Promoting Science Through the Food and Agriculture Research Experiences for Teachers (RET) Program

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The Need for Food & Agricultural Literacy

• Reasons:
  ▪ By 2050 there will 2.4 Billion more people on earth…how will we continue to feed the word?
  ▪ Confusion among consumers and voters about food, where it comes from and how it is produced.
  ▪ In the U.S., less than 1.5% of people live on farms. Children think that milk comes from stores and that chickens are treated cruelly.
  ▪ Few understand or appreciate the role of agriculture in the U.S. economy and trade.
  ▪ In Nebraska, 1 in 3 jobs is agriculture-related.
The Need for Science Literacy and Effective Pedagogy

• Most elementary teachers have not experienced “doing” science.

• Most elementary teachers don’t understand that science is not simply a collection of facts, but an ongoing process of discovery.

• Most elementary teachers have not been asked in their science experiences to develop a question, collect data, use data to make inferences, and apply new knowledge.
Research & Discovery Learning

• Effective teachers understand and articulate the knowledge and practices of contemporary science.
• Effective teachers of science understand how students learn and how to develop scientific knowledge through inquiry approaches.
• Effective teachers engage students in collecting and interpreting data in order to develop and communicate concepts and understand scientific processes, relationships and natural patterns from empirical experiences.
Goals of the Program

The program focuses on developing a trans-formative model of education and professional development for teacher.

Features of the program:

• Food and agriculture used as a vehicle for understanding concepts in science
• Research and discovery – science practice
• Systems-thinking
Soybeans as the vehicle for teaching science ...

- In schools, food and agriculture are the perfect vehicles for delivering the concepts of biology, chemistry, environmental and earth sciences, and other topics in the existing standards and curriculum.
- Historically, these science areas have been taught independently of each other, however, we now recognize that there is a need for a systematic and integrated understanding of systems among our students.
Systems Thinking

• Many important problems that our society faces are complex and require a systems approach for developing solutions

• Agricultural systems are an excellent model for integrating complex systems:
  • interactions between animals and their food
  • the influences of the physical and biological environment on the diverse organisms that live within it
How Does the Program Work?
Summer Soybean Institute (SSI)

- Soybean system
- Research and discovery
- Explore classroom connection – How to replicate this experience in the classroom?
  - Systems level inquiry approaches
  - National, state and local science standards
  - Overstuffed” curriculum, limitations on how much science is taught
Classroom Implementation

• Lesson Plans - MySoybean.org

• Other Educational Resources
  - Ag in the Classroom
  - State Soybean Boards

• Program support
  - Scientists
  - Science educators
  - Master teacher
Impact of the Program
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• Promotes science literacy
• Promotes food and agriculture literacy
• Provides teachers the tools and knowledge necessary to communicate and educate the youth of Nebraska on the role of science and soybeans in
  • their lives
  • the lives of their families
  • the impact soybeans on the state, region and nation

...by using food and agriculture as model systems for science instruction
Impact of the Program

• Approximately 100 teachers and 2500 students have participated in the program

• Examples of success:
  ▪ 390 Lincoln Public Schools K-2 classrooms use soybean as the model plant system
  ▪ Ag Research Fairs – 4th grades
  ▪ Soybean Tuesdays – LPS middle school

• Expansion of model
  ▪ Northeast Nebraska
  ▪ Kansas
  ▪ Minnesota
Outcomes

• Strengthened partnerships:
  • Scientists, science educators, teachers
  • School districts in Nebraska
  • Department of Education
  • Agricultural-based commodities

• Institution Initiatives
  • NebraskaScience
  • Science Literacy – food, energy, water

• Discipline-based educational research
Conclusions

- Using model systems – explore other plant systems, animal systems, etc.
- Promoting science literacy using model systems that are local and important
- Promoting food and agricultural literacy
- Unique model – science educators and scientist working together
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- United Soybean Board