



#8706

# EARTHQUAKES AND MOUNTAINS

Grade Levels: 4-6

14 minutes

SVE & CHURCHILL MEDIA 1999

## DESCRIPTION

What is the rock cycle? What causes earthquakes? Why do volcanoes erupt? Is the earth solid? Elementary students in a science lab learn what a peach and the layers of earth have in common, and then learn answers to questions about continental drift, how the earth changes, plate tectonics, and types of mountains.

## ACADEMIC STANDARDS

### Subject Area: Earth and Space Sciences

- ♦ Standard: Understands Earth's composition and structure
  - Benchmark: Knows how features on the Earth's surface are constantly changed by a combination of slow and rapid processes
  - Benchmark: Knows that the Earth's crust is divided into plates that move at extremely slow rates in response to movements in the mantle
  - Benchmark: Knows processes involved in the rock cycle (e.g., old rocks at the surface gradually weather and form sediments that are buried, then compacted, heated, and often recrystallized into new rock; this new rock is eventually brought to the surface by the forces that drive plate motions, and the rock cycle continues)



### Subject Area: Geography

- ♦ Standard: Knows the physical processes that shape patterns on Earth's surface
  - Benchmark: Understands how physical processes help to shape features and patterns on Earth's surface
  - Benchmark: Knows the major processes that shape patterns in the physical environment
  - Benchmark: Knows the consequences of a specific physical process operating on Earth's surface (e.g., effects of an extreme weather phenomenon such as a hurricane's impact on a coastal ecosystem, effects of heavy rainfall on hill slopes, effects of the continued movement of Earth's tectonic plates)

## INSTRUCTIONAL GOALS

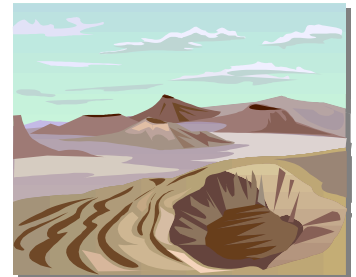
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1. To understand that the center of the earth is a magnet and that this magnetic force keeps earth in its orbit around the sun.
2. To identify the different layers of the earth from core to crust.
3. To discuss the process of the rock cycle and define different types of rock in and on the earth.
4. To explain how an earthquake happens and describe the theory of plate tectonics.
5. To describe how earthquakes can be measured with a seismograph and explain how the Richter scale is used.
6. To identify the reasons for and effects of volcanic eruptions.
7. To name the four different ways in which a mountain can be made and describe the formation process.
8. To understand that the earth is constantly changing and rebuilding itself.

## VOCABULARY

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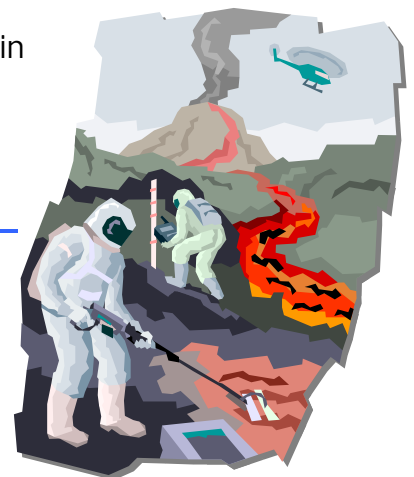
- |                      |                       |
|----------------------|-----------------------|
| 1. aftershock        | 20. magnet            |
| 2. block mountain    | 21. magnitude         |
| 3. canyon            | 22. mantle            |
| 4. continent         | 23. metamorphic rock  |
| 5. continental crust | 24. mountain          |
| 6. continental drift | 25. oceanic crust     |
| 7. core              | 26. orbit             |
| 8. crust             | 27. Pangea            |
| 9. domed mountain    | 28. plates            |
| 10. earthquake       | 29. plate tectonics   |
| 11. erosion          | 30. Richter scale     |
| 12. evolve           | 31. rock cycle        |
| 13. fault            | 32. sediment          |
| 14. folded mountain  | 33. sedimentary rock  |
| 15. fossil           | 34. seismograph       |
| 16. geologist        | 35. valley            |
| 17. igneous rock     | 36. volcanic mountain |
| 18. lava             | 37. volcano           |
| 19. magma            |                       |



## BEFORE SHOWING

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1. Familiarize the students with the rock cycle.
2. Show the different layers of earth.



## AFTER SHOWING

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### Discussion Items and Questions



1. What is the deepest part of earth called? What materials does the core contain? What is special about these materials? What is the temperature like at the core? What is the rock at the center of earth called?
2. What is the next layer of earth? What is the outermost layer? How thick is the continental crust compared to the oceanic crust?
3. Describe the process of the rock cycle. Since the rock is constantly being used over and over again, does that mean that the earth is always the same? Why or why not?
4. How do we know that the planet is evolving? What theory did German scientist Alfred Wegener develop about the continents? What evidence proves this theory? Is it possible to see how the continents were once interconnected on a map? Are the continents still moving? Will the continents move very much in the future?
5. What is another, sometimes deadly, phenomenon that tells us earth's plates are constantly moving? What are *faults*? What is an example of a fault in the United States? What forces have created this fault? What city is very near the San Andreas Fault?
6. How are earthquakes measured? How are readings on the seismograph interpreted? What are *aftershocks*?
7. Why is the 1960 earthquake in Chile significant? What were the effects of this tragic quake? What city in California has experienced a number of devastating earthquakes? Why? When was the most powerful earthquake in San Francisco and what did it measure on the Richter scale? When did another earthquake occur in San Francisco that registered 7.1 on the Richter scale?
8. How many earthquakes are there during a year? Why isn't there more devastation if there are so many earthquakes? How often does one great earthquake—measuring 8.0 on the Richter scale or higher—occur?
9. Why do volcanoes erupt? How are volcanoes and earthquakes connected? What volcano in southwest Washington State began a major explosion in 1980? How did scientists help save lives before the volcano even exploded? Do all volcanoes erupt like this one?
10. How are mountains formed? How are mountains formed by volcanoes and what are they called? What are *folded mountains*? What is an example of a folded mountain? How are block mountains formed? What is an example of this type of mountain? What other type of mountain is formed by lava? What is *erosion*? What happens to a mountain after years and years of erosion? What is the longest mountain range in the world?

## RELATED RESOURCES



### Captioned Media Program

- Earth--Our Changing Planet #8704
- Geology: Our Restless Planet #3037



### World Wide Web



The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid-safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

- **EARTHQUAKE!**

<http://www.discovery.com/exp/earthquakes/liveseismic.html>

Look at seismic activity occurring right this minute. This digital feed from the U.S. Geological Survey is updated every minute.

- **USGS: THE STORY OF PLATE TECTONICS**

<http://pubs.usgs.gov/publications/text/dynamic.html>

Click on picture icons to find out more about "Historical Perspective," "Understanding Plate Motions," "Hotspots: Mantle Thermal Plumes," and others.

- **USGS: VOLCANO HAZARDS PROGRAM**

<http://volcanoes.usgs.gov/>

Check out the weekly report of worldwide volcanic activity including the U.S. and Russia.