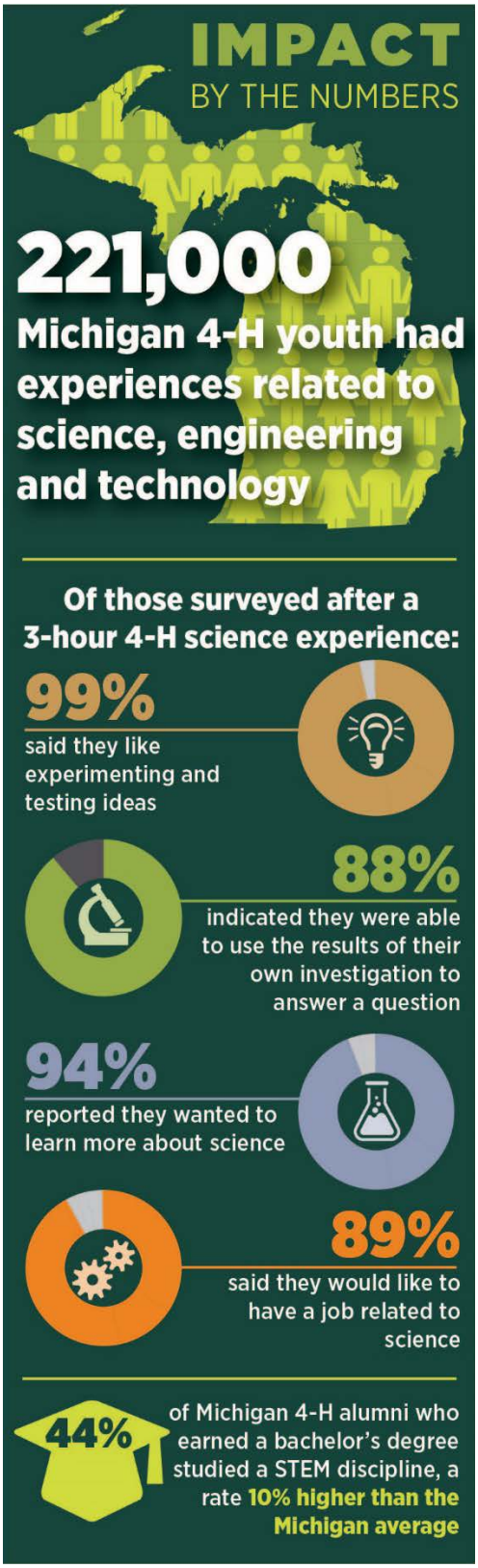

MSU EXTENSION: BUILDING SCIENCE LITERACY & FUTURE STEM PROFESSIONALS

THE ISSUE

The U.S. Office of Science and Technology Policy indicates that STEM (science, technology, engineering and mathematics) occupations are growing at nearly two times the rate of non-STEM jobs. In addition, a growing number of fields are seeking employees with STEM-related skills such as problem-solving, critical thinking and technical abilities. Despite this increasing demand for STEM-educated professionals, 77 percent of 2016-17 Michigan seventh graders were below proficient in science achievement, and the U.S. Department of Education reports that only 16 percent of high school seniors are interested in pursuing STEM careers.

MSU EXTENSION ACTION

To help create a future workforce excited about STEM careers and armed with important STEM skills, Michigan State University (MSU) Extension has made science education a key focus of its 4-H Youth Development programming. During the 2017-18 program year, Michigan 4-H youth explored science, math, engineering and technology through 221,000 4-H experiences in fields ranging from animal science to robotics and biology to consumer science. In addition to increasing their science knowledge in these exciting areas, 4-H STEM programming also engages youth in the experiential inquiry-based learning process that helps them to build important problem-solving, critical-thinking and decision-making skills.

THE IMPACT

After participating in 4-H science programming, participants showed high rates of positive attitudes and aspirations toward science, interest and engagement in science, and an ability to demonstrate responsibility, critical thinking and problem-solving skills. This indicates that after participating in 4-H STEM activities, youth are more likely to recognize the relevance of science and see themselves pursuing a related career, as well as more equipped with the cutting-edge STEM skills in high demand.

Creating conservationists and creative thinkers

In 2018, 26 Michigan 4-H'ers spent five days on the campus of MSU as they attended 4-H Renewable Energy Camp. This pre-college program is designed to educate youth on current issues and technologies impacting energy and the environment as youth work with researchers to conduct experiments, make their own biofuel, design and test wind turbines, and create a solar-powered model home.

As a result of their attendance, youth improved their knowledge and skills related to environmental science and conservation, scientific processes and STEM careers. In particular:

- 80 percent of youth felt they could influence environmental issues through conservation.
- 73 percent could use scientific data to form a question.
- 61 percent were interested in a career in environmental science.

This mastery of the subjects at hand allowed 12 participants for 4-H Renewable Energy Camp to earn two digital badges, an acknowledgement of their comprehension and development in the topics. Beyond their own personal enhancement, youth found the skills gained to be of great importance to others as well.

"[We are] learning how to solve problems that will need to be solved in the future," said one young person.

"[This program] was fun and told me I can solve issues on my own if I try."

- Eighth grade Michigan 4-H Robotics Youth Challenge participant

"I wanted to let you know it [her 4-H experience] left a great impression on her. She now thinks science is cool."

- Parent of a Michigan 4-H science program youth participant

In 2018, the state's $63.1 million investment in MSU AgBioResearch and MSU Extension generated more than $1 billion for Michigan residents. Every dollar the state invested in MSU AgBioResearch and MSU Extension resulted in an additional $2.26 leveraged in federal funds and external contracts, grants and other revenues, as well as $5.80 in additional community benefits. As a result, MSU Extension and MSU AgBioResearch are able to serve Michigan residents with a benefit/cost ratio of 16:1.

These cost benefits are huge, but they are not the only benefits that MSU Extension brings to the state. Through Michigan 4-H Youth Development, more than 203,000 youth learn compassion, respect, leadership skills, responsibility, the value of hard work and other critical abilities. In addition, MSU Extension early childhood education programs prepare thousands of Michigan's youngest children for school success. Learn how you can contribute to this type of programming at: msue.msu.edu/giving.