



Science Literacy

BUILDING SCIENCE LITERACY & FUTURE STEM PROFESSIONALS

In 2015, the state's \$56.6 million investment in MSU AgBioResearch and MSU Extension generated more than \$1 billion for Michigan residents. Every dollar the state invested in AgBioResearch and MSU Extension leveraged an additional \$2.59 in federal funds and external contracts, grants and other revenues, including nearly \$1.3 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 18:1.

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 200,000 youth learn lifelong skills, develop leadership abilities and discover the value of community service. In addition, MSU Extension early childhood education programs prepare thousands of Michigan's youngest children for school success.



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 STEM jobs. A State of Michigan Department of Technology, Management and Budget March 2015 report states that STEM jobs in Michigan are expected to grow by nearly 12 percent by the year 2020, compared to just 8.5 percent for all occupations. Despite this staggering growth and the overwhelming importance of STEM careers to the U.S. economy, 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, Michigan State University (MSU) Extension has made science education a key focus of its 4-H Youth Development programming. During the 2014-15 program year, more than 187,000 youth explored science, engineering and technology through 4-H projects 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 these youth focused on individual projects, 36,000 people also participated in more than 600 science literacy workshops, trainings, series and outreach activities specifically designed to improve science knowledge.

THE IMPACT

While 4-H STEM programming seeks to increase science literacy, it also exposes youth to the experiential inquiry-based learning process that helps them to build important problem-solving, critical-thinking and decision-making skills. As a result, youth who participate in 4-H STEM events are excited about science and better equipped with critical life skills necessary for future success. Among the 4-H science literacy participants surveyed:

- 96 percent had increased their science knowledge and 93 percent had the ability to apply science knowledge after participating in a 4-H science program.
- 87 percent were interested and engaged in science-related activities.
- 81 percent had positive attitudes about science, recognizing the relevance of science to the world and seeing it as a part of their future.
- 79 percent believed they had positive decision-making skills.
- 74 percent would like to have a job related to science.
- 72 percent said they had strong problem-solving and critical-thinking skills.

MSU Extension also engaged more than 1,500 adults in 4-H STEM programming in an effort to arm volunteers who work with youth with the skills and knowledge to use and teach the experiential inquiry-based learning model. Of those surveyed:

- 72 percent indicated they understood how to teach youth using an experiential, inquiry-based approach.
- 96 percent planned to apply the knowledge and skills they have acquired to help youth learn science.

4-H Camp Expands Knowledge and Dreams

The 2015 4-H Animal and Veterinary Science Camp provided 40 youth with the opportunity to learn more about the fields of animal and veterinary science. Attendees toured MSU farms and facilities to learn about animal research and handling; engaged in hands-on veterinary activities such as dissection, suturing and physical exams; and worked through a veterinary science case study regarding zoonotic diseases. These experiences allowed participants to develop practical knowledge in the fields of animal and veterinary science while also learning about potential careers.

For one participant, the camp was particularly life changing: “I learned a lot about the determination and persistence that it takes to go into the veterinary field. I’ve realized that you’ll often be discouraged by the time and effort it takes, but now I’m convinced that with the right attitude, you can pursue those dreams.”

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“Camp made me want to pursue a career in biology or chemistry and increased my confidence, problem solving and bravery.”

- 4-H Great Lakes and Natural Resources Camp participant from Calhoun County



“This 4-H workshop was very beneficial. There was so much information given that I will be able to use back in our home county.”

- 4-H Beef, Sheep and Swine Workshop volunteer from Van Buren County