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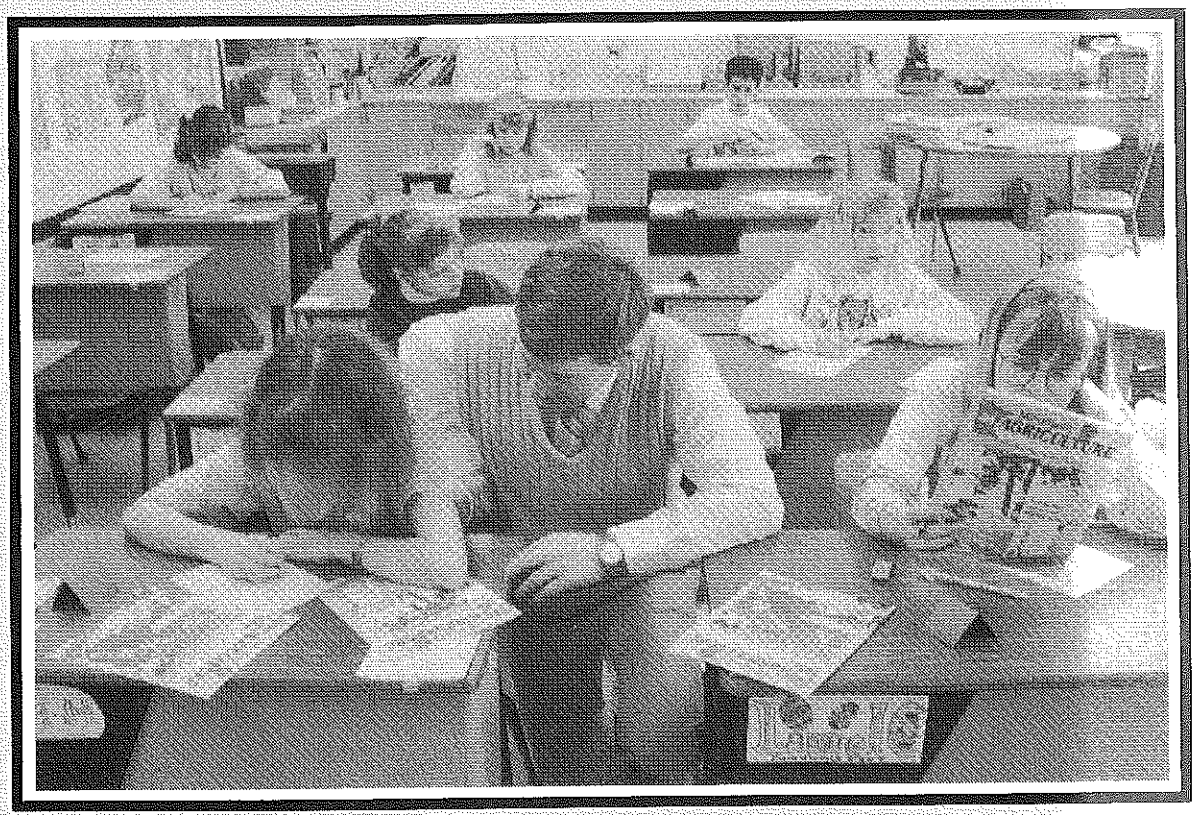

Teaching Agriculture In Elementary Schools

THE
AGRICULTURAL EDUCATION
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The Final Frontier

By Ed Osborne, Editor

Dr. Osborne is associate professor and program chair of agricultural education at the University of Illinois.

Agricultural education is ever so steadily making the change toward effective junior high school programs, comprehensive secondary programs, wide-ranging community college programs, and university programs that include, but go beyond, teacher certification efforts. Although adult education is a struggling enterprise in many states, we have had a long history of involvement in systematic programming for this audience. The one remaining frontier for exploration and development is the elementary schools. This may be the largest and most challenging territory of them all; we are just now beginning to summon the courage to venture into this new frontier of agricultural education.

The need for explicitly including agriculture in the elementary curriculum is obvious. The trends are frightening. Fewer and fewer Americans have any experience or knowledge whatsoever of the agriculture and food system. Yet, the demand for food and other agricultural products will never become less than it is today, as world population continues to rapidly expand. We must find a way to make room for agriculture in the elementary schools so that people of the 21st century know about agriculture, understand how it affects them, and realize how they can be a part of the agriculture system.

The opportunity is unparalleled. The number of elementary schools and classrooms is staggering. Yet, we cannot turn our backs on the chance to present the right messages about agriculture and help students form positive images about agriculture, before they form wrong opinions based on misinformation or no information. Unless agriculture becomes a recognizable part of the elementary curriculum, getting public support for agriculture and attracting people to study and work in agriculture will become even more difficult than it is today.

The challenge is awesome. The sheer magnitude of the job to be done makes us hesitant to begin. With our current set of agricultural educators, how can we possibly make a difference in the elementary schools? By and large, we cannot. For agricultural education to be successful in making agriculture a visible part of the elementary curriculum, we must think beyond ourselves to identify new partners in the delivery process. This means enlisting the support and involvement of other teachers, administrators, parents, and representatives from agribusiness and industry. This also means rethinking *how* we in agricultural education provide the necessary leadership at the local level to accomplish our agricultural literacy objectives.

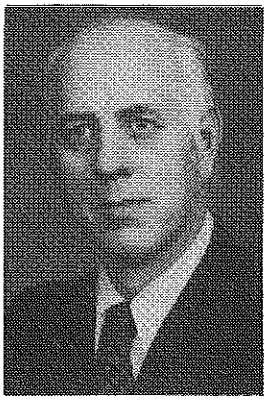
To depend upon already overworked secondary agriculture teachers to get agriculture into the elementary schools is unreasonable. Some secondary teachers will be able to achieve success in elementary classrooms, but there is simply no way they can provide a comprehensive, strong secondary program and oversee an effective agricultural literacy program in the elementary schools. One effort will suffer at the expense of the other.

Agricultural education is a timid profession. We know we have good things to offer, such as agriculture in the elementary curriculum, but we are afraid to ask for the resources necessary to do the job. So instead, we develop great materials for elementary teachers to use and hope that they will find the time and have the interest to use them sometime during the year. We cannot accomplish our objectives for agricultural education in the elementary schools using this approach. We must be more creative and aggressive in responding to this tremendous opportunity.

For us to make a difference in elementary students' knowledge, appreciation, and understanding of agriculture, every elementary school district must have a full-time agriculture teacher. This teacher would have three major reponsibilities: (1) teach agriculture to classes of elementary students on a rotating schedule similar to that of elementary music and art teachers, (2) assist other elementary teachers in their efforts to incorporate agriculture into their curricula, and (3) serve as the liaison for coordinating curriculum efforts among agriculture teachers in all schools of the community.

In this era of school district budget deficits, the only way to secure the funds →

Making A Difference



By GERALD R. FULLER

Dr. Fuller is professor of agricultural and occupational education at the University of Vermont.

The importance of providing education about agriculture in the elementary grades is well recognized and documented. For example, the report **Understanding Agriculture: New Directions for Education** contains an excellent discussion on the need for agricultural literacy education. The National Council for Agricultural Education has established a Task Force on Agricultural Literacy/Awareness which will help determine our profession's role and plan of action in the area of agricultural literacy.

We, as agricultural educators, need to be active participants in the shaping of public policy about our nation's agriculture, food, and natural resources systems. We can do this by helping educate other teachers about agriculture, teachers who will influence public policy in their communities. These teachers will in turn transmit their new-found knowledge to the policy shapers of the future, the students. Together, we can make a difference.

Providing education to assure that our nation's citizens are agriculturally literate requires a systems approach; the problem must be viewed from a holistic perspective. This will require meaningful interdisciplinary teamwork, networking, and active participation by all groups involved. Elementary education is part of this system.

Our agricultural education profession is also part of the system (not the total system). What we need to do is identify our role in regard to elementary education. It is abundantly clear that we must make clear decisions regarding the allocation of our scarce resources; we cannot be everything to everybody.

As part of the elementary education team we need to be sure we understand the principles and practices that apply to grades K-8. We need to go to the elementary educators and find out what they do that works. We need to use interdisciplinary teams to examine proposals and make recommendations.

The one thing we cannot afford to do is force our practices and philosophies upon elementary educators and students. It is easy to think we have the best answers. However, the literature of our agricultural education progression is not overflowing with articles and research reports that tell us what really works at the elementary school level.

Our agricultural education profession should address the four Cs to facilitate

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The Final Frontier

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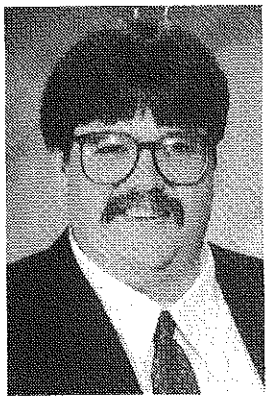
for hiring elementary agriculture teachers is via private sources. While not all communities would come forward with sufficient funds, we might be surprised at the number of communities that would readily provide continued funding for such a position. Candidates for agriculture teaching positions in the elementary schools must be certified elementary teachers. Our university agricultural education programs must provide the leadership for (1) getting elementary agriculture teacher certification programs approved and (2) preparing a sufficient number of candidates. At the national and state levels we must turn our attention away from curriculum development efforts and toward program development, an agenda item long-ignored in agricultural education.

The probability of success is uncertain. Getting agriculture into the elementary schools in a systematic way is even more of a challenge than our current efforts to make secondary curricula more science and business-based. But we cannot continue to introduce secondary agriculture teachers to new initiatives and expectations in a rapid fire manner. We cannot ask secondary agriculture teachers to also make sure agriculture is taught in the elementary schools of their communities. Yet, agricultural education cannot relinquish the opportunity/challenge of incorporating agriculture in the elementary schools to agribusiness, USDA, or other agencies. We should become a lead partner in charting this new frontier, working with our colleagues in other agencies to provide the new types of programs and people necessary to meet the challenge. ■

FOOD FOR AMERICA — A Day at the Farm for Third Graders



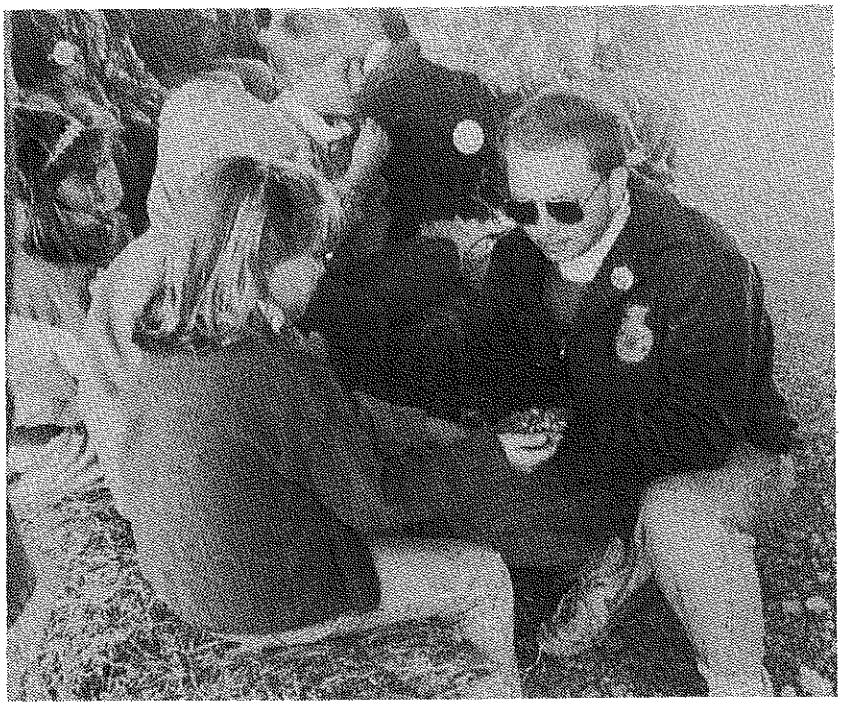
By LEE WEIS

Mr. Weis is an agriculture teacher at Williamsburg High School, Williamsburg, Kansas.

Imagine 500 urban third graders taken from their warm, familiar classrooms, loaded into buses, and driven for a little over an hour into an unfamiliar land. Gone are the large buildings, traffic jams, and billboards. Present are trees, open spaces, fields of crops, and pastures with livestock. Soon the buses are stopping and teenagers dressed in blue and gold jackets are escorting the students to rows of hay bales arranged in an amphitheater style.

For the next four hours the 500 third graders are led around a rural Kansas farm and introduced to the world of agriculture and rural living. The different interest areas on the farm tour consist of sheep shearing, farm crops, farm machinery, food from field to table, farm livestock, agricultural careers, and three units of wildlife. During the tour, the students are fed a nutritional lunch consisting of hamburgers, carrots, farm grown apples, chips, a cookie, and milk.

This is a description of a program called Day at the Farm, a simple off-shoot of the National FFA's Food for American program. The Williamsburg, Kansas, FFA Chapter started this program in 1986, with only 180 third graders attending. Through word of mouth, the program has now grown to its limit of 500 students. By educating students about food, wildlife, rural living, and agriculture as a whole, we will improve our agricultural industry. Food for America programs also teach elementary students about the FFA.



An FFA member practices learning by doing with elementary students. Crop seeds are passed around for students to hold and examine. (Photo courtesy of Lee Weis, Williamsburg, KS)

Upon completing my first year of teaching agriculture, I decided I wanted an innovative idea that would benefit many students and promote agriculture. Early in the summer the FFA officer team and I came up with the Day at the Farm idea. We wanted to reach urban Kansas City students and provide them with a positive experience about agriculture and rural life. We chose Kansas City for several reasons. Williamsburg is a small rural community with about 300 residents and only about 60 students in the entire high school. We wanted to reach a target group that would grow up being affiliated with agriculture only as consumers. The FFA chapter decided it wanted to show this target group the source of their food.

The Day

We also decided that agriculture could appeal to urban students as a recreational area which included hunting and fishing. During the 1991 Day at the Farm program, birds of prey and Kansas freshwater ecosystems were the main topics. The Kansas Wildlife and Parks officials provided two of our three programs on fish and wildlife. FFA members presented a program on harmful and beneficial insects. The use of the chapter's five-inch Madagascar cockroaches opened the eyes of many third graders. Several other collections were used to show the students different kinds of insects.

In dealing with consumerism, we introduced students to the different kinds of crops grown in our state and the many products made from them. Samples of the plant and the grain itself were passed around so the students could feel and →

touch them. Since Kansas is known as the wheat state, we committed an entire session to the production and processing of wheat. Wheat was shown in its various stages of growth. Grain was actually ground into whole wheat flour. Flour, wheat, and the dough were passed around for students to touch and see up close. Both crops and livestock were discussed. Traditional livestock, such as a cow and calf, baby pigs, chicks, a pony, goats, sheep, and rabbits, were provided for the third graders to experience. We also provided some non-traditional animals (channel catfish, quail, and pheasant) that are raised on the farm we use each year. Students also were able to see and touch the livestock, learn what each animal's purpose is, and discover the products derived from each animal. Sheep shearing was demonstrated, and wool products were discussed.

In dealing with consumerism, we introduced students to the different kinds of crops grown in our state and the many products made from them.

FFA members showed and talked about different types of farm machinery and their uses. Elementary students have many ideas about farm machinery. One year a group thought a combine with the auger in the unloading position was a cannon, and the grain auger with its hopper was a catapult. Ideas seem to run wild when urban students come to the farm.

FFA Members Benefit

FFA members develop many skills while providing this Food for America program. In the Williamsburg FFA Chapter's Day at the Farm program, high school FFA members learn public speaking, organizational, human relations, and educational skills. They contact guest speakers and locate animals, machinery, crops, and livestock pens. They contact businesses and agricultural groups that provide educational materials used to compile teacher packets. These packets provide materials teachers can use to continue the agricultural education program in their own third grade classrooms and items for students themselves, such as coloring books and pencils.

Once the day is over and the third graders have gone home, FFA members take time to reflect. Topics such as urban students' odd ideas about rural life and urban life are discussed. The Kansas City third graders had already developed ideas about rural living and agriculture, including one-room schools, outdoor facilities, and walking to school. Once the day is over these misconceptions are laid to rest. Rural FFA members learn that urban students are not much different than themselves.

FFA members develop many skills while providing this Food for America program.

The Day at the Farm activity can be a positive program for any FFA chapter. At Williamsburg we are turn schools away because of lack of space. I encourage other FFA chapters to work on providing such programs. It is educational for high school and elementary students alike.

Making A Difference

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easy to think we have the best answers. However, the literature of our agricultural education profession is not overflowing with articles and research reports that tell us what really works at the elementary school level.

Our agricultural education profession should address the four Cs to facilitate teaching about agriculture in the elementary schools. This framework will help us determine how best to examine the opportunity costs and serve as a guide to allocate the valuable, finite resources we have at our disposal.

Coordination: The major input of our profession should be leadership/management.

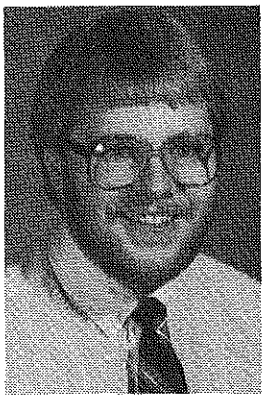
Connection: We need to guide the development of systematic instruction toassure that there is a connection between elementary and secondary education.

Collaboration: Editor Ed Osborne, in his January, 1992 Editorial, reminded us that we need to develop new, meaningful relationships as well as continue our associations with our traditional partners.

Communication: We need to facilitate open, two-way communication with the many agencies and organizations involved with elementary education about agriculture.

A lot of great things are happening in the elementary schools throughout our nation. The following articles illustrate what is working, who some of the participants are, and what roles our profession can play in providing education about agriculture in the elementary schools. ■

Agricultural Education: An Elementary Emphasis



By JACK LAVALLA
Mr. LaValla is an agriculture teacher at New London-Spicer High School, New London, Minnesota.

The future success of the agricultural industry depends heavily upon the ability of agricultural educators to provide it with skilled and competent professionals to assume a wide variety of roles in producing, processing, and delivering food and fiber to people throughout the world. Indeed this is an important focus of agricultural education. However, all people will need to have a broader knowledge about agriculture and how it affects their lives so that they can make intelligent choices about it in the future.

Agriculture touches everyone, including school-aged children who will become tomorrow's world leaders. For this reason agricultural educators must realize their important role in informing all students about agriculture. The National Research Council's Board of Agriculture reported in its findings in 1988 that agriculture is too important to be taught only to a small percentage of students considering careers in agriculture or pursuing other vocational studies. It further stated that beginning in kindergarten and continuing through twelfth grade, all students should receive some systematic instruction about agriculture. As agricultural educators, we have the opportunity to participate and to take the lead in this important task.

As a component of USDA, the Agriculture in the Classroom program is found in every state, and each program has a coordinator or contact person to provide support and information.

The Minnesota Agriculture in the Classroom (M-AITC) program has been working closely with agricultural educators and many others who are interested in providing a K-12 focus on agricultural awareness. The program began in 1985 and has become a model public/private partnership between the State Department of Agriculture and many supporting organizations from both the agriculture and education communities. In many instances local agriculture teachers provide the link in their communities to this program and especially to elementary school students. As a component of USDA, the Agriculture in the Classroom program is found in every state, and each program has a coordinator or contact person to provide support and information.

How may a teacher of agriculture, whose main focus and energies are directed at teaching a target audience of students with interests in the subject, become involved in teaching elementary students about agriculture? This may seem like a monumental task which could tax already prioritized schedules. However, the agricultural educator can have an important role in this delivery system by providing some leadership to the teaching staff at elementary schools without a major commitment of time.

The role of the local teacher of agriculture can fit the current strengths of that person quite well and may be viewed as a three-part responsibility: (1) the agriculture teacher is the recognized leader of agricultural education in the local school district, (2) the instructor is a resource person for others who need information, and (3) this person may serve a support function by advising on curriculum, delivery systems, and a variety of technical needs of elementary educators.

Recognized Leadership

It is important that within the local school district people naturally turn to the teacher of agriculture for guidance and assistance. This kind of recognition may be developed through good rapport with the administration and staff of any school district. A willingness to help and a sincere display of interest in what is going on at the elementary level can help to foster such a role. It is important to note that highly visible FFA activities which involve elementary students can have a tremendous impact on these young students and their teachers. Winning the respect and interest of these people can cause them to notice more closely what the agriculture program is doing and thus, broaden their knowledge of agriculture. The possibility of an increased interest among younger →

students in agriculture can also aid the teacher of agriculture in recruiting potential enrollees for the future. Most people react positively to effective leadership, and elementary teachers are no exception. Most welcome new ideas and help in delivering and reinforcing relevant information. As a rule, these teachers are creative, and their rooms are alive with enthusiasm.

Resource Person

Agriculture teachers may be a wealth of information for elementary teachers. Agriculture teachers quickly discover that they hold valuable knowledge that other teachers desire. Agricultural educators should not take this responsibility lightly. They should welcome the opportunity to share accurate and up-to-date information about the agricultural industry with those around them. Even concepts which seem quite simple might be misrepresented by those who do not have a practical knowledge of agriscience.

Agricultural educators have a professional responsibility to teach people of all ages about agriculture and how it affects their lives.

Agriculture teachers may provide literature, audio-visuals, speakers, equipment and facilities for use in elementary programs. Teachers greatly appreciate the availability of good teaching materials without spending lots of time researching and developing it on their own. The agriculture teacher is the local expert, and by providing resources to the right people, they can help to insure that the story of agriculture is told correctly.

Support Staff

People feel threatened, of course, to become involved with an activity in which they are not experienced. Therefore, teachers of agriculture can provide essential support to those elementary teachers who are willing to teach students about agriculture within the context of their own ability.

Agriculture teachers are able to suggest curricula which may be used effectively in the elementary setting. They may provide encouragement, answer questions, and provide advice. Team teaching is not out of the question, and it may prove to be a refreshing experience for all parties involved. Agricultural educators have a professional responsibility to teach people of all ages about agriculture and how it affects their lives. By supporting others throughout the local school district in this venture, they serve the needs of their program and the industry in general. The contributions of time need not be monumental to gain significant results. Agricultural educators, trained in assertive leadership, are well suited for this task.

. . . a basic knowledge of agriculture by all students in the school district is essential in order for them to make intelligent choices about their future lives.

Success Stories

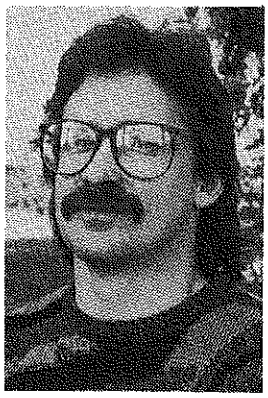
Many examples of success stories exist in teaching elementary students about agriculture. Some activities to try in local school districts are as follows:

1. Set up a children's barnyard and invite elementary students to observe the farm animals.
2. Help elementary teachers plan field trips to local farms, orchards, and other agribusinesses.
3. Have FFA officers speak to grade school classes about agriculture and the FFA.
4. Invite elementary teachers to use your teaching materials, computer software, equipment, and facilities in preparing a lesson on agriculture.
5. Brainstorm with FFA members and elementary teachers about other ideas to use in promoting a better understanding of agriculture in the local school.

Summary

In summary, a basic knowledge of agriculture by all students in the school district is essential in order for them to make intelligent choices about their future lives. The local teacher of agriculture is in a position to provide leadership and encouragement to accomplish this task. An agriculture teacher is the locally recognized leader/expert in agriculture and may provide accurate and up-to-date information to other teachers. This individual can serve as an important support person within the local school district. This task may be accomplished without a major commitment of time. The teacher of agriculture needs mainly to demonstrate a sincere interest in the goals of other instructors and be willing to provide support for education about agriculture in their local districts. ■

The Middle School: Planting Seeds For The Future



By JERRY DELSOL

Mr. DelSol is an agriculture teacher at Douglass Junior High School, Woodland, California.

Teaching in middle schools is an experience every teacher should have at least once. As we look into the 1990s, middle schools may be the place for growth and survival of vocational programs. How do you reach students of this age, and what will the agriculture curriculum look like? For the past 20 years Douglass Junior High School (DJHS) in Woodland, California, has built a diverse agriculture program that is tailored to the needs of middle school students.

Woodland is a town of about 30,000 people, and its number one industry is agriculture. Many students feel that they know all about agriculture. However, their definition of agriculture includes only production. When asked to define agriculture, many say, "Agriculture is farming!" In order for our future community leaders to understand agriculture, we need to inform them as students of the industry's diversity and value to their community.

In order for our future community leaders to understand agriculture, we need to inform them as students of the industry's diversity and value to their community.

There are two middle schools and one high school in our local district. Each middle school has about 1,000 students in grades 7-9. Agriculture has been taught in the middle school since the early 1970s. The agriculture department now serves 200 seventh graders, 150 eighth graders, and 100 ninth graders.

Seventh Grade Exploratory Electives

The seventh graders at DJHS go through a program called Exploratory Electives, or "Expo" for short. Instead of choosing an elective their first year in junior high school, students are scheduled into the Expo program, which exposes them to all of the electives available to them in their eighth grade year. There are 10 sections of Expo classes currently offered at our school, including wood shop, home economics, Spanish, computers, keyboarding, music, drug and alcohol awareness, art, QUEST, and introduction to agriculture. Our counseling department schedules approximately 25 students into each section. After six weeks, each group of 25 moves to the next section of Expo.

During the six weeks in Ag Expo, an overview of agriculture in California is presented. Remembering that some students may have an extremely short attention span, students work on a task for about 10-15 minutes. Therefore, classes are designed with at least three activities per 50 minute class period. Since students at this age learn better by doing rather than by hearing or seeing, most of the activities are built around the hands-on approach. Units include local agriculture, plant science, animal science, apiculture, FFA, ecology, wildlife management, and farm management. What follows is a typical few weeks in this class.

The first week in Ag Expo students are introduced to Yolo County and California state agriculture. They learn the top five cash crops in Yolo County and the five top crops in California. In order to learn, students need to touch these crops and understand how they impact their lives. The teacher brings these unprocessed crops into class and has students search at home for the processed version. When information must be recorded, the students write it on the chalkboard. In this way, they really get a sense of ownership for the topics. At the end of each week, the students take a unit test using a hands-on approach. Instead of listing the crops that they have learned about on a piece of paper, students must arrange a physical representation with the crop; i.e., a yogurt container for dairy products, clothes for cotton products, and so on. In this way students are tested in the mode in which they are taught.

During the second week in Ag Expo, a unit on animal science is taught. The two main objectives of this unit are livestock terminology and rabbit conformation. Our department has worked to maintain a rabbitry with 50 rabbits that are used mainly for SAE projects. Seventh graders are taught a two-day lesson on caring for, →

showing, and judging rabbits. It is amazing how many students have never even held a live animal before. Students help demonstrate to the rest of the class some of the skills they need to learn in order to show rabbits. Students break into six groups, and each group gets its own rabbit. Students pick the best handlers out of their groups to show the rabbits in a mock rabbit show. All of the participants are given certificates of excellence. The rest of the week is spent in the computer room, where students work at their own pace learning livestock terminology. They use the Food and Farm Bytes software for Apple II computers to search with a partner for livestock terms. The last day is spent viewing livestock slides and connecting the terms with the animals.

Students survey the results of their Bottle Biology project. By using this technique, students are able to test what they have learned about habitats. (Photo courtesy of Jerry DelSol)

The third week the students learn basic farm management and agricultural economics through the use of a program called Modern Farming. The program sets the students up with a 300 acre farm, including 100 acres of corn, 100 acres of soybeans, and 100 breeding sows. The students must decide how to run the farm on a month-by-month basis for one year.

The object is to make it through the year without going bankrupt and accumulating as much cash as possible. Students learn record keeping skills and set up a farm ledger so they can keep track of their transactions. Since they learn when to buy and sell their crops according to market prices, which change on a monthly basis, they really get a feel for economics and the commodities market. It is amazing how much a seventh grader can understand, given the right learning environment.

In the last week in their Ag Expo rotation, students learn about FFA. They start off by electing class FFA officers. The officers read their opening ceremony parts at the beginning of each class period. By the end of this unit, they have learned about their own leadership potential. On the second and third days, the students learn about prepared and extemporaneous public speaking. Care has to be taken at this point to make the speaking as enjoyable as possible, since this is usually the first time most of the students have been asked to do this.

For their extemporaneous speeches, students are given ordinary props, such as welding gloves, glue sticks, or staple guns. They are asked to give a two minute speech to sell their item. The last part of this week is spent showing the students how each week in our Expo class is really an introduction to all of the classes offered at the eighth and ninth grade levels in our agriculture program. This class works very well as a recruiting tool, enabling the department to funnel students into one of three agriculture electives offered at the eighth grade level.

Eighth and Ninth Grade Courses

The eighth grade courses are either semester or year long. The semester course is Agricultural Mechanics 8. Topics include leatherworking, woodworking, and sheet metal work. The year-long courses are Horticultural Science and Natural Resource Management.

The mechanics course is articulated with an industrial technology course. For one semester the agriculture department teaches leatherworking and sheet metal, while woodworking and drafting are taught by the industrial technology department. Students switch classes at the end of the semester. Students at this level learn basic safety and operation of hand and power equipment.

In the leather unit, students form class companies which design, manufacture, and sell leather products. This course doesn't simply teach basic leatherworking skills, it also introduces inventory control, marketing and cooperation. The computer is incorporated into the class for tracking inventory, sales, and cost accounting.

The year long Natural Resources and Ornamental Horticulture courses are offered for eighth and ninth grade students. Both courses count for science credit toward graduation from high school. Topics for Ornamental Horticulture include plant growth, plant morphology, →

leadership/FFA, SAE, horticultural mechanics skills, plant reproduction, soil science, plant nutrition, plant pathology, landscape design, and careers. Topics for Natural Resources include the environment, leadership/FFA, conservation, rangelands, record books/SAE, recreation, fish and wildlife, forestry, park systems, and weather systems. Topics in these classes rarely last for more than two to three weeks. The emphasis is on "Doing to Learn and Learning to Do."

Middle School Teaching

Activities should be based on the learning needs of middle school students. For instance, one to two short laboratories per week are common in horticulture. These activities generally have a high degree of teacher instruction during the initial phases of the experiment. Group reports/presentations at this level are more prevalent.

We have not, by any means, developed our agriculture program alone. There are many resources already in place to help middle school agriculture teachers develop similar programs. Both of our middle schools offer similar curricula, and all ninth grade course work is carefully articulated with the high school. Agriculture teachers from the middle schools and high school meet weekly to discuss department business and plan activities.

There is also a district-wide Agricultural Advisory Committee (consisting of teachers, agribusiness representatives, and community leaders) that reviews and approves new and existing curricula for all agriculture programs. All ninth grade classes follow state framework curriculum guidelines in either physical or life science and count toward high school graduation requirements. The eighth grade classes follow the state life science framework for that grade level. Our eighth grade mechanics course follows the industrial technology framework, since there is no framework for agriculture at this level. The Expo seventh grade curriculum was generated locally by the need to offer seventh graders an opportunity to explore all of the electives at the middle school level.

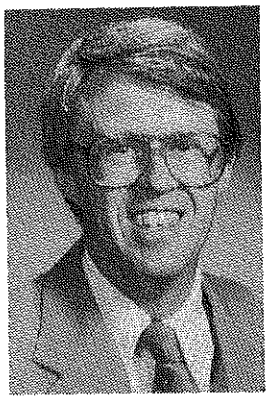
Our curriculum addresses many needs of the middle school student by providing a balance between student and teacher-directed activities. Young students need to see, taste, hear, touch, and manipulate in order to learn well. In our agriculture courses, 75% of the class time is devoted to hands-on activities. The activities include propagating carrots by tissue culture, making terrariums, designing and installing an herb garden, making compost, testing soil, making biotic regions out of plastic bottles, role playing the life cycle of a salmon, and making weather instruments.

Computers are extensively incorporated into the seventh grade Expo program. In the eighth and ninth grade classes, students learn to use word processing, database, and spreadsheet computer programs. In addition, these students are required to have an agriculture project. Rarely is a large profit made on a project. However, students work cooperatively, learn teamwork, and develop a sense of ownership. All of these activities add up to a hands-on approach that meets the needs of the middle school student. ■

Upcoming Themes

Issue/Theme	Due Date	Theme Editor
September Focus on Teaching	June 1, 1992	Dr. Jamie Cano Ohio State University 208 Ag Admin. Bldg. 2120 Fyffe Rd. Columbus, OH 43210-1099
October Teaching the Science of Agriculture	July 1, 1992	Dr. Jeff Moss University of Illinois 124 Mumford Hall 1302 W. Gregory Dr. Urbana, IL 61801
November Problem Solving/Inquiry Teaching	August 1, 1992	Dr. Jim Flowers North Carolina State University Box 7801 Raleigh, NC 27695-7801
December SAE Programs — A New Look	September 1, 1992	Dr. Kirby Barrick Ohio State University 208 Ag Admin. Bldg. 2120 Fyffe Rd. Columbus, OH 43210-1099

Reaching and Teaching Elementary Teachers About Agriculture



By JOHN HILLISON

Dr. Hillison is professor and program chair of agricultural education at Virginia Tech, Blacksburg, VA.

Agriculture teachers, like other agricultural professionals, are concerned about the future of their programs and the image of agriculture. Reaching elementary students and teaching them accurate and positive information about agriculture is one method to help solve both problems. The key to getting information to such students is through elementary teachers. This is the concept of Agriculture in the Classroom and instruction about agriculture.

Agricultural educators who want to both reach and teach elementary teachers need to keep their needs and perspectives in mind. In general, elementary teachers have highly specialized pedagogical skills, but are definitely generalists in subject matter background. Many elementary teachers have very weak backgrounds in agriculture. Like most teachers, they are looking for ways to teach complex concepts in an interesting way. They are not looking for additional topics to teach, as they already have numerous items in the curriculum. However, anything that will add interest and efficiency to curricular topics is very welcome.

If elementary teachers are confident that agricultural educators will assist them and serve as resource people when needed, they will be much more likely to incorporate information about agriculture in their instruction.

Agricultural teacher educators, or others who work with elementary teachers, should keep several points in mind. Information needs to be shared about where to find assistance and how to enhance agricultural knowledge and background. If elementary teachers are confident that agricultural educators will assist them and serve as resource people when needed, they will be much more likely to incorporate information about agriculture in their instruction. Elementary teachers should be encouraged to contact local agriculture teachers who can serve as contacts for other resource people in the community who have expertise in agriculture. Such examples might include the local extension agent, the District Conservationist with the Soil and Water Conservation District, agricultural business people, local farmers, members of the FFA Alumni affiliate, and members of such organizations as Farm Bureau, Ruritan, Grange, or other agricultural organizations.

Field Trips

Elementary teachers should be encouraged to take students on agricultural field trips. A local implement dealer is one possibility. While at the dealership several careers can be explained that require a working knowledge of agriculture. Implement dealers are generally willing to donate literature to the teachers. Such literature can be used later in the classroom. Teachers can buy toy tractors and implements or have students bring them to class and use them with a scale-model farm in the classroom.

Another good field trip can be planned around the adopt-a-farm concept. A field trip to the adopted farm or a visit by the farmer to the classroom can both generate a great deal of interest. Field trips and visits that include a live animal, such as a baby pig, generate the most interest. Students can draw pictures of what they have observed and what has been described. They can figure yields from crops and percentages on some examples of animal production to develop mathematics skills. Students can write letters to the farmer. The farmer can respond by describing seasonal activities on the farm. And, of course, pictures are always helpful.

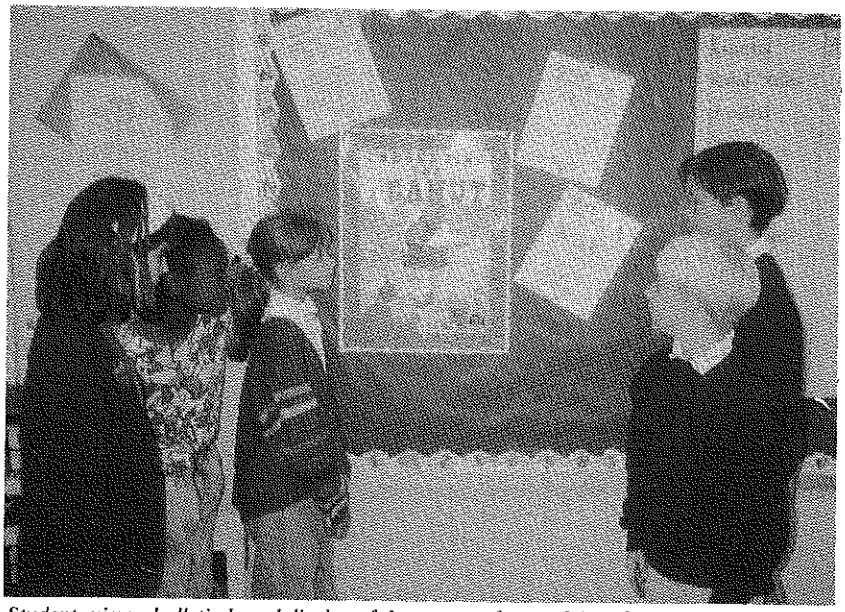
Bulletin Boards

Students can design bulletin board displays of agricultural products. Charts could start at the farm and end at the retail outlet. Examples could include milk, wool, cotton, beef, corn, and swine. Students could select agricultural occupations they would like to pursue. They could bring pictures to class or cut out pictures from magazines showing people at work in the career of their choice. →

Students could give oral reports on the career of their choice and write a one page report on it. Different reports could be selected and placed on the bulletin board.

Guest Speakers

The farmer on the adopted farm could visit students in the classroom. Pictures or slides of various scenes and activities on the farm could be shown. People in other agricultural occupations could also visit class. They should be encouraged to wear a uniform, if they typically use one. They should also be encouraged to bring something about their work. For example, a soil conservationist should bring a soil profile, or a game warden could bring a small animal, such as a raccoon. Teachers can have students draw pictures of the guests. They can also record unique vocabulary words used by the guests and add them to the weekly spelling list.



Students view a bulletin board display of the peanut after studying about it in class. (Photo courtesy of John Hillison)

Free Resources

Use of readily available and free resources, such as state highway maps, should be encouraged at workshops. Elementary students can use maps to identify different parts of the state and the dominant crops grown there. The lesson could also include discussion of varying soil types and topography. It could emphasize the relationship of soils, crops, and animals. The maps could also be used to identify the site of important historical events, including some that were agricultural in nature, and where the state fair is located.

Most state departments of agriculture provide statistics publications. Statistics on crop yields, rainfall, and commodity prices can aid elementary teachers in teaching about agriculture. Such information is localized, accurate, and a natural to teach about mathematics, charts and graphs.

Thought-Provoking Questions

Elementary teachers participating in workshops should be encouraged to ask their students thought-provoking questions about agriculture. Examples could include the average farmer feeds 116 other people. What if each farmer only fed 75 people? What if food costs twice as much as it presently does? What rights do animals have? What are ways to enjoy wildlife, other than hunting and fishing? Other contemporary, controversial topics such as ecology, the environment, conservation, wildlife, animal rights, health related to good nutrition, and zoning conflicts between urban and rural areas can also be taught.

With all the potential benefits to the field of agricultural education by encouraging elementary teachers to teach about agriculture, it is very worthwhile for agricultural educators to provide workshops for elementary teachers. If workshops are carefully planned and provide information about agriculture, encourage the use of resource people, field trips, bulletin boards, guest speakers, free resources, and thought-provoking questions, the dividends will be very large. Agricultural education will benefit from accurate information, an enhanced image, and greater recruitment. ■

About The Cover

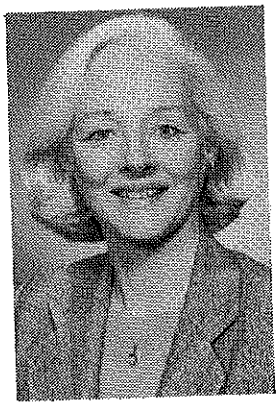
Jerry Irsfield, fifth grade teacher at Emmet D. Williams School in St. Paul, Minnesota, teaches students about Minnesota agriculture.

The sequence in the acceptance of a new idea:

1. It's a foolish idea and won't work.
2. It's not a bad idea, but the time isn't ripe.
3. The time is ripe, but we couldn't finance it.
4. I was always in favor of this idea.

—Edgar Dale

Ag in the Classroom Has An Agricultural Education Connection



By SHIRLEY TRAXLER

Dr. Traxler is National Director of Agriculture in the Classroom, USDA, Washington, DC.

When the curriculum coordinator at Wakulla Middle School called sixth grade teacher Angie Williams into the office to introduce her to Florida's Ag in the Classroom, Angie's initial reaction was, "Agriculture? Do I really need to be teaching this on top of everything else I have to teach?" But once she looked over the materials and realized how well they fit into what she was already teaching in life science and social studies, and when she understood the purpose of Ag in the Classroom, she said, "Yes, I need to be teaching this; this is important."

Williams' reaction is like those of educators around the country who have become involved in a national agricultural literacy effort called Ag in the Classroom. They recognize the need for education about agriculture, and they have become enthusiastic supporters of the program.

I now realize, through Ag in the Classroom, that an understanding and an appreciation for agriculture is of vital importance in every child's education.

At the 1991 National Ag in the Classroom Conference in Washington, D.C., Williams said, "As educators, we must never lose sight of the fact that we are preparing students for the future — teaching them what they need to know so they can make wise decisions later on. I now realize, through Ag in the Classroom, that an understanding and an appreciation for agriculture is of vital importance in every child's education."

She echoes the thoughts of people in education, agriculture, and government who came togehter in 1981 to voice their concern about the lack of up-to-date, accurate information about agriculture in school curricula.

They reminisced about the days, not so very long ago, when agriculture was generally understood and school calendars revolved around planting and harvesting of crops. Then nearly everyone had close ties to the farm. They talked about how times have changed. Agriculture is foreign to today's students who, if they consider it at all, think their food originates at the grocery store.

. . . it is vital that people understand the dynamics and the economics of agriculture.

They spoke of the importance of agriculture to our economy, about the role agriculture plays in the lives of people around the world. They were concerned that until faced with a crisis of grand proportion — food, drought, infestation — that threatens the availability of food, people tend to take agriculture for granted.

In order to maintain the strength and productivity of American agriculture, they concluded, it is vital that people understand the dynamics and the economics of agriculture.

As a result of the meeting, a task force was appointed with representation from the education, agriculture, and government sectors. It would be the duty of the task force to articulate the mission and to help states organize and establish K-12 agricultural literacy programs called Ag in the Classroom.

Agricultural Education

Agricultural educators have made significant contributions to Ag in the Classroom. They have accepted leadership roles and support roles with skill and enthusiasm. They have developed materials, recruited and trained teachers, and provided expert resource support to classroom teachers.

As an example, John Davis, Assistant Director for Vocational and Career Education for Ohio, is responsible for getting Ag in the Classroom started there, and he also serves on the steering committee of a national K-12 agricultural and environmental materials development effort →

called Project Food, Land, and People.

"Part of the Strategic Plan for Agricultural Education deals with agricultural literacy, and Ag in the Classroom is certainly one component of that. Agricultural educators need to be team players in this effort," Davis says. "In some states, they may be quarterback on the team, and in others, they may play second string. But the important thing for them is to take an interest in and contribute wherever possible."

In Oklahoma, the State 4-H Department and the Agricultural Education Division of the State Department of Vocational Technical Education take turns helping each other. "Randy Kirk, Curriculum Development Specialist with the State Department of Vo-Tech, has been on the Ag in the Classroom Curriculum Committee since we started," according to Paul Czarniecki, coordinator of Ag in the Classroom curriculum development in the State 4-H Department. In turn, Czarniecki and some other Ag in the Classroom people helped Randy with validation of the new eighth grade agriculture curriculum.

The Oklahoma Vocational Agriculture Teachers Association was a charter member of the Oklahoma Ag in the Classroom Association. Jim Yokum, Central District Coordinator for Agricultural Education, explained, "We wanted to be counted in because never in the history of agriculture has agricultural literacy been so important to so many people." Yokum said that by revamping the state agricultural education curriculum to be broader based, the enrollment in agricultural education has increased by 1500 students — about a ten percent increase — proof that agriculture can appeal to more students. "Ag in the Classroom will most certainly improve that interest throughout the early years of education. We were not about to miss the opportunity to let it be known that we support Ag in the Classroom," said Yokum.

Phil Birkenbile, Curriculum Consultant for the Agricultural Education Division, agrees that "to accomplish the goal of agricultural literacy education, we (Agricultural Education and Cooperative Extension) need to combine our resources and talents to help each other and ultimately assure that all students have an opportunity to know more about where their food and fiber comes from." Czarniecki hopes that the constructive working relationship on the state level will carry over to the county and local levels as it already has in some instances.

Food for America, FFA's program to help third graders understand more about agriculture by using high school students as teachers, is another area where there is cooperation between agricultural education and Ag in the Classroom. Several Ag in the Classroom leaders served on an FFA committee to revise the Food for America materials. According to Davis, only 40% of the FFA chapters are involved in Food for America. "That number should be 75%," says Davis. "It dovetails perfectly into the mission of Ag in the Classroom, and students who participate in Food for America are enriched by the experience of teaching third graders about agriculture."

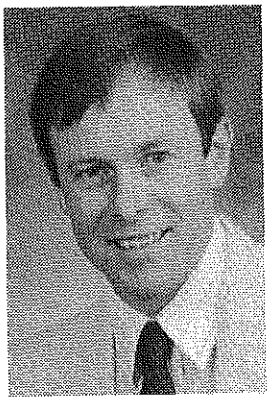
The New England/New York Ag in the Classroom Consortium is chaired by Gerald Fuller, Professor of Vocational Education and Technology at the University of Vermont. This regional approach, under Fuller's leadership and guidance, has proven enormously successful in utilizing the talents of Ag in the Classroom participants in each of the states to plot strategies and develop materials of benefit to the entire region. The Consortium has completed work on a regional poster and ancillary materials, and they are currently working on an agriculture/economics curriculum for grades 7-12, in cooperation with the National Council on Economic Education. Plans are to eventually distribute these materials nationwide. The Consortium plans to sponsor regional teacher training workshops and other mutually beneficial ventures.

Robert Havener of Winrock International said, "Students will be increasingly called upon to help legislate, to help oversee, to help comment upon to make policies related to the agricultural production process, and it is vital that they understand biology, understand economics, and how they interrelate in the field of agriculture."

Fuller agrees, "There is an enormous job to be done to foster agricultural literacy, with more than enough work to go around for everyone. Each of us must take advantage of every opportunity to tell agriculture's story."

If we don't tell it, who will? ■

Ag in the Classroom Begins With Educating Teachers



By TOM DORMODY and MARY SHANKS

Dr. Dormody is an assistant professor of agricultural and extension education at New Mexico State University and Mrs. Shanks is a second grade teacher at Capitan Elementary School, Capitan, New Mexico.

The New Mexico Agriculture in the Classroom (NMAITC) agricultural literacy program is a cooperative effort between the New Mexico Farm and Livestock Bureau, Agricultural and Extension Education Department (AXED) at New Mexico State University (NMSU), New Mexico Department of Agriculture (NMDA), New Mexico Cooperative Extension Service (NMCES), and New Mexico Beef Council.

Begun in 1983, the program has involved more than 1,000 public and private school teachers in teaching agriculture. Operating on a small budget, without the assistance of a foundation, NMAITC has grown because of grassroots-level participation from teachers throughout the state and strong linkages to agricultural agencies, businesses, institutions, and organizations.

State Chairperson

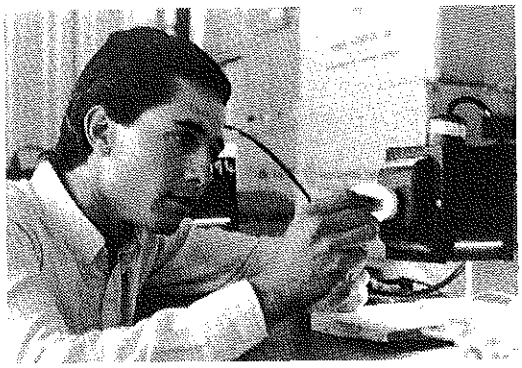
Program administration is the responsibility of Grace Cain, NMAITC's State Chairperson. Mrs. Cain works with the Farm and Livestock Bureau to obtain operating funds. She chairs the NMAITC advisory committee, made up of representatives from the Farm and Livestock Bureau, AXED, NMDA, NMCES, and the Beef Council. The committee plans, oversees, and evaluates the summer university class, curriculum development, workshops, and other activities. Mrs. Cain also oversees curriculum consolidation, cataloging, and distribution. She is working with a Farm and Livestock Bureau study committee to establish a foundation that will provide a steady source of funding for the program.

Another of Mrs. Cain's responsibilities is to coordinate and facilitate about 20 annual NMAITC teacher workshops that highlight new curriclulum and learning activities. Agricultural literacy is most needed in urban schools. Approximately one-third of New Mexico's people, including 87,000 public school students, live in Albuquerque. Mrs. Cain conducted four workshops in the Albuquerque School District in 1991. She worked with NMCES and the Beef Council to set up tours of the New Mexico State Fair agricultural exhibits. There were 24 Albuquerque teachers and more than 600 students involved in the September 1991 tours.

Summer University Class

A summer class to train non-agricultural K-12 teachers on how to integrate agriculture with language arts, math, science, and social studies has been offered through AXED at NMSU for the past five years. First taken by 24 educators, the 1991 class contained 61 students. Until last year, the class had a general agriculture theme.

The 1991 class focused on animal agriculture. Issues like grazing on public lands, animal welfare and rights, and food safety of animal products were addressed. Resource persons from about a dozen agricultural agencies, businesses, institutions, and organizations helped with the class. Rotational workshops were set up where the students learned how to make sausage, dye wool with native plant dyes, and candle eggs.



Students enjoy candling eggs. Only a dark room, flashlight, and cone made out of construction paper are needed to candle eggs in an elementary classroom.

Two field trips were taken by the class. On the first, students visited NMSU's Jornada Experimental Range with a range researcher and discussed the suitability of the Chihuahuan Desert for grazing. They were also able to observe an artificial insemination demonstration at NMSU's College Ranch. After the trip, students listened to and questioned a panel who had →

also addressed grazing on public lands in New Mexico. Tha panel consisted of representatives from the U.S. Forest Service, Bureau of Land Management, State Land Commissioner's Office, NMSU Biology Department, Farm and Livestock Bureau, and New Mexico Range Improvement Task Force. Students gained an appreciation for the complexity of public land use issues and were encouraged to explore ways to incorporate these issues into their classes. The second field trip took the class to the Deming Livestock Auction.

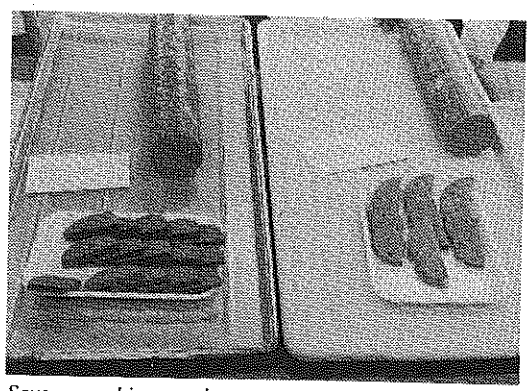
Other highlights of the class included presentations on AITC and AITC curriculum resources by Shirley Traxler, National Director for Agriculture in the Classroom, a sharing session, and a NMDA puppet show about grazing on public lands.

Because the class is offered through continuing education, tuition funds pay for supplies, mailings, field trip transportation, curriculum materials, refreshments, and an annual New Mexico-style luncheon that features a variety of local dishes. Sponsors were found for two other luncheons and a dinner. The social aspects of the class have been one of its selling points.

Mary Shanks tells her second grade class about the soil profile before planting a tree as part of her Project Soil program. (Photo courtesy of Greg Haussler)

Curriculum Development

Students enrolled in the summer class have had the option of taking two more credits to develop an agriculturally related unit of instruction. The units are written in a standardized format to provide continuity. Each begins by identifying the appropriate grade level and topic area, with a brief summary of the unit. Specific competencies in agriculture, language arts, math, science, and social studies addressed by the unit are listed and assigned identification numbers (teachers are encouraged to use state identification numbers whenever possible). An agricultural content outline follows the list. Whenever posible, agricultural content is paired with academic competencies, using identification numbers. Descriptions of at least four agricultural learning activities follow the content outline. Competency identification numbers also accompany these activities. For example, along with a description of a learning activity about bean seedling



Sausage making can be set up as a science experiment to show the effects of different ingredients.

growth using a bottle biology technique would be pairings of agricultural competencies with required science, math, and language arts competencies, using the numbers. Cross-referencing ensures the unit does not add many new competencies to an already overburdened curriculum. Finally, units must contain two self-paced homework assignments, evaluation tools, and answer keys, when appropriate.

Students submit two copies of their unit to AXED for grading. One copy is returned with comments and a grade. The second copy is sent to Mrs. Cain for cataloging. A catalog of the units is published annually and distributed to teachers across the state. Units are organized by grade level and assigned an identification number. Summary statements are copied from the units into the catalog to facilitate "shopping," and to reduce duplication of effort by future curriculum developers. An order form is included in the back of the catalog. In the past two years, almost 100 units have been cataloged and made available to teachers in this manner.

Many of the units draw on the tricultural (Native American, Hispanic, and Anglo) heritage of New Mexico. Uniquely southwestern agricultural and food traditions provide a motivational backdrop for teaching academics. →

NMAITC in Action

Agriculture in the Classroom is a motivational way to teach. Agriculture affects everyone. Teachers at Capitan Elementary School share a conviction that teaching agriculture and natural resources within all areas of the curriculum ties basic skills development to the real world and provides children knowledge and skills to make intelligent decisions.

At Capitan Elementary, teachers use many resources to teach agricultural concepts. They started an outdoor classroom with the help of the Upper Hondo Soil and Water Conservation Service. It is a fenced area including several trees and a drip irrigation system. Plans for the classroom include adding native flowers and grasses with identification plates, and a weather station. Most of Capitan Elementary's teachers have received training for Project Learning Tree and Project Wild, two interdisciplinary, supplementary environmental and conservation programs for teachers of kindergarten through high school students. Project Learning Tree, from the Society of American Foresters, U.S. Forest Service, ties trees and forestry to our everyday lives. Project Wild, from the Western Association of Fish and Wildlife Agencies and the Western Region Environmental Education Council, has a wildlife focus. Capitan Elementary second grade teacher Mary Shanks has also developed and conducted in-service for a program called Project Soil to teach basic soil conservation principles.

Resources from these three programs are widely used at the school for teaching about wildlife, forestry, and soils while addressing different academic competencies.

Teacher Gail Campbell demonstrates how Native Americans of the Southwest have used native plants for centuries to dye wool.

To obtain information about these programs, the reader can write to:

Project Learning Tree
American Forest Council
1250 Connecticut Avenue, NW
Washington, DC 20036

Dr. Cheryl Charles, Director
Project Wild
Salina Star Route
Boulder, CO 80302

Project Soil
Upper Hondo Soil and Water Conservation Service
Box 900
Capitan, NM 88316

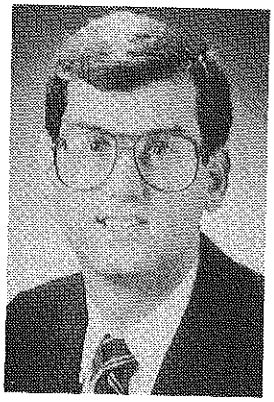
Capitan Elementary also uses community resources in its AITC program. The local Cowbelles and Wool Growers organizations presented a puppet show that explained how wildlife and livestock can benefit each other. On Arbor Day, resource people from the State Department of Forestry, U.S. Forest Service, and Soil Conservation Service presented a puppet show about forest fires, wildlife, and the importance of trees. Each child received a tree seedling to plant at home. Fourth graders are taken on a ranch tour where they experience basic ranching practices. First graders incubate pheasant, duck, and chicken eggs during the year. Other activities are centered around agricultural products, like chile, apples, and wool.

Whole language activities lend themselves to AITC. For example, a New Mexico product, such as apples, can be used to improve reading when the story of Johnny Appleseed is read. Geography and map reading skills are improved when students learn the apple-producing states. Solving problems, such as bushels produced per tree or cups of apples needed for a recipe, can improve math skills. This integrated approach helps students relate agriculture to all aspects of their lives.

Summary

The sources of strength in New Mexico's Agriculture in the Classroom program are threefold. First, strong linkages have been forged between school teachers and agricultural agencies, businesses, institutions, and organizations. Second, the summer university class and annual workshops provide friendly and fun forums to exchange and gather agricultural literacy ideas. Finally, the teachers have developed, and at times provided inservice for, much of the curriculum used in the state. The program is vital and growing, in spite of not yet having a foundation to supply consistent and substantial financial backing. ■

Effective Teaching Practices



By Dr. Donald M. Johnson

Dr. Johnson is an assistant professor of agricultural and extension education at Mississippi State University.

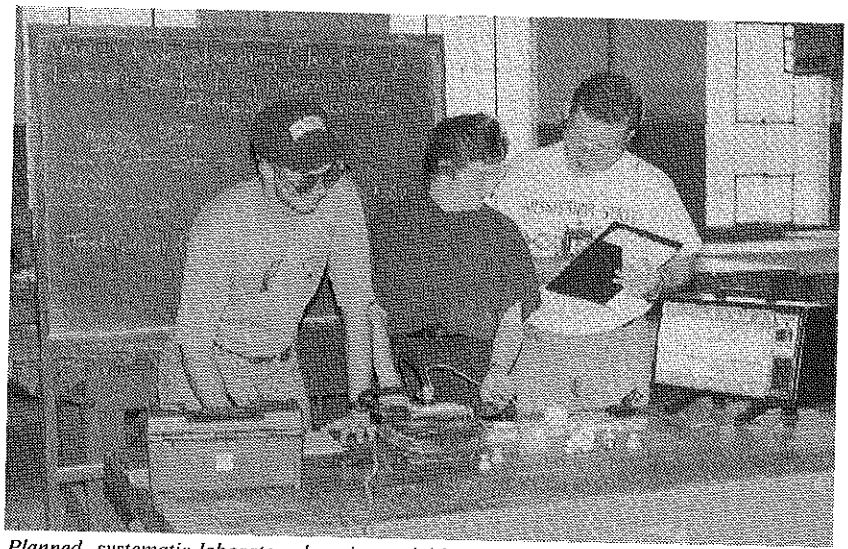
Is your laboratory an educational facility where students actively engage in structured, hands-on learning experiences directly related to course objectives? Or is your laboratory merely a place where students pass (waste) an hour or so between English and math classes? Do your students look forward to going to the laboratory because they know they are going to learn something relevant and meaningful? Or do they look forward to going to the laboratory because it means "free" time and a break from "real" class?

What determines which type of laboratory experience your students have? YOU DO! As the instructor, you make this determination based on the way you view the pupose of your laboratory and by the laboratory teaching practices you use. This article discusses the appropriate use of laboratories in agricultural education and highlights effective laboratory teaching practices.

Do your students look forward to going to the laboratory because they know they are going to learn something relevant and meaningful?

Appropriate Uses of Laboratories

There are any number of excuses for using laboratories in agricultural education. For example, one teacher may take students to the laboratory simply because no classroom lesson has been prepared. Another teacher may have students in the laboratory so he or she can use the class period to work on a personal project or attend to other non-instructional tasks. In both cases, the teachers view the laboratory as a way to occupy (waste) student time rather than as an educational facility.



Planned, systematic laboratory learning activities contribute to student mastery of course objectives. (Photo by Dr. Michael Newman, Mississippi State University).

There is only one reason for using laboratories in agricultural education. Effective teachers use laboratories only when their use is the best available means of helping students master specific instructional objectives. When used for this reason, agriculture laboratories have the potential to be true educational facilities.

Effective Laboratory Teaching

Knowing when to use laboratories is important; however, teachers must also know how to use laboratories, if maximum student learning is to occur. Effective teachers provide students with planned experiences and emphasize student learning in the agriculture laboratory.

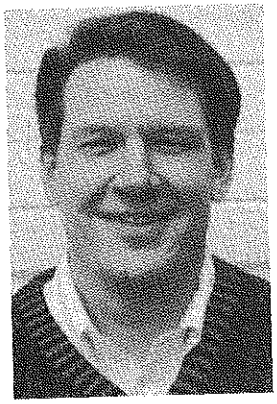
Provide Planned Laboratory Experiences: Too often teachers begin a laboratory period by asking the question, "Does everybody have something to work on today?" This usually indicates a lack of planning on the part of the teacher. Teachers who provide their students with planned, systematic laboratory experiences know what each student should be doing in the laboratory on any given day.

Laboratory activities must be carefully planned if they are to contribute to student mastery of specific instructional objectives. Without planned, systematic laboratory experiences, a student may fail to develop important skills and understandings essential for career success and/or further education.

Emphasize Student Learning. What is the most important product produced in your agricultural laboratory? Is it the livestock trailer built by the agricultural mechanics class? The crop of bedding plants grown by the horticulture class? Or the market steers finished out by the production agriculture class on the school land laboratory?

Hopefully, you realize that livestock →

Let's Not Reinvent The Wheel



By MICHAEL WALSH
Mr. Walsh is the agriculture teacher at Genoa-Kingston High School, Genoa, Illinois.

My life as an agriculture teacher at the high school level has taken a sudden turn since we have added aquaculture to the facilities and the curriculum.

In northern Illinois, at least where I am, production agriculture as we know it is long gone. The days when students were taking subjects like swine production, beef production, corn production or soybean production are a mere memory. Agricultural production at my school means raising geraniums, petunias and other bedding plants in large quantities in the high school greenhouse.

We are currently experiencing an infusion of many science and agriscience concepts into the agriculture program. The new aquaculture facilities and curriculum are just one aspect of agriscience concepts being taught.

When one thinks of adding a new dimension, such as a new aquaculture course to an existing curriculum, one would assume you get a textbook, make an outline, and away you go. This was not quite what happened in my case.

My first realization that the aquaculture program was having a profound effect on my life was the number of additional hours it requires. At first I compared it to running a school greenhouse, which I also do. Your first semester is somewhat easy going, but things really heat up as you prepare for the big spring bedding plant sale. The greenhouse takes almost all of your spare time from March until June. At least with the greenhouse you can look forward to the end of the sale or season and some down time. Aquaculture is much the same way, with one exception, I don't see it as seasonal, because when you are not actively raising fish, you are between crops doing cleaning, repair, and maintenance to get ready for the next batch of fish. My unspoken, unwritten motto about aquaculture is "Aquaculture is like a sponge, it will soak up as much time and money as one gives it."

Some people would take this as a negative comment; it is anything but negative. As a first-time aquaculture teacher, the only time I have been more enthused or excited about a project was when I walked into an agriculture classroom for the first time as a teacher. Aquaculture has given my agriculture program a new burst of energy. It is attracting a new clientele of students — students who are now challenging me on math and science aspects of the course. Rather than teaching to the middle intelligence level of a mechanics class, I can teach to the top level of the aquaculture class.

One of the biggest and best ways that my life has changed is the influx of science and math concepts and principles into the agriculture curriculum. I am being forced to re-learn certain math and science formulas, procedures, calculations and techniques, some of which I haven't used since my senior year in high school, and it's invigorating and exciting. For the first time in a few years, I am really and truly "preparing" a lesson. I am a teacher again, not just going through the motions of teaching another semester of welding, →

Effective Teaching Practices

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trailers, bedding plants, or market steers are not your most important laboratory product. As an educator, you are in the business of using your laboratory to produce student learning. The skills, understandings, and attitudes students take from your laboratory to the job or further education are your real products. When viewed from this perspective, laboratory projects and activities become a means to an end rather than an end in themselves.

Summary

Agricultural laboratories can either be highly productive educational facilities or places where students waste valuable time and develop poor work habits. As the teacher, you decide which type of laboratory experience your students will have. When you use your laboratory for the correct reason, provide students with planned activities, and emphasize student learning, your students will have the right type of laboratory experience. ■

but really teaching. One thing is certain, there is much more learning taking place behind the teacher's desk than in front of it.

Recently, one of my colleagues said he couldn't talk for five minutes about aquaculture. For him this was probably true, but by working in the field, reading everything you can get your hands on, and making it your number one priority, talking about aquaculture is one of my favorite pastimes.

Aquaculture has given my agriculture program a new burst of energy. It is attracting a new clientele of students — students who are now challenging me on math and science aspects of the course.

"Learning To Do, Doing To Learn, Earning To Live, Living To Serve." The FFA motto is being put to the ultimate test. Over the past 18 months since our aquaculture program has been in existence, we have put considerable stress and strain on the first two lines of the motto. "Learning To Do and Doing To Learn" has been severely tested as we built the homemade system from the ground up. No truer words have been written or spoken as "You learn from your mistakes." As we progress through our first crop of Tilapia fish, and as they pass from one growth stage to another, we find out what works and what doesn't. What seemed to have worked in the two to three inch fingerling stage often does not at the five to six inch stage.

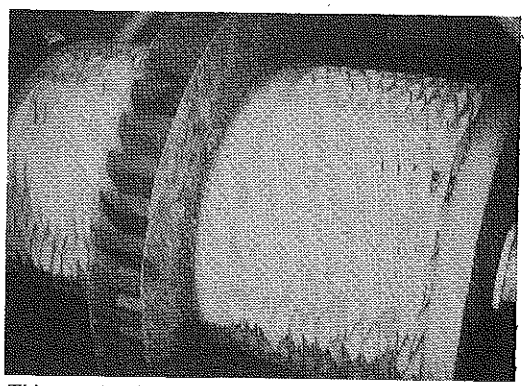
One of the biggest problems we are experiencing is the of lack of funds to make this program evolve. As a result of low funding capabilities, rather than purchase some of the industry's tested and mass produced products, we have entered the field of research and development.

I am a teacher again, not just going through the motions of teaching another semester of welding, but really teaching.

There are three items that come to mind that we have designed, tested and used in our system, some because of the lack of money to purchase them, but more so because we could not find them on the market at all, so we designed, built, and tested them ourselves. Remember, this is happening at the high school level — not at a college or university.

We have experienced a wide range in fish size. Currently, our largest Tilapia is 10 or 11 inches in length, and the shortest is 3 or 4 inches. To try to even out the size factor we have developed a "creep feeding station" for fish. The smaller fish are able to feed separately and undisturbed from the larger fish, but all within the same fish tank. This allows the smaller fish to eat and not be in competition for the same food as the large 10-inch fish. So far we are seeing moderate results, and smaller fish are gaining in size to provide a more uniform-sized population.

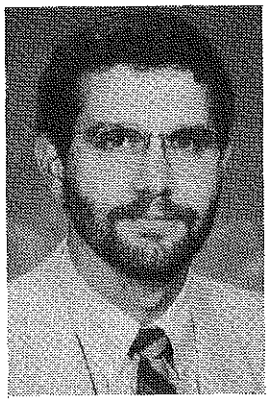
We have been told by numerous industry officials that Tilapia will grow fine in brackish waters. However, when we have visitors to our facilitiy, they want to be able to see the fish, and in brackish water they remark, "What's wrong, why is your water so dirty?" So we have developed, built, and tested a filter that allows approximately 15% of the water to be circulated through a tank containing pea gravel, silica sand, and activated carbon chips. Over a period of only two days, our 2,000 gallon tank changes in water clarity from six-inch visibility to a visibility of seven feet. We have also found that students have little interest when they can only see fish in the upper six inches of the tank, compared to having great interest when they can see to the bottom of the seven-foot deep tank.



This rotating bio-disc filter is the homemade bio filter that our agriculture students constructed. The construction is made from commonly found lumberyard materials. Three students spent 40 hours in the construction process.

Our third research and development project has been in the area of biofiltration. Our project started with the homemade construction of a rotating biodisc filter. For several reasons we have phased this out and have developed a six-tiered biofilter stack. Each of the six stacks is filled with a different biomedia. Through the →

Preparing Today For Tomorrow's Classrooms



By Dr. Gary Straquadine

Dr. Straquadine is an assistant professor and assistant head of the Department of Agricultural Systems Technology and Education at Utah State University.

Imagine you enter the classroom like Captain Kirk on the popular television show Star Trek. You have probably traded in your boots, necktie or coveralls for the sleek, forever wrinkle-free uniform of an instructional leader. The command center of your classroom more closely resembles the banks of flashing lights, control units and video screens Mr. Spock stoically commands. And with the freedom to explore strange new worlds, you are charged with taking your agriculture students to where no man, or woman for that fact, has gone before.

Technology: A Window to the Future

By definition, technology can be seen as any piece of equipment, technique, or principle that improves upon currenct practices. At the center of our current and future technologies is the computer. Whether students are placed before free-standing microcomputers or networks communicating with other computers in the same room or across the nation, the computer is destined to replace the text-book and notebook rack used in most agriculture programs. Satellite linkages will bring data and instruction into the most remote locations. Two-way video communications between students and agricultural scientists will abound. And as the hardware and software advances, near-reality systems will allow students to experience learning activities in traditional and exotic agricultural production, processing, and management without leaving the classroom.

A list of affordable technologies available for us as teachers of agriculture can be developed with one logical error. Some technologies we will be using in the first half of the next century have yet to be invented. However, while the appearance of technology in the classrooms of the future is widely expected and, for the most part, accepted, the role of these new technologies is uncertain. The appropriate application of new technologies will require restructuring of the current curriculum and understanding the role of the teacher in the agriculture classroom of the future.

The Role of Technology in the Classroom of the Future

Technological innovation can be marked by isolated peaks on the education timeline. For example, the invention of the printing press had profound effects by making the ideas of universal literacy and public school possible, as well as reducing emphasis on memorization. The perfection of the internal combustion engine put school buses on the back roads of America and aided in the consolidation of rural schools and the dispersion of people to the suburbs. The effects of television and video technology on our society are evident in the decline of the print culture and the rise of a visual culture with shorter attention spans.

It would be foolish to ignore the role current and future technologies will have in our agriculture classrooms, laboratories, supervised student experience programs, and youth organization. Yet, the serious consideration of these technologies goes well beyond cleaning out a corner of the classroom as a work space. The use of technologies in the classroom of the future needs to be considered in relation to the →

Let's Not Reinvent The Wheel

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aquaculture class we are able to test and experiment on which media material is most effective for the growth of bacteria. All three of these development projects were designed and built by high school students and staff and are currently being used in our system.

The new aquaculture facility and curriculum have been a very positive influence in the community, school, aquaculture program, and to me professionally. I would encourage anyone who is looking for a new high-tech, science and math-filled area to add to their curriculum to consider aquaculture. It's not just a job, it's an adventure. ■

entire educational program. Teachers, administrators, agricultural employers, parents, and students need to be aware of the impact advancing technologies can have in the agriculture classroom. We should look beyond the technology as the panacea for excellence. Even the best technologies will fail if corresponding changes are not made in the way teachers apply technologies in agricultural education.

Restructuring Schools

To succeed in the classroom of the future, the school environment itself may have to undergo significant restructuring before technology can become an instrument of change. According to Linda Roberts, director of a recent study on computers and video in education for the U.S. Congress Office of Technology Assessment, "Today's classrooms typically resemble their ancestors of fifty years ago more closely than operating rooms or business offices resemble their (fifty-year-old) versions." The evidence continues to indicate that the usual practice of marching students and teachers from one conventional classroom to another in lockstep schedules does not provide the stimulating environment needed to develop new ways of learning.

While changes in classroom organization and time management may provide the groundwork, many educators believe restructuring the curriculum itself is the key to meaningful changes with technology. What is needed is more experience-based learning and inter-curricular study areas in place of orthodox curricula that emphasize the dispensing of textbook information in separate, unrelated sessions. Perhaps the most logical areas of inter-curricular study would be the hybridization of agricultural science and biological science. As an applied biological science, agriculture provides the perfect platform for demonstration and experimentation.

Changing The Role of Teachers

Infusing technology into the agriculture curriculum will require altering the roles teachers and students play in the learning process. The teaching of new technologies with new technologies will require the teacher to shift from the didactic to constructivist view. For too many years teachers have been prepared to teach as information transmitters. This didactic view holds that teachers should be masters of particular domains of knowledge and that their job is to transmit their expertise about these domains to students through lecture and recitations. Students should memorize the facts and concepts and practice the skills until they can demonstrate that mastery on appropriate tests.

The constructivist view, supported by the writings of John Dewey, Lev Vygotsky, and Maria Montessori, propose that teachers serve as facilitators who help students construct their own understanding and capabilities in carrying out challenging tasks. This view puts the emphasis on the activities of the student rather than the teacher. For decades this inquiry into problems rather than information about problems has served as a successful model in the agriculture classroom. Yet, the importance of the problem-solving approach to teaching should not be diminished as the predominate teaching method in the next century. As classrooms switch from conventional textbook learning to computer-aided discovery learning, students will become more active participants in how they learn and in what they learn.

Conclusions

The future of agricultural education will depend upon the successful application of technologies in teaching. This application will require a greater appreciation for technologies when preparing and inservicing teachers. More importantly, it will also require a commitment to restructuring the curriculum and changing the role of the teacher. Otherwise, the enthusiasm and use of new technologies will fade like a new toy two weeks after Christmas.

Coming in June and July —

Themes: Advisory Councils
Collaborative Relationships

Feature Columns: Hydroponics
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Marketing the Program
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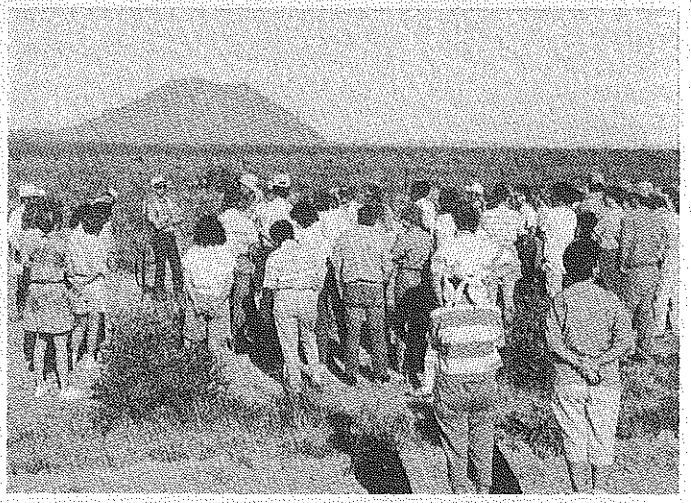
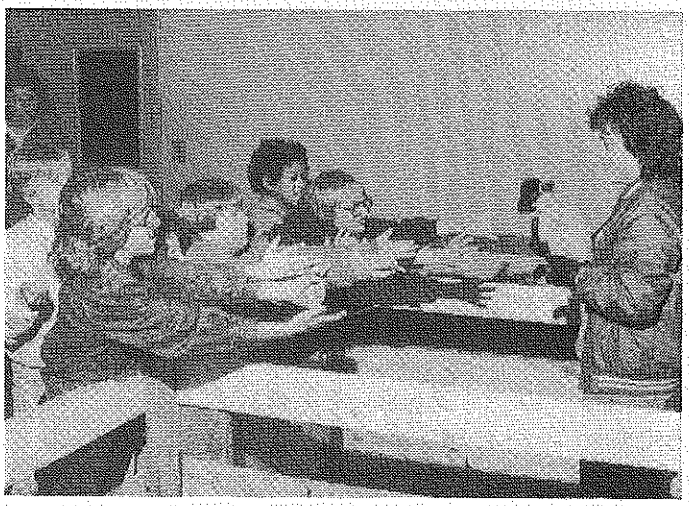
STORIES IN PICTURES



Understanding public land use issues was a major goal of a summer course offered for New Mexico elementary teachers. (Photo courtesy of Tom Dormody)



Furnishing students with on-site experiences improves students' understanding of food origins. (Photo courtesy of Martin J. Frick)

Shirley Traxler, National Director for Ag in the Classroom, shares curriculum resources with New Mexico teachers. (Photo courtesy of Tom Dormody and Mary Shanks)

Elementary students from Silver City perform a skit about New Mexico vegetables. (Photo courtesy of Tom Dormody and Mary Shanks)