

Impact

Colorado State University
Extension

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

Exploring the science of food production

A new agricultural education program for elementary school children in Eastern Colorado explores the science behind how and where food is grown.

Issue

Food production is the second largest revenue source in Colorado. In 2007, the state's top five producing counties, all located in Northeast Colorado, generated nearly \$3 billion in agricultural revenue—almost half of the state's \$6 billion total. Ironically, many young people living in these agricultural-rich areas often think food comes from the store rather than a farm. Yet, as more families in Eastern Colorado are relocating to towns and cities, children are getting more and more disconnected from how farmland is related to production agriculture. Schools are a likely forum for teaching young students about agriculture and the science behind food production. However, science lessons rarely focus on agriculture. Furthermore, teachers don't always have the time, resources or knowledge to deliver standards-based science lessons that also engage students in hands-on learning.

Extension's Response

In 2010, CSU Extension agents from across Eastern Colorado created *AgFest 2010*, a one-day, agricultural and science enrichment program for fifth- and sixth-grade students. The event featured 10 activity stations focused on a science-based learning objectives related to agriculture. Topics included:

- Microbes and bacteria
- Embryology
- Metamorphosis and pollination
- Bio Technology & Plant Science and crop production
- Ruminant digestion
- Dairy production
- Biodiesel production
- Farm and tractor physics
- Wool and natural fiber production
- Bee keeping

Extension agents designed a variety of hands-on learning activities which made challenging science concepts easy to understand. For instance, at the farm and tractor physics station, students experimented with pulleys and levers to learn about lifting loads and multiplying force. Students were also introduced to a cow's four-chambered stomach, good versus bad bacteria, hatching chicks, how a press can turn oil seed into fuel, plant germination, and insect life cycles.

Approximately 300 students from 13 school districts across Eastern Colorado attended one of three *AgFest* events held at fairgrounds and community centers in Brush, Siebert and Lamar. *AgFest* will return to these three areas in 2011.



The Bottom Line

- *AgFest* enhances science education through standards-based activities that raise student awareness about food production and farming.
- *AgFest* complements classroom learning and provides teachers an opportunity to increase their students' understanding of science concepts.

Ag Fest Contributors

The event was made possible by contributions from the Western Dairy Association, Colorado Farm Show, Southern Colorado Farm Credit, Koberstein Farms, Colorado Corn, Scottish Wright Outpost, and Northeast Colorado Shriners.

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Results from surveys taken before and after *AgFest* show that students greatly increased their understanding of scientific and agricultural concepts. Results suggest that students learned the most about physics and ruminant digestion, two topics that featured some of the most interactive and engaging activities. Students also demonstrated an increased awareness that food doesn't come from the store, but is grown on a farm.

AgFest surveys asked students to write down the most interesting thing they learned that made a lasting impression. Overwhelmingly, students provided detailed descriptions of the levers and pulleys, incubating eggs, 'gross' germs, and the 'amazing' four-chambered cow stomach. The majority of students was enthusiastic about *AgFest* and expressed a desire to return because it was so much fun.

Backed by 4-H curriculum development in Science, Technology, Engineering and Math (STEM)¹, Extension agents provide the resources and expertise of science-based activities that many teachers cannot offer in their classrooms. As *AgFest* evolves, Extension agents hope to further develop station activities to give students ever-more engaging hands-on learning opportunities that develop their understanding of the agricultural, natural, physical, and life sciences while increasing their awareness of food production.

"The thing I liked the best is the levers. It was fun getting to try them. I wish we could go back and learn more. It was a great field trip and I would go there again."

– *AgFest 2010*
5th grader

"Thanks for doing this. I don't have the funding, the time, or the technical expertise to do this for my students."

– Nora Hubbell, 5th & 6th grade teacher
Hi Plains Elementary School, Verona, Colorado

County Partners

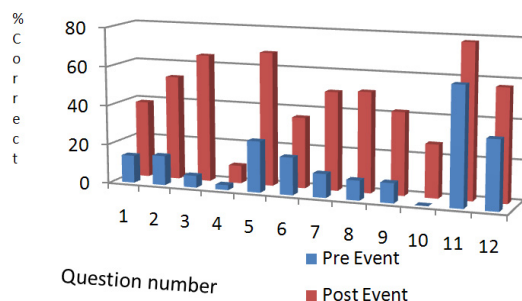
AgFest was organized and delivered by Extension agents, specialists and program associates from the following counties:

Bent County
Cheyenne County
Crowley County
Kiowa County
Kit Carson County
Lincoln County
Logan County
Morgan County
Otero County
Phillips County
Prowers County
Sedgwick County
Washington County
Yuma County

Contact Information

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Student knowledge of	Pre Event	Post Event
1 Embryology - 2 requirements for eggs to hatch	14	39
2 Natural Fibers - uses and resistance to flame	15	53
3 Physics - levers & pulleys	6	65
4 Dairy Production - daily production per cow	2.5	9
5 Ruminant Nutrition - compartments of the bovine stomach	26	68
6 Bio Fuels - alternate fuel sources	19	36
7 Metamorphosis - life cycle and damage	12	50
8 Microbiology - virus, bacteria and protozoa	10	51
9 Entomology - bee keeping & honey	10	42
10 Biotechnology & Plant Science	0	27
11 Where our food is produced	60	78
12 Student's Interest in Career in Ag	35	57



¹ Science, Technology, Math & Engineering (STEM) combines the strengths of 4-H programming, non-formal experiential-based delivery modes with strong youth/adult partnerships to address content as defined by the National Education Science Standards and practice STEM abilities in order to prepare our youth to compete in the 21st century workplace.