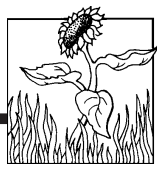


Preface: Why Agricultural Literacy?

In the fall of 1989, the National Academy of Sciences published a report entitled "Understanding Agriculture—New Directions for Change," in which they found that most people do not have a clear understanding of agriculture. Their definition of agricultural literacy as education about agriculture included the following:

> An agriculturally literate person's understanding of the food and fiber system includes its history and current economic, social and environmental significance to all Americans. This definition encompasses some knowledge of food and fiber production, processing and domestic and international marketing.

The report spurred several researchers to study the need in California schools (Rilla et al.). Their findings, published in 1990, had encouraging news. The survey results indicated that educators believe agricultural literacy is an important element of a complete education and that they feel it would be best incorporated at the fourth through sixth grade levels through integration into the science and social studies frameworks.

In the summer of 1991, the Marin Community Foundation agreed to fund the Marin Agricultural Literacy Project as part of the foundation's goals to educate children and adults about Marin's agricultural resources, and about issues affecting agriculture and the environment. Over 50 percent of Marin's land-use base is tied to agriculture, yet many children believe that milk comes from the supermarket, not a dairy cow.

Our philosophy is based on the belief that healthy agriculture is an essential ingredient in a healthy economy and community. It links us to the soil, weather, water and land of which we are all a part. Agriculture is tied forever to the natural laws that govern life on our planet, from the germination of a seedling to the birth of a lamb. Everyone who is tied to the land in this way is a steward of our natural resources. Students, in turn, become "stewards" as they observe and explore the interconnectedness of our natural and agricultural resources.

The Marin Agricultural Literacy Project includes this activity guide, "Food for Thought"; an agricultural resources directory for teachers; and a video on Marin's agriculture told from a child's point of view. This was a collaborative project involving many people from all parts of Marin. Because Marin's schools have a large contingent of native Spanish speakers, we have provided handouts in both English and Spanish, and the glossary incorporates English and Spanish names.

Acknowledgments

This project represents the hard work of many people from very diverse backgrounds, including sheep and dairy ranchers, an oyster grower, an organic farmer, a bilingual teacher, a college professor, a community activist and a professional writer. This group provided context, parameters, vision and the overwhelming desire to provide their community's teachers with useful materials that will assist them in discovering and exploring the story of agriculture in their classrooms.

We'd like to acknowledge the following people for all their expertise and contributions to the initial success of this project and to the team that revised and created the 2001 version:

Marin Agricultural Literacy Project Advisory Committee *(see inside back cover for names)*

Design Team
- Susan Giacomini-Allan
- Elaine Boling
- Dan Desmond
- Ross Herbertson
- Gloria Lopez-Gutierrez
- Gary Longfellow
- Valerie Pankow
- Rich Ponzio
- Liz Sandlin
- Kay Slagle

2001 Revision Team
- Constance Washburn
- Julie Evans
- Ellie Rilla

Ideas, Suggestions, Feedback
- Susan Giacomini-Allan
- Rick Bennett
- Bob Berner
- Dan Desmond
- Roy and Agnes Erickson
- Annette Grossi
- Gloria Lopez-Gutierrez
- Ross Herbertson
- Lisa Jang
- Stephanie Larson
- Dewey Livingston
- Valerie Pankow
- Valerie Peterson
- Jorge Rebagliati
- Rich Ponzio
- Liz Sandlin
- The Stewart Family

Many thanks to Fred Hoel and the fine staff at Printing Services, County of Sonoma, for their outstanding service.

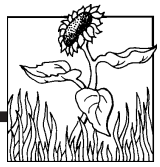


Table of Contents

Preface i
Acknowledgments ii
Table of Contents iii
Introduction v
How to Use This Guide vii

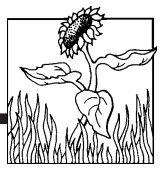
Section I: Discovering Agriculture
1 Farms Underwater? 1
2 Gimme Some Milk 3
3 Interview at the Market 9
4 Let's Farm! 13
5 Milk, Meat and More 17
6 Soil Detectives 27
7 Germination Stations 29
8 Dueling Greens 33

Section II: Exploring the Historical and Cultural Diversity of Agriculture
1 Our Human Roots 37
2 Better Butter 41
3 Culture in Horticulture 45
4 Baaa, Kabobs and Blankets 49
5 World Feast 53
6 One Potato, Two Potato 57
7 Seasons! 67

Section III: Understanding the Management and Economics of Agriculture
1 Life Story of a Lunch 77
2 Food Chains 79
3 Cut and Dry 87
4 Who's Hungry? 91
5 World Web 93
6 Reduce, Reuse, Recycle 97
7 To Market, To Market We Go 99

Section IV: Relating Agriculture and the Environment—Interdependence
1 Land Plans 101
2 What is Organic? 103
3 Carrying Capacity 107
4 Vanishing Farms 109
5 Run-off Race 111
6 Salmon Survival 113
7 What's It Worth? 117

Glossary 119
Source Materials 123
Activity Index 125
Amazing But True… Facts About Agriculture in Marin County 127
Evaluation Form 131
Framework Correlations 133



Introduction

This collection of activities for grades three through six offers classroom teachers and their students a wonderful opportunity to explore the world of agriculture in their community using traditional classroom disciplines. We developed them using the following guiding principles: First of all, they must work for the students and the teachers. The activities are designed to be fun and challenging while inspiring students to learn, ask questions and pursue knowledge. Because it has proved an effective teaching technique, hands-on, active learning is used. Complete instructions, readily available materials and thorough background information, including extensive resources for further information, give teachers the tools necessary for success. We don't want to add more to the busy teacher's schedule; no Friday afternoon agriculture lessons. For this reason we have integrated math, science, social studies, history and language arts into a complete learning experience. This material is designed to teach traditional disciplines using an agriculture theme. Thus, you, the teacher, are addressing the required curriculum using agricultural information from the students' home region.

The guide's format is a result of a teacher survey, and the activities have been field tested at diverse school sites. Many of the activities take place in small groups where students work together to solve problems and apply their knowledge. Some activities take place outside on the school grounds or in preparation for attending Marin's outdoor education school, Walker Creek Ranch, situated on a 1700- acre former dairy ranch in west Marin. The sections start with activities that relate agriculture to the students' knowledge, then relate the activities to the broader community and the world. Final activities in each section focus on problem-solving and student participation.

While addressing these guiding criteria we have also kept the California Department of Education's Frameworks for education sitting in front of us throughout. Following is a brief description of how these materials meet the principles and content requirements set forth in the Frameworks:

Mathematics Framework
The activities encourage students to estimate numbers and distances. They are called upon to do mental computations and develop the ability to approximate. Measurements are common to many activities. Observation of geometric patterns and work with spatial reasoning are also found within these activities. Plants are great simulators of patterns, and seasonal changes are explored as an example of rhythms in agriculture. Many of the activities require students to collect data and manipulate information. This provides concrete experience with writing statements, developing theories and recognizing principles. Several activities present real world problems and encourage students to think about ways to solve them and verify solutions.

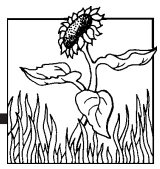
Science Framework
This agricultural topic includes the three basic fields of scientific study: physical, earth and life sciences. Students experience controversy free of dogmatism and open to inquiry. Technology, its relation to agriculture and implications for society are discussed. Hands-on experiences are emphasized in these activities as well. Ideas are introduced with inquiry and investigation. We have devised questions for discussion to allow challenge and success to learners of varied levels and types. Vocabulary is not presented for rote learning but as an integral part of the learning experience. Outside learning situations, speakers and field trips are repeatedly encouraged to help students realize that learning is not limited to the classroom. Activities have built-in assessment; the performance and investigation within the activities fulfill this function.

History-Social Science Framework
Within this collection of activities virtually every one of the K-12 Goals and Curriculum Strands are addressed. Special attention has been paid to economic, geographic, cultural, historical and ethical literacy. Critical thinking is encouraged throughout, and civic values are inherent in many of the activities. The lessons are integrated in their

approach to teaching history-social science. The diverse cultural history of agriculture in Marin County is discussed in several activities. Within each section the information is built from the individual student's experience to their community and the world. Exploratory methods for learning are emphasized throughout the guide. Controversial issues have not been skirted but are treated equitably so students can review facts and make independent decisions. The activities encourage students to consider their community and their role within it to help them develop a commitment to public service.

English-Language Arts Framework
These materials integrate the whole of language learning, including listening, speaking, reading and writing, with the teacher supporting grammar, spelling and handwriting instruction. Critical thinking is applied to both the comprehending and composing processes of oral and written language. The content of the materials to be read is diverse and encourages development of comprehension. Techniques and activities interrelate speaking, reading and writing with thinking. New vocabulary is introduced in multiple contexts. Students are given the opportunity to practice and use spelling, grammar, punctuation and handwriting. The use of language is related to other content areas, and extensions are provided, many extending students' activities beyond the classroom. Students with varied learning modes and abilities can use the activities with success.

See page 133 for an Activity Index that correlates activities to the California Learning Standards for grades 3-6.



How to Use This Guide

The guide is organized into four sections with a total of 29 activities prepared for classroom or field trip use. The sections are developed around four major topics:

I. DISCOVERING AGRICULTURE
Activities that encourage students to gain awareness of agriculture in their community and appreciate the role it plays in their lives.

II. EXPLORING THE HISTORICAL AND CULTURAL DIVERSITY OF AGRICULTURE
Activities that explore the rich historical and cultural heritage of Marin's past and how it relates to students' lives today.

III. UNDERSTANDING THE MANAGEMENT AND ECONOMICS OF AGRICULTURE
Activities that develop a better understanding of the processes, economics and skills needed in agriculture on a local and global level.

IV. RELATING AGRICULTURE AND THE ENVIRONMENT—INTERDEPENDENCE
Activities that highlight the dependence of sustainable agricultural systems on a healthy ecosystem.

Within each section activities build their concepts from the student's **personal and family experience** to **community** and the student's role within the family and community context. The next level of exploration is the **world view** of agriculture, its effects on us and ours on it. Lastly, we hope to get students thinking and incorporating their own views and learning through **personal action** in their community.

Other materials included in this guide are:

- English and Spanish student handouts
- An index cross-referencing activities
- Glossary in English and Spanish

Other Resources:

A companion booklet that complements this guide is "Food For Thought: Agricultural Resources Directory for Teachers" (Marin edition).

A companion video that complements the activities is: "Food For Thought: A Visual Introduction to Marin Agriculture."

Write to the University of California, Cooperative Extension office in Marin for further information:
1682 Novato Blvd., Suite 150B, Novato, CA 94947 or call 415-499-4204.

Each of the activities is presented in a similar format.

Title of the Activity

Objective: What we designed the activity to teach.

Summary: A brief description of how the objective is obtained.

Time: An approximation of time needed to complete the activity.

Student Grouping: Most are designed to be done in cooperative learning groups, but often variations are possible for adapting to special classroom needs.

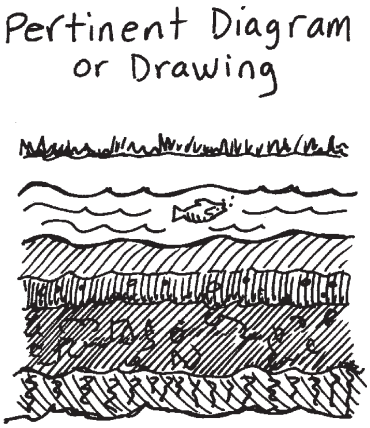
Materials: Almost everything called for is inexpensive and easy to obtain.

Background Information: General information that relates to the activity is given here. When the concept is quite involved, the background information will be more extensive and may refer you to other sources to clarify any questions you may have.

Marin Ag. Facts: The Marin County agriculture community has provided us with a wealth of information that brings these concepts and lessons alive and close to home. The history, cultural diversity, political outlook and current status of agriculture in our beautiful home are covered in this section.

Preparation:

These are notes to teachers that will help the activity go smoothly in the classroom and in the field. Here you will find out where to locate materials and get suggestions on how to divide the students into optimal learning groups.



Procedure:

Step-by-step instructions are delineated here for the day of the activity. What comes next and how to do it is laid out in plain fashion so the already too-busy teacher doesn't have to figure it out on the run.

Questions for Discussion:

- These can be used for assessment after each activity. Questions are designed to allow success for varied-level learners as well as to challenge the more proficient students.

Extensions:

- When you're on a roll and the students are enjoying a topic, you can turn here for ways to extend an activity and further the learning already begun.