

Chapter 1

Introduction

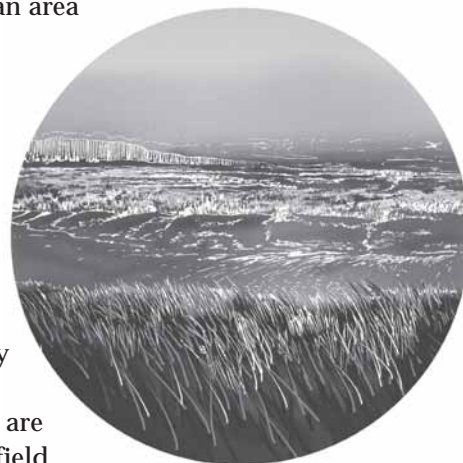
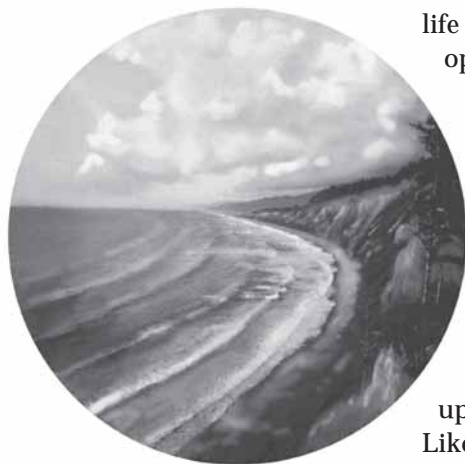
Welcome to a book that may give you a new perspective on our state. From the snow-capped peaks of the Sierra Nevada, to our warm, sandy southern beaches and our rugged, wind-swept north coast, our stunningly beautiful state supports a bounty of life and a diversity of habitats. This diversity presents an outstanding opportunity to witness science in action, regardless of where you live.

We all live in a watershed, and almost all watersheds ultimately empty into coastal waters. *Waves, Wetlands, and Watersheds* will help students understand the natural systems that connect all Californians to our coast, whether they live on the San Joaquin River, on the shores of Lake Tahoe, or in the middle of Los Angeles.

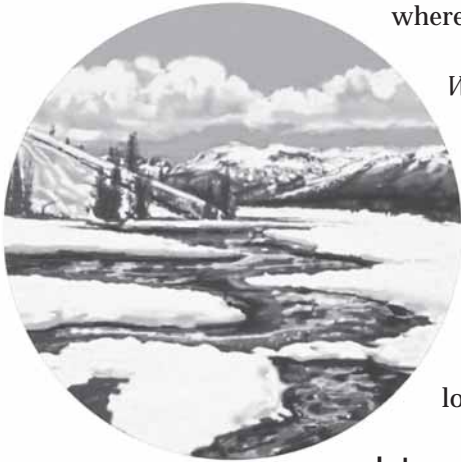
California's natural resources have provided a robust livelihood for its human inhabitants for hundreds of years. We continue to rely upon those resources for food, housing, clothing, and entertainment. Like a family heirloom passed from mother to daughter, California's natural heritage can be cherished and polished from generation to generation. However, it is human nature to take care only of what we understand to be valuable. These activities use an inquiry-based learning approach to develop this understanding. Once students comprehend how natural systems work, and their role in the continued function or ultimate collapse of these systems, they have taken their first step to protecting and conserving California's valuable resources.

Activity Focus

These activities were adapted from exemplary time-tested science curricula developed by outstanding environmental and scientific organizations. The hands-on activities were evaluated and selected based on three criteria: they concentrate on an area of critical concern to the California Coastal Commission (wetlands, coastal processes, rare and endangered species, nonpoint source pollution, and marine debris), they address multi-disciplinary standards (science content, language arts, mathematics, and history-social science) for California students in grades 3-8, and they are designed to be accessible to all students as no expensive materials are necessary and only one requires a field trip (grade 6). Community Action activities (Chapter 9) can be used by all grade levels, as they do not directly address science content standards but encourage students to become more aware of marine pollution sources and participate in efforts to address the problem.



The activities serve many academic and community needs. They provide students with classroom experiences that bring to life the sometimes static textbook descriptions of scientific concepts. Students will build their knowledge using models just like the scientists use, and learn about real life adventures of California's plants and animals. The activities engage students and promote conceptual learning because they provide hands-on experiences that exercise both creative and critical thinking skills. The activities are presented within a local context that links students' backyards and neighborhoods to the coastline, no matter where they live.



Waves, Wetlands, and Watersheds follows many of the teaching and learning practices recommended for California teachers as in *Making Connections: A Guide to Implementing Science Standards* (California Science Teachers Association, 1999). These include inquiry-based teaching and learning, an integrated science approach that assists understanding of how systems work rather than isolated fact memorization and recitation. Most importantly, the activities promote teaching and understanding of basic concepts by encouraging students to gather information, look for patterns, and then make sense of the patterns.

Integrating Activities into Your Curriculum

Through studying the environment, students learn not only the scientific basis for natural phenomena, they also learn the roles that people (and they themselves) play as they interact with the world around them. In this way, *Waves, Wetlands, and Watersheds* can be used to convey a broad range of concepts. Since each activity specifically addresses at least one Science Content Standard (and many also address standards in other disciplines), teaching about the environment can fit seamlessly into your curriculum. For instance, if you are a third grade teacher, you can teach about wetland habitats and species while covering the concepts of adaptation and survival (Science Content Standard 3, Life Sciences). Depending upon time and the degree of student interest, you may begin with simpler concepts and then build up to the larger, in-depth issues and extensions.

Chapter 2

How-to Guide

How to use this book

There are three activities for each grade level from third to eighth grade. The last chapter, *Chapter 9: Community Action*, has activities that may be adapted for use by all grade levels from first to twelfth. All activities in a grade level fall under the same science topic or theme. Each activity within a grade level may be completed independently of the other activities. Following is the format in which the pages are organized.

Science skills

The actions students undertake to complete this activity.

- observing: using all five senses
- classifying: identifying like and unlike objects, grouping into sets
- measuring: using numbers to describe size, weight, quantity, volume, or time
- organizing: analyzing and interpreting data
- inferring: drawing conclusions from data
- predicting: forming hypotheses based on past observations and results
- experimenting: identifying and controlling variables in testing hypotheses
- deducing: deriving a conclusion from something known or assumed
- communicating: verbal, written, or other methods of informing others about results and conclusions

Concepts

Underlying themes or understandings to be revealed by the activity. A concept shows relationships. For example, "Wetlands support life forms that have adapted to a part wet, part dry habitat."



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Activity

Details on how to conduct activity. Includes scripts for leading a classroom discussion, information on how to assemble stations, and the sequence of steps to complete the activity.

(indicates new activity) 

Results and Reflection

Activity wrap-up and discussion. Worksheets may be used for assessment and evaluation.

Conclusions

The big picture your students will understand by this point. The "take home" content information.

Extensions and Applications

Does this activity interest your students? Want to go further? Do more? Field trip ideas, research papers, topics for further whole class discussions, and how to become more involved in the community.

Adapted from

The citation of the original activity including contact information. If you like this activity, you may wish to contact the organization to obtain a complete list of their curricula. This section also includes additional references where appropriate.

California Science Content Standards

Also listed are language arts, mathematics, and history-social science standards where appropriate.

According to the *Introduction to the California Science Content Standards*, the standards represent the essential skills and knowledge in science that students are expected to have acquired at each grade level. The content within each grade or span is organized into strands.

For grades K-5, the science content strands are Earth Science, Life Sciences, Physical Sciences, and Investigation and Experimentation. For grades 6-8, the content is organized in concentrations, with a focus on Earth Science in grade 6, Life Science in grade 7, and Physical Science in grade 8. *Standards listed in each of these activities are only those that are specifically addressed in the activity.*

Vocabulary

New words and concepts

Objectives

Measurable student learning goals of the activity.

Time to complete

An estimate—may be different depending on class reading level or other variables. Does not include setup or cleanup time.

Mode of instruction

Synopsis of how the activity proceeds, from whole class discussion to results and reflections.

Materials

Detailed list of what is needed to complete the activity, including worksheets.

Preparation

Overview of what to expect in completing the activity, what to plan for in advance.

Outline


What to do a week before, day before, day of the activity. A “to-do” list.

Final Tips

Throughout the activity guide you will find boxes similar to this that contain information you may use to get more out of the activity. The information is usually optional—gauge your class’s level of interest first and then decide whether to use the additional facts. Here are some final notes on how to use the book.

To conduct the activity, first check the left column. It contains preliminary information to decide how to arrange the time, facilities, and materials to do the activity. Look down this column to get an overall view of the activity. Once you have decided where it fits into your yearlong curriculum, read the background and activity description in the wider column to the right. This column gives you the “how-to” of the activity, from how to open a whole class discussion on the topic, to how to conduct the demonstration or assist students in their own experiments, to the activity wrap-up, and finally to the results and reflections, and optional extensions.

Most activities may be carried out within a one-hour class period. Some will take longer, some shorter, and a few can be continued over a number of days. Some of the activities require ordering videos from the Coastal Commission a few weeks in advance; this is noted in the “Preparation” section. Most activities can be completed within the confines of your classroom or schoolyard, using materials readily obtainable. No materials must be ordered from a scientific supply house, and most can be picked up at a grocery or hardware store. Have fun with these activities, and let us know how they turned out for your class. E-mail your comments to us at coast4u@coastal.ca.gov, and be sure to visit our website at www.coastforyou.org for updates and more information.

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