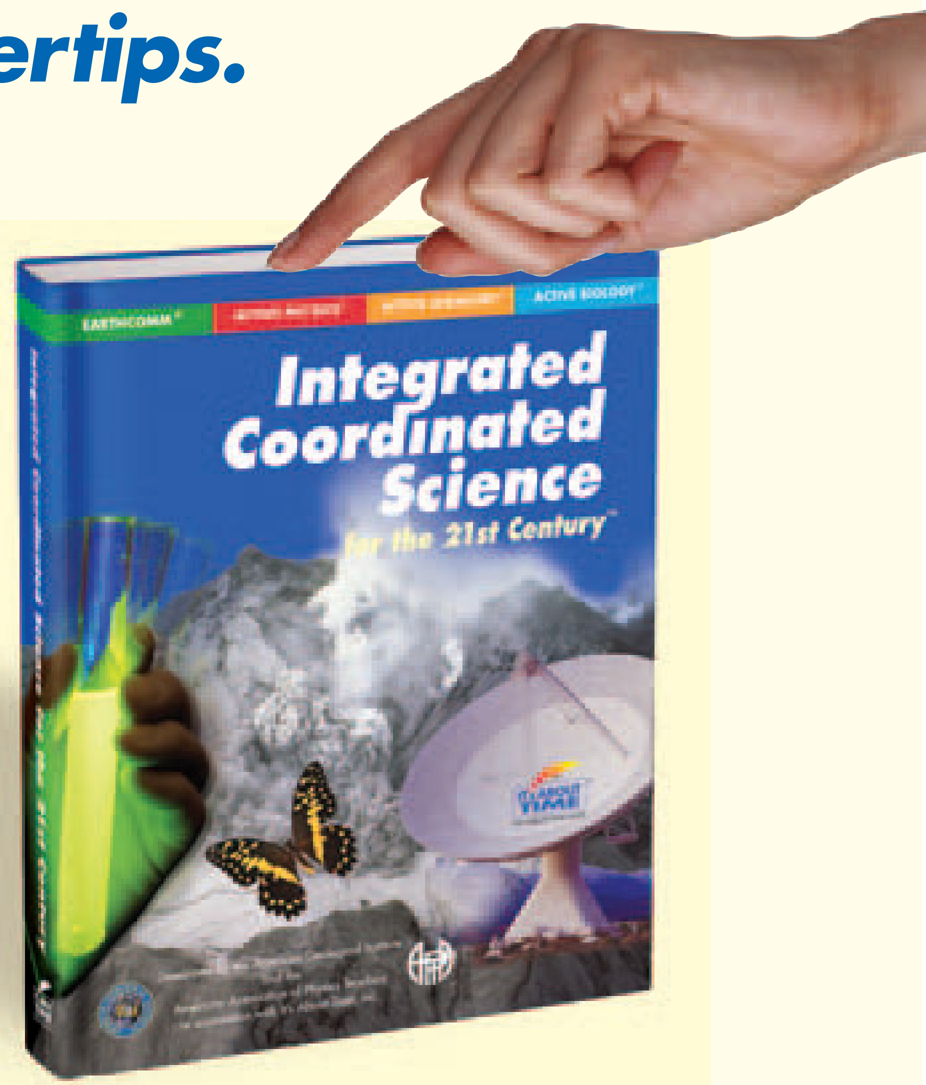
EARTHCOMM® | ACTIVE PHYSICS™ | ACTIVE CHEMISTRY™ | ACTIVE BIOLOGY™

Imagine having everything you need to meet the California State Frameworks at your fingertips.

Remember how you had to search all over the place to find the content you needed for an ***Integrated Coordinated Science Year 1*** course, and then, make sense of it when you tried to combine all the different materials into one cohesive curriculum? Search no more!
It's About Time, has taken four of its proven programs and created a coordinated curriculum that takes the work out of your hands, so you can concentrate on what you do best... educate your students.

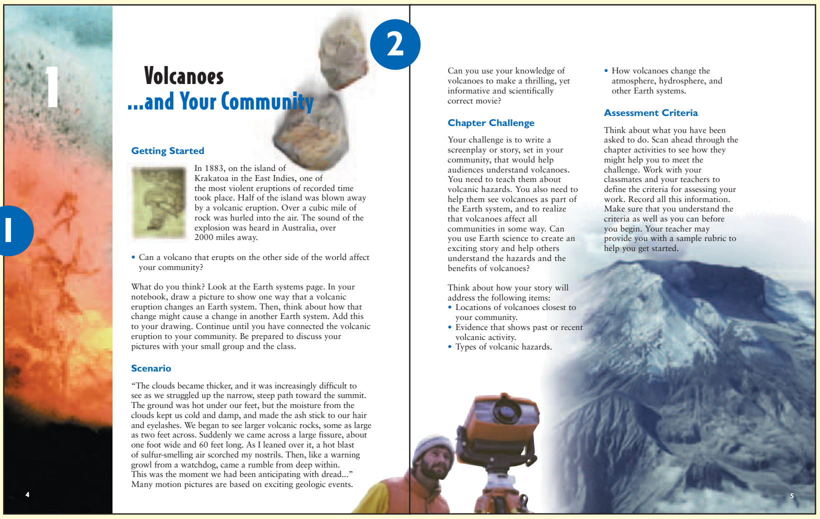


The Active Learning System™ *Making a Difference*

IT's ABOUT TIME®
HERFF JONES EDUCATION DIVISION

Your students can do any science.
Here are the reasons why...

Integrated Coordinated Science for the 21st Century,™ has the following features that make it much easier for your students to understand the science principles they will be studying. You will find that regardless of which science discipline they approach, whether it be Earth science, physics, chemistry, or biology, the way they go about learning each of them is the same. Every step along the way will prepare them for the following step. Using all these features together will help your students actually learn about science and see how it works for them every day, everywhere.



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Volcanoes
...and Your Community

Getting Started

In 1883, on the island of Krakatoa in the East Indies, one of the most violent eruptions of recorded time took place. Half of the island was blown away by a volcanic eruption. Over a cubic mile of rock was hurled into the air. The sound of the explosion was heard in Australia, over 2000 miles away.

- Can a volcano that erupts on the other side of the world affect your community?

What do you think? Look at the Earth systems page. In your notebook, draw a picture to show one way that a volcanic eruption changes an Earth system. Then, think about how that change might cause a change in another Earth system. Add this to your drawing. Continue until you have connected the volcanic eruption to your community. Be prepared to discuss your pictures with your small group and the class.

Scenario

"The clouds became thicker, and it was increasingly difficult to see as we struggled up the narrow, steep path toward the summit. The ground was hot under our feet, but the moisture from the clouds kept us cold and damp, and made the ash stick to our hair and eyelashes. We began to see larger volcanic rocks, some as large as two feet across. Suddenly we came across a large fissure, about one foot wide and 60 feet long. As I leaned over it, a hot blast of sulfur-smelling air scorched my nostrils. Then, like a warning growl from a watchdog, came a rumble from deep within. This was the moment we had been anticipating with dread..." Many motion pictures are based on exciting geologic events.

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Can you use your knowledge of volcanoes to make a thrilling, yet informative and scientifically correct movie?

Chapter Challenge

Your challenge is to write a screenplay or story, set in your community, that would help audiences understand volcanoes. You need to teach them about volcanic hazards. You also need to help them see volcanoes as part of the Earth system, and to realize that volcanoes affect all communities in some way. Can you use Earth science to create an exciting story and help others understand the hazards and the benefits of volcanoes?

Think about how your story will address the following items:
- Locations of volcanoes closest to your community.
- Evidence that shows past or recent volcanic activity.
- Types of volcanic hazards.
- How volcanoes change the atmosphere, hydrosphere, and other Earth systems.

Assessment Criteria

Think about what you have been asked to do. Scan ahead through the chapter activities to see how they might help you to meet the challenge. Work with your classmates and your teachers to define the criteria for assessing your work. Record all this information. Make sure that you understand the criteria as well as you can before you begin. Your teacher may provide you with a sample rubric to help you get started.

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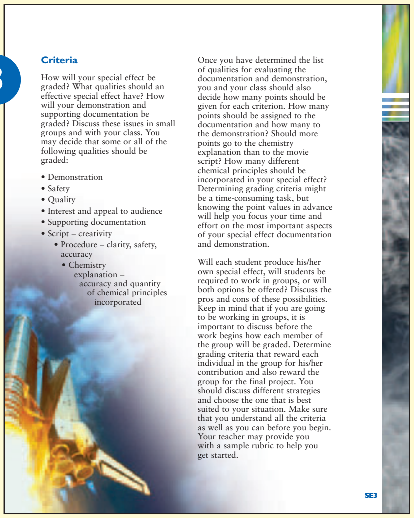


Criteria

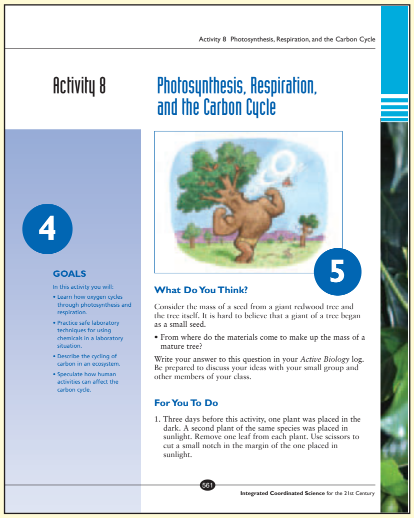
How will your special effect be graded? What qualities should an effective special effect have? How will your demonstration and supporting documentation be graded? Discuss these issues in small groups and with your class. You may decide that some or all of the following qualities should be graded:

- Demonstration
- Safety
- Quality
- Interest and appeal to audience
- Supporting documentation
- Script – creativity
  - Procedure – clarity, safety, accuracy
    - Chemistry explanation – accuracy and quantity of chemical principles incorporated

Once you have determined the list of qualities for evaluating the documentation and demonstration, you and your class should also decide how many points should be given for each criterion. How many points should be assigned to the documentation and how many to the demonstration? Should more points go to the chemistry explanation than to the movie script? How many different chemical principles should be incorporated in your special effect? Determining grading criteria might be a time-consuming task, but knowing the point values in advance will help you focus your time and effort on the most important aspects of your special effect documentation and demonstration.

Will each student produce his/her own special effect, will students be required to work in groups, or will both options be offered? Discuss the pros and cons of these possibilities. Keep in mind that if you are going to be working in groups, it is important to discuss before the work begins how each member of the group will be graded. Determine grading criteria that reward each individual in the group for his/her contribution and also reward the group for the final project. You should discuss different strategies and choose the one that is best suited to your situation. Make sure that you understand all the criteria as well as you can before you begin. Your teacher may provide you with a sample rubric to help you get started.

SE3



Activity 8 Photosynthesis, Respiration, and the Carbon Cycle

Activity 8 Photosynthesis, Respiration, and the Carbon Cycle

GOALS

In this activity you will:
- Learn how oxygen cycles through photosynthesis and respiration.
- Practice safe laboratory techniques for using chemicals in a laboratory situation.
- Describe the cycling of carbon in an ecosystem.
- Speculate how human activities can affect the carbon cycle.

What Do You Think?

Consider the mass of a seed from a giant redwood tree and the tree itself. It is hard to believe that a giant of a tree began as a small seed.

- From where do the materials come to make up the mass of a mature tree?

Write your answer to this question in your *Active Biology* log. Be prepared to discuss your ideas with your small group and other members of your class.

For You To Do

1. Three days before this activity, one plant was placed in the dark. A second plant of the same species was placed in sunlight. Remove one leaf from each plant. Use scissors to cut a small notch in the margin of the one placed in sunlight.

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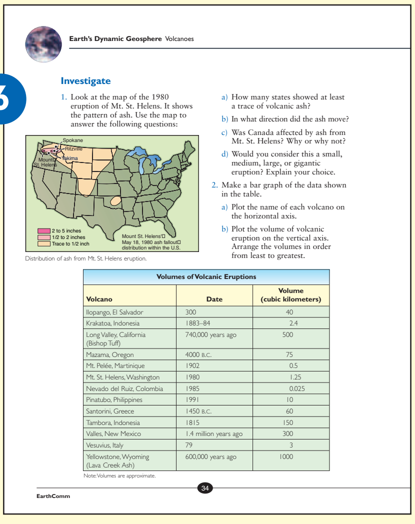

Earth's Dynamic Geosphere Volcanoes

Investigate

1. Look at the map of the 1980 eruption of Mt. St. Helens. It shows the pattern of ash. Use the map to answer the following questions:
   a) How many states showed at least a trace of volcanic ash?
   b) In what direction did the ash move?
   c) Was Canada affected by ash from Mt. St. Helens? Why or why not?
   d) Would you consider this a small, medium, large, or gigantic eruption? Explain your choice.

Distribution of ash from Mt. St. Helens eruption.

2. Make a bar graph of the data shown in the table.
   a) Plot the name of each volcano on the horizontal axis.
   b) Plot the volume of volcanic eruption on the vertical axis. Arrange the volumes in order from least to greatest.

Volumes of Volcanic Eruptions

Volcano	Date	Volume (cubic kilometers)
Ilopango, El Salvador	300	40
Krakatoa, Indonesia	1883–84	2.4
Long Valley, California (Bishop Tuff)	740,000 years ago	500
Mazama, Oregon	4000 B.C.	75
Mt. Pelée, Martinique	1902	0.5
Mt. St. Helens, Washington	1980	1.25
Nevado del Ruiz, Colombia	1985	0.025
Pinatubo, Philippines	1991	10
Santorini, Greece	1450 B.C.	60
Tambora, Indonesia	1815	150
Valles, New Mexico	1.4 million years ago	300
Vesuvius, Italy	79	3
Yellowstone, Wyoming (Lava Creek Ash)	600,000 years ago	1000

Note: Volumes are approximate.

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1 Scenario

Each chapter begins with a realistic event or situation. Students might have actually experienced the event, or they can imagine participating in a similar situation at home, in school, or in their community. Chances are they probably never thought about the science involved in each case.

2 Challenge

This feature presents your students with a challenge that they can expect to complete by the end of the chapter. As they progress through the chapter they will accumulate all the knowledge needed to successfully complete the challenge.

3 Criteria

Before the students begin the chapter and the challenge, the class, along with the teacher, will explore exactly how they will be graded. All will review the criteria and expectations for solving the challenge, and make decisions about how their work should be evaluated.

4 Goals

At the beginning of each activity students are provided with a list of goals that they should be able to achieve by completing their inquiry.

5 What Do They Already Know?

Before the students start each activity they will be asked one or two questions to consider. They will have a chance to discuss their ideas with their group and the class. Students are not expected to come up with the "right" answer, but to share their current understanding and reasoning.

6 Investigate

In *Integrated Coordinated Science for the 21st Century* students learn by doing science. In their small groups, or as a class, students will take part in scientific inquiry by doing hands-on experiments, participating in fieldwork, or searching for answers using the Internet and reference materials.

7 Reading Sections

These sections provide text, illustrations, and photographs that will give students a greater insight into the concepts they explored in the activity. Equations and formulas are provided with easy-to-understand explanations. **Science Words** that may be new or unfamiliar to them are defined and explained. In some chapters **Checking Up** questions are included to guide them in their reading.

8 Reflecting on the Activity and the Challenge

Each activity helps to prepare students to be successful in the challenge. This feature gives them a brief summary of the activity. It will help them relate the activity that they just completed to the challenge. It's another piece of the chapter jigsaw puzzle.

9 Science to Go

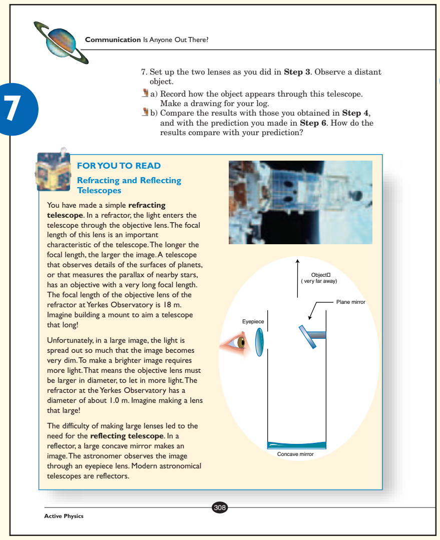
Questions in this feature ask students to use the key principles and concepts introduced in the activity. Students may also be presented with new situations in which they will be asked to apply what they have learned. They are excellent as a study guide, helping them to review and understand what is most important from the activity. Students will also be provided with suggestions for ways they can organize their work and get ready for the challenge.

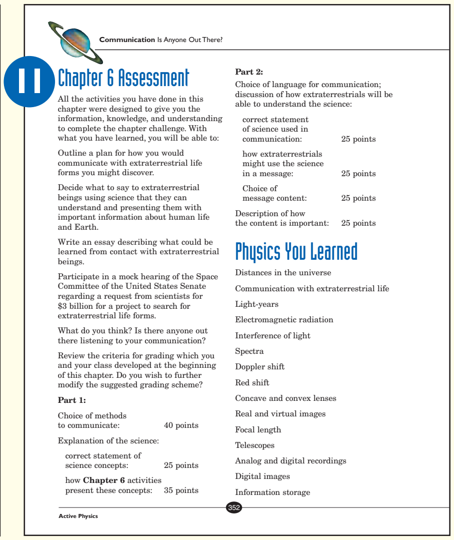
10 Inquiring Further

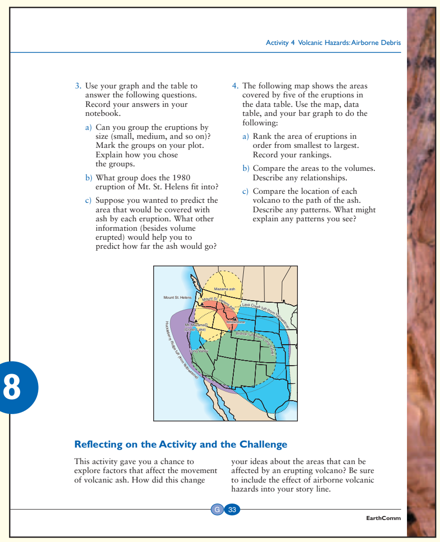
This feature stretches your students' thinking. It provides suggestions for deepening their understanding of the concepts and skills development. Also, if they're looking for more challenging or in-depth problems, questions, and exercises, they'll find them right here.

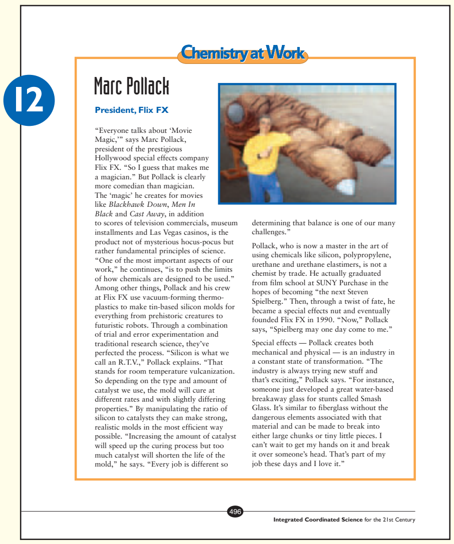
11 Chapter Assessment

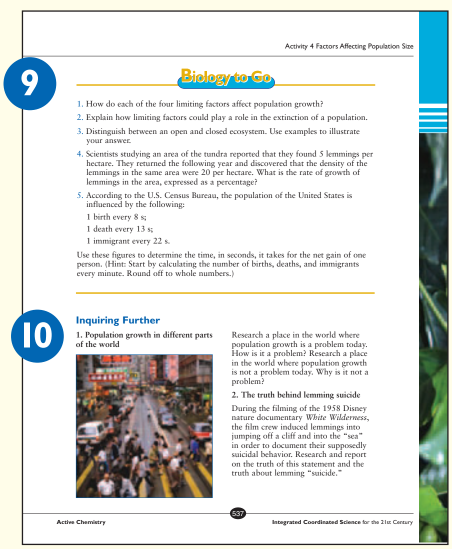
How do your students measure up? Here is their opportunity to share what they have actually learned. Using the activities as a guide, they can now complete the challenge they were presented at the beginning of the chapter.











12 Science at Work

Science is an integral part of many fascinating careers. This feature introduces some people working in different fields that involve the principles of science.

13 Making Connections

This feature at the beginning of each unit shows students how each science is connected. It also sets the stage for preparing and exciting the students for their next discipline.

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Integrated Coordinated Science for the 21st Century,™ is an innovative core curriculum assembled from four proven inquiry-based programs. Each program has been edited in the same instructional model to form one cohesive course. It is supported by the National Science Foundation and developed by leading educators and scientists. The *EarthComm, Earth System Science in the Community,* Unit 1, was developed by the American Geological Institute under the guidance of Dr. Michael Smith, Director of Education and Outreach, and Dr. John Southard of MIT. Unit 2, *Active Physics*, was developed by the American Association of Physics Teachers, and the American Institute of Physics.

Both the *Active Physics*, and *Active Chemistry*, Unit 3, are projects directed by Dr. Arthur Eisenkraft, past president of NSTA. Unit 4, *Active Biology*, was derived from materials that were originally developed by Biological Sciences Curriculum Study (BSCS). Each unit of this course has been designed and built on the National Science Education Standards... the same instructional model... and the same project-based, guided inquiry approach to science.

The success of this coordinated curriculum for integrated science, can also be attributed to the use of ***The Active Learning System***™ approach for its professional development and lab equipment. The system incorporates decades of research on how students best learn and how educators can best facilitate this process in the classroom.

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