



MSU Extension's Impact On

BUILDING SCIENCE LITERACY & FUTURE STEM PROFESSIONALS

In 2016, the state's \$60.2 million investment in MSU AgBioResearch and MSU Extension generated a more than \$1 billion impact for Michigan residents. Every dollar the state invested in AgBioResearch and MSU Extension leveraged an additional \$2.68 in federal funds and external contracts, grants and other revenues, including nearly \$1.1 million leveraged by MSU Extension children and youth programs alone. As a result, MSU Extension and MSU AgBioResearch are able to serve Michigan residents with a benefit/cost ratio of 19:1 when adding in other social and economic benefits too.

These cost benefits are huge, but they are not the only benefits that MSU Extension brings to the state. Through MSU Extension 4-H Youth Development, more than 212,000 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.

"I got to build and control machines and I loved it!"

- Fourth-grade student who participated in a 4-H robotics program



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, 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 2015-16 program year, Michigan 4-H youth explored science, engineering and technology through 262,000 4-H experiences in fields such as biological sciences, environmental sciences, rocketry, mechanics, consumer sciences, renewable energy, computer sciences, robotics, animal sciences and plant sciences. 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

As a result of their 4-H STEM experiences, youth are excited about science and better equipped with critical life skills necessary for future success. After participating in long-term 4-H science programming of 3 hours or more, participants showed **statistically significant increases in their attitudes and aspirations toward science, their interest and engagement in science, and their ability to demonstrate responsibility, critical-thinking and problem-solving skills.** This indicates that because of 4-H STEM activities, youth are

not only more likely to recognize the relevance of science and see themselves pursuing a related career, but also more equipped with the cutting-edge STEM skills in high demand.

Among youth surveyed, specific findings include:

91% reported they were excited about new discoveries.



90% said they use information to make decisions.



90% indicated they liked science.



84% could explain why things happen in an experiment.



Data also indicates that Michigan 4-H'ers are more likely to pursue STEM disciplines in post-secondary education. Of those who earned a bachelor's degree, **45 percent of Michigan 4-H'ers graduated with a STEM degree, a rate 11 percent higher than the Michigan average.**

First-Year 4-H Robotics Team Wins Big

In 2016, St. Clair County 4-H launched their first robotics program and found the program to be in high demand: they filled three different teams of varying ages. But overwhelming interest was not the only thing the 4-H robotics teams experienced – they also saw great success. One team even did so well as to earn a spot in the World Championship competition after finishing first at two district events and winning the Rookie Inspiration Award at the State Championships.

Though thrilled with its success, parents and kids in the program found even more benefits of the program. “We are so glad St. Clair County 4-H has brought this new adventure in technology to these kids who would not otherwise have this opportunity,” said Trevor Korn, a 4-H robotics club volunteer whose 10-year-old son participates in the program. “4-H teaches good life skills for its youth members. There are many new areas of science and STEM that have become a large part of the 4-H program today.”

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“This camp has opened my mind to various careers related to animal science, and also allowed me to develop or enhance vital skills like communication. I’ve also been impacted in that I now believe I want to be a vet and will be able to make that happen.”

- Michigan 4-H Animal & Veterinary Science Camp participant



“This is my favorite program I’ve ever done and I wish I could learn more about robots.”

- Fourth-grade student who participated in an in-school 4-H robotics program