

Agriculture and Fertilizer Education for Grades K-12

FREP Contract Number 97-0361

Project Leaders:

Pamela Emery, Curriculum Specialist
California Foundation for Agriculture in the Classroom

Richard Engel, Curriculum Coordinator
California Foundation for Agriculture in the Classroom

Judy Culbertson, Executive Director
California Foundation for Agriculture in the Classroom

Project Cooperators

William C. Pauli, President
California Farm Bureau Federation
Sacramento, CA 95833-3239

Jennifer Bursey, Educational Consultant
Madera, CA 93637

Jean Kennedy, Science Teacher
Holmes Junior High School
Davis, CA 95616

Objective:

The purpose of this FREP Grant was to provide educators and students with educational materials about the nutrient requirements of plants and knowledge on how the agricultural industry uses this information to produce the food, clothing, floral and forest products people use. Educating teachers on fertilizer-related information not only better informs them as present-day consumers, citizens and voters but also assists them in educating their students and colleagues of the important role agriculture plays in their daily lives. Specifically, the money from the FREP grant was used to develop, print and distribute three Plant Nutrient Fact/Activity sheets as well as reprint and distribute plant nutrient requirement lessons developed from previously funded FREP grants.

Summary:

California is the leading agricultural producer in the United States for both domestic and foreign consumption. Increasingly, farmers and ranchers are challenged to produce more food on less land for more people. The lack of concise knowledge about the role of agriculture and the important use of fertilizer is repeatedly apparent in society and, in particular, in the print and electronic media. Inaccurate information is frequently transmitted to the general population. Children are part of our present consumer population and will be our leaders and decision-makers in the years ahead. Educating

them about agriculture's role in their lives and fertilizer's role in agriculture will enable them to make informed decisions in the future.

The California Foundation for Agriculture in the Classroom developed three different Plant Nutrient Fact/Activity Sheets to be used by educators and students. They focus on the three primary nutrients plants require--nitrogen, phosphorus and potassium. Over 9000 copies of each fact/activity sheet were printed and distributed to educators since their development in July 1998. Continual reprints will occur, as needed, and become part of CFAITC Fact/Activity Sheet Sets. It is estimated that over 12,000 Fact/Activity Sheet Sets are distributed annually. The three Plant Nutrient Fact/Activity Sheets have been posted on CFAITC's web site (www.cfaitc.org) which has an average daily number of hits of 565.

The 1997-98 FREP grant also provided funding for the California Foundation for Agriculture in the Classroom to reprint and distribute 250 of the six previously-produced FREP educational units for grades K-12. These units along with the fact/activity sheets were promoted and/or distributed at a variety of workshops and conferences including Farm Days (Colusa and Butte, 5/98-9/98), County Summer Agricultural Seminars for educators (numerous statewide, 5/98-9/98) an AITC Ambassador Reception (Stockton, 9/98), the California Science Teachers Association Conference (San Jose, 10/98), and the CFAITC California Conference (Sacramento, 10/98).

CFAITC developed and placed promotional pieces and advertisements on the fertilizer education materials. The FREP educational materials were placed in *Ag Alert* (circulation: 44,000), *The California Classroom Science Teacher* (circulation: 20,000), *CFAITC 1998 Teacher Resource Guide* (circulation: 25,000), *Cream of the Crop* newsletter (circulation: 60,000) and others.

Work Description:

Fact/Classroom Activity Sheets on the three primary fertilizer nutrients

The California Foundation for Agriculture in the Classroom completed the three Plant Nutrient Fact/Activity Sheets on Nitrogen, Phosphorus and Potassium. Ten copies of each are included with this report. The following paragraph describes the procedures involved in preparing these materials for classroom teachers and the public and identifies the completion of tasks.

In January, 1998, over 30 people met to discuss the development and distribution of the California Foundation for Agriculture in the Classroom's (CFAITC) Fact/Activity Sheets. This committee included teachers, Farm Bureau representatives, county Agriculture in the Classroom chairpersons, technical experts and others who utilize the documents. Selected individuals met a second day to brainstorm ideas for the three Plant Nutrient Fact/Activity Sheets. Drafts of the fact/activity sheets were developed by Jennifer Bursey and Pamela Emery. The drafts of the document were reviewed by many individuals including California Fertilizer Association representatives (including Al Ludwick of the Potash & Phosphate Institute, Kim Courtney from Unocal Corporation Agricultural Products, Greg Wahl from United Horticultural Supply and David Holden from AG RX), Kathy Mathers of The Fertilizer Institute, numerous educators, and CFAITC staff. Revisions of the document were made along with final edits by proof

editors. The documents were sent to print on June 15, 1998. An interim report, interpretive summary and the three Plant Nutrient Fact/Activity Sheets were submitted on June 20, 1998.

Reprint previously produced FREP-sponsored education units

The K-12 educational units produced on plant nutrient requirements between 1992-1995, through a series of FREP grants, are continually distributed to educators. During the months of May and June, 1998, 250 copies of each of the six educational units (plus appropriate Spanish worksheets) were reprinted. Distribution includes inclusion in AITC Resource Boxes, distribution at selected conferences and workshops and through purchased orders. The units reprinted are listed below:

The Mysterious Plant Caper (grades K-1)

What Do Plants Need to Grow? (grades 2-4)

How Much is Too Much? How Little is Too Little? (grades 5-8)

Starting All Over Again (The Cycles of Nature) (grades 6-8)

The Interrelationships of Soil, Water, and Fertilizers and How They Affect Plant Growth (grades 9-12)

The Chemistry of Fertilizers (grades 10-12)

Promotion and distribution of FREP units and Plant Nutrient Fact/Classroom Activity Sheets

A variety of vehicles are used to promote and distribute CFAITC's educational materials and resources including the FREP funded lesson plans and Fact/Activity Sheets. Several distribution methods are described as follows.

The 1998 CFAITC *Teacher Resource Guide* was developed in March, 1998 with 25,000 copies printed in April, 1998. In it, the FREP lesson plans were described and an order form included. A flyer describing the FREP lesson plans along with an order form was sent to 5,000 educators in April, 1998 (Subtask 3.3). The lesson plans and fact sheets were also listed in the resource sections of the Spring, 1998 and Autumn, 1998 issues of the *Cream of the Crop* newsletter which has a circulation of 60,000.

CFAITC continually works to improve the quality of its web site (www.cfaitc.org). CFAITC'S 1998 *Teacher Resource Guide* was put on line in May, 1998. This provided educators with the opportunity to preview many of the resources CFAITC has available including the FREP lesson plans. Upon their completion, CFAITC added the three Plant Nutrient Fact/Activity Sheets to its web site.

One of the most successful methods for distributing CFAITC materials is to participate in educator conferences and workshops. The Plant Nutrient Fact/Activity Sheets are distributed at all conferences in which CFAITC participates. CFAITC

exhibited and/or provided hands-on workshops at, among others, the following conferences and seminars:

National Agriculture in the Classroom Conference (New Hampshire, 5/98; 200	participants)
CFAITC Summer Agricultural Institute (Sacramento, 6/98; 30 participants)*	
California Science Teachers Association (San Jose, 10/98; 8000 participants)*	
California Agriculture in the Classroom Conference (Sacramento, 10/98; 350	participants)*
County Summer Agricultural Seminars (Statewide, 6/98-9/98; 300 participants)*	

*Conferences at which FREP lesson plans and/or Plant Nutrient Fact/Activity Sheets were highlighted at a workshop.

Advertise FREP Units and Fact/Activity Sheets in educational and agribusiness publications.

CFAITC developed an advertisement for the FREP lesson plans and Plant Nutrient Fact/Activity Sheets . It was determined that the advertisement would be placed in the *California Classroom Science* newspaper (circulation: 22,000) in May, 1998; *Ag Alert* (circulation: 44,000) in September, 1998 as well as CFAITC's publications such as the *Cream of the Crop* newsletter and *Teacher Resource Guide* and *Ambassador Updates*.

Results, Discussion and Conclusions

As discussed previously in the Work Description, CFAITC was successful in developing three Plant Nutrient Fact/Activity Sheets on nitrogen, phosphorus and potassium. Educators are pleased to have basic facts on these three fertilizer components. Over 12,000 of these Fact/Activity Sheets will be distributed annually for the next two years. Over 500 of each Plant Nutrient Fact/Activity Sheet was given to the California Fertilizer Association, along with a master for making copies, for their use.

The FREP lesson plans were promoted and distributed throughout 1998. CFAITC understands the importance of continually promoting the FREP educational materials and appreciates the continued educator interest in the materials.

Copies of the three Plant Nutrient Fact/Activity Sheets and the items developed to promote the fact sheets and FREP lesson plans are included in this packet.

Project Evaluation

CFAITC makes every effort to work with educators and technical experts during resources development to insure that the materials are accurate and appropriate for the classroom. Evaluations are included with each lesson plan and Fact/Activity Sheet set distributed. The verbal response as well as written comments from educators continues to be extremely positive. Educators appreciate the well-balanced, student and teacher friendly approach to fertilizer science education.

Outreach Activities

CFAITC is a nonprofit educational organization that sponsors many projects for teachers and students in an effort to increase their understanding of agriculture's impact in today's world. Numerous outreach activities are done continually by CFAITC staff members. A partial list of the displays at conferences and workshops presented is described in the Work Description, Task 3. CFAITC estimates that over 7,500 annually receive information from the Foundation at conferences and workshops. Another 15,000 educators and supporters of the Foundation receive mailings from CFAITC twice each year. Another 50,000 receive information from the CFAITC web site or from CFAITC Ambassadors, educators who sign up to distribute materials to colleagues at their school sites. The FREP funded materials are distributed in the venues described above and are well received by the educational and agricultural communities.