Impact

Colorado State University Extension

Sharing the difference CSU Extension makes in people's lives and their communities.

A network of STEM specialists enrich learning opportunities

More Colorado youth and educators are learning about and engaging in Science, Technology, Engineering, and Math (STEM) through 4-H science inquiry-based programs.

Issue

Throughout the nation and especially in Colorado, the need for a workforce with strong STEM skills is being addressed. One of the ways Colorado 4-H has responded to the national 4-H challenge was through the STEM initiative to reach youth with hands-on learning experiences that encourage discovery.

Extension's Response

Almost three years ago, Colorado State University Extension followed the lead of the national initiative by hiring a state STEM specialist and four regional STEM specialists. Regional STEM specialists support both statewide and local inquiry-based STEM learning opportunities. They provide educational support for county 4-H agents, volunteers, youth, and classroom teachers by:

- developing or enhancing STEM-related curriculum, activities, and kits, such as robotics, GPS, water resources;
- customizing STEM learning for school enrichment, out-of-school programs, and 4-H clubs;
- producing STEM trainings for agents, leaders/volunteers, teachers, and youth;
- working with underserved and under-represented youth;
- procuring $273,000 in grant funds to support STEM-related 4-H initiatives.

Throughout the state, STEM specialists have collectively developed or expanded signature programs, such as Robotics, Tech Wizards, MetLife teacher trainings, and STEMasters. STEMasters, which piloted in Summit County in spring 2012, trains local adult and youth volunteers as well as teachers to lead STEM activities both in- and out-of-school. Grants from J.C. Penney and FIRST Robotics helped regional specialists expand 4-H participation in robotics through clubs, projects, and competitions. A $15,000 MetLife Foundation afterschool training grant allowed specialists to provide more than 300 teachers and out-of-school educators—through nine separate trainings—with STEM-enriched 4-H curriculum.

Regional STEM specialists have also developed many local STEM learning opportunities that reflect the strengths and interests of regional communities. The bimonthly STEM newsletter details these efforts. For more information see recent newsletters at: www.colorado4h.org/stem/stem-newsletters.php.

The Bottom Line

- Since 2011, approximately 9,400 youth have participated in STEM-related programs and projects.
- Regional STEM specialists have made this possible by developing STEM programs that meet the specific needs and interests of communities around the state.
- 4-H STEM programs, such as robotics and GPS, provide youth new opportunities to participate in Colorado 4-H.

By the Numbers

- Grant dollars raised by 4-H STEM (2 ½ years): $492,737
- Youth served STEM education programs (2012): 4,777
- Training provided to educators, agents, and volunteers (2012): 1,728
- Indirect support and outreach efforts across Extension: Upwards of 10,000 (youth and adults)

Impact

The Colorado 4-H regional STEM specialist team has significantly increased opportunities for youth around the state to engage in inquiry-based STEM learning experiences that enhance positive youth development. Christy Fitzpatrick, Front Range region STEM specialist based at the CSU Northeast Regional Engagement Center in Sterling, believes that the combination of STEM learning with positive youth development gives kids the skills they will need to excel professionally. "They need to do more than just be good at math and science," Fitzpatrick says. "They need to be good at teamwork and communication and many other life skills that 4-H teaches."

Regional specialists also have created new avenues for county agents to reach youth who are new to Colorado 4-H, including a wide range of school enrichment and out-of-school resources—curriculum, kits, and activities. They have also supported an expansion in the number of robotics programs around the state. Regional STEM specialists work closely with 4-H agents to support their communities' STEM activities, trainings, and special programs to help meet the needs and interests of local youth. Collaboration has resulted in diverse STEM programming across the state, along with increased 4-H participation including:

- Western Region (Southwest Colorado): Ute Mountain Middle School students are designing and building a community satellite over a series of weekend camps;
- Front Range Region (Urban Corridor): Hispanic, Asian, and Somali youth are gaining life skills through Tech Wizard programs that focus on acquiring knowledge and skills specific to GPS, GIS, robotics, videography, and photography;
- Northeastern Regional Engagement Center (Eastern Plains): Robotics programs are reaching parents and youth who wanted to be involved in 4-H but didn't have a means to participate in traditional agriculture projects;
- Peaks & Plains (South Central): Water education programs through the WRECking Crew (Water Resource Education Curriculum) where three high schools are participating.

In addition to helping youth gain life skills, 4-H STEM activities are helping youth develop an interest in lifelong learning related to STEM. Specialists have also designed career fairs to provide a hands-on means by which middle and high school students can learn from professionals about how STEM knowledge can lead to a meaningful career.

Career fairs will also link students to campus admissions representatives from colleges around the state, helping students make a connection between their STEM interests, the realities of a career, and the education it takes to get there. Some 4-H youth are getting a head start in applying their STEM knowledge and skills. The STEMasters program in Summit County motivated high school youth participants to develop and lead an afterschool robotics team at the middle school.

Colorado 4-H STEM specialists will continue to develop and expand STEM initiatives, resources, and activities by:

- expanding STEMasters to other Colorado communities and develop new modules;
- enhancing the 4-H STEM website with more information, resources, and links to activities, such as participating in 4-H's National Youth Science Day;
- developing STEM programs, activities, and kits that support 4-H programs and projects.

"You need to do more than just be good at math and science. You need to be good at team work and communication—the life skills we focus on in 4-H."

– Christy Fitzpatrick
4-H STEM specialist, Northeast Regional Engagement Center

"4-H STEM programs teach youth 21st Century Skills, which meets their needs and the needs of our nation too."

– Claire Dixon
4-H STEM specialist, Front Range region

"We are asking STEM professionals to share a hands-on activity with students and to discuss what they do."

– Barbara Shaw
4-H STEM specialist, Western region

Learn More

Connect with the Colorado 4-H STEM program online: www.colorado4h.org/stem

Regional STEM specialists:

- Anne Casey (Peaks & Plains Region)
- Claire Dixon (Front Range)
- Christy Fitzpatrick (Northeastern Regional Engagement Center)
- Barbara Shaw (Western Region)

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