

TOO HOT TO HANDLE- VOLCANOES

Master Teacher: Theresa Hoggard

Grade Level: 5-6

Time Allotment: Two 45-minute class periods

Overview: Earth's plates collide, pull apart, and slide past each other. Most mountains and volcanoes form at plate boundaries. Many earthquakes also occur at plate boundaries. A volcano is a mountain formed by lava and ash. Lava is magma that reaches Earth's surface. Ash is small pieces of hardened lava. Chains of volcanoes form where a continental plate and an oceanic plate collide. The edge of the oceanic plate pushes under the edge of the continental plate. The leading edge of the oceanic plate melts as it sinks deep into the mantle. The melted rock becomes magma that forces its way up between the plates.

In this lesson, the students will observe the causes and effects of volcanic eruptions. The students will use real time data to chart the exact location of the most recent volcanic eruptions. They will use latitude and longitude to graph coordinates all around the world.

Subject Matter: Earth Science

Learning Objectives:

Students will be able to:

- ☐ identify the location of certain volcanoes around the world
- ☐ view the effects of volcanic eruptions
- ☐ witness a volcanic eruption
- ☐ read and interpret coordinates
- ☐ explain why there are no volcanoes on the east coast of the United States
- ☐ draw conclusions about the causes of volcanic formations
- ☐ identify three different kinds of volcanoes

Standards:

Texas Essential Knowledge and Skills
Grade 5
Objective 12
Science concepts

The student knows that the natural world includes earth materials and objects in the sky. The student is expected to:

Interpret how landforms are the result of a combination of constructive and destructive forces such as deposition of sediment and weathering

Media Components:**CD-Rom: Newton's Apple Multimedia**

"Dinosaur Extinction and Earthquakes"
copyright 1999 by Twin Cities Public Television and GPN

Video:

ETV Series
3-2-1 Classroom Contact # 113
"Too Hot To Handle"

Web Sites:**USGS Hawaiian Volcano Observatory**

http://volcano.und.nodak.edu/vwdocs/current_volcs/current.html or
<http://wwwhvo.wr.usgs.gov/>

Hawaiian volcanoes site. Learn about the history, hazards, and current activity on Hawaii's volcanoes.

Update on current volcanic activity

U.S. Geological Survey- Hawaiian Volcano Observatory

<http://hvo.wr.usgs.gov/>

Learn about how to safely and carefully view an active volcano.

National Park Service-Hawaiian Volcanoes

<http://www.nps.gov/havo/home.htm>

Website displaying the aftermath of the eruptions that have happened in Hawaii since 1916.

Hawaii Volcanoes Environmental Education Center

<http://www.nps.gov/havo/teach/index.htm>

Learn about Hawaii's National Park exhibit for volcanoes.

Hawaii Institute of Geophysics & Planetology -

<http://volcano1.pgd.hawaii.edu/goes/bigisland/latest.shtml>

an exhibit of Hawaiian pictures

Hawaii Center for Volcanology

<http://www.hawaii.edu/GG/hcv.html>

Learn about the geography and formation of volcanoes and some of the hot spots on the islands.

Mount St. Helen's National Volcanic Monument

<http://www.halcyon.com/rdpayne/mshnvm-services.html>

everything you need to know about Mount St. Helen's

Teacher's Guide to the Geology of Hawaii Volcanoes National Park

<http://volcano.und.nodak.edu/vwdocs/vwlessons/atg.html>

A guide on the evolution of Hawaii's volcanoes

Materials:

For each student:

World map

Different igneous rocks- basalt, tuff, pumice

Pen or pencil

Dry erase board (if using laminated world maps)

Prep for Teachers:

Prior to teaching the lesson, bookmark all Web sites which will be used. Load any plug-ins necessary to run the Web sites. Install CD ROM. Cue the videotape to the appropriate starting point.

Introductory Activity: Setting the Stage

The following activity will prepare your students for a lesson on volcanoes, and provide them with context for the causes of volcanic eruptions.

Step 1. Review plate tectonics. Show CD-ROM.

Step 2. Pass around different types of igneous rocks. Igneous rocks can vary in size, shape, mass, and texture. Ask them to describe the rock to a partner. They should observe that igneous rocks vary in color and mass. Pumice is very light and porous. Tuff is also very light in mass but not as porous as pumice. Basalt, on the other hand, is very dark in color and very dense. Tell students that the intensity of the volcanic eruption determines the rock type.

Step 3. Next, show students pictures of the three types of volcanoes. *Shield volcanoes* are broad volcanoes with gentle slopes and are mostly lava. *Cinder cone volcanoes* are tall and narrow, with steep slopes and are mostly ash. *Composite volcanoes* are wide and have fairly steep slopes. They are lava and ash.

Learning Activity

Step 1. Explain to students that they will now be witnessing a volcanic eruption through a video. They will view the effects of a volcanic eruption and draw conclusions about the causes of volcanic formations. Provide students with a **Focus for Media Interaction** by asking them for the locations of volcanic activity visited and presented in the video. Also have the students infer what type of volcano they are seeing in the video.

Step 2. Insert *Too Hot to Handle* video

BEGIN viewing tape at the beginning. **PAUSE** after Lisa says, "Are you ready, Robin?" "Ready."

Ask students why it would be hotter near the vent. (It is where the lava is seeping out of the crust.) Ask students to estimate how hot it would be near the vent. (Thousands of degrees Celsius) Activate prior knowledge by asking, "What is the boiling point of water?" Ask students the location of the volcano.

RESUME video. **PAUSE** when helicopter flies off. Have students turn to a partner and tell about the purpose of taking samples. (To find the age of the rock)

RESUME video. **PAUSE** when background music stops and is the end of the volcano footage. Ask students how the volcano has changed. Now ask what it has produced. (land)

End of Video

Ask students to make a list of 10 facts learned from the video.

END OF CLASS ONE

Learning Activities

- Step 1. Review facts and details learned from yesterday's video.
- Step 2. Students tell a partner the locations of volcanoes visited in yesterday's video.

Culminating Activity

In order to help students explore the locations of volcanic eruptions in the last few months, try this activity involving graphing of coordinates that show volcanic eruptions around the world.

- Step 1. Distribute individual world maps- either laminated ones for use with white board markers or consumable desk maps. Tell students that today they will be learning about locations of active volcanoes around the world. Review graphing coordinate points with students. Remind them that the first number is always the

latitude and the second number is always the longitude. Remind students about the compass rose. (North, South, East, and West)

Step 2. Log on to

http://volcano.und.nodak.edu/vwdocs/current_volcs/current.html

Explain the picture first seen on the web page. It is a picture of Mt. St. Helen's explosive eruption in May 1980. Explain to them that we will be tracking volcanic eruptions around the world as they erupt. The following web page tells of the location, coordinates, and date of last volcanic eruption.

Step 3. Model graphing coordinate points. Ask students to locate the last 10 volcanic eruptions around the world by marking on their world map. Ask students to draw conclusions and infer where most volcanic eruptions occur. (near plate boundaries)

Step 4. Bring closure to lesson by giving students information about volcanic islands. Many islands in the oceans are actually tops of volcanic mountains. Hawaii is part of a 3,000-mile chain that extends from Alaska. The oldest member is near Alaska and was formed 700 million years ago. The island of Hawaii is the youngest one at one million years. The chain formed because a narrow plume of magma burst through the crust, and while the plume remained stationary, the plate moved, forming a chain of mountains. In this chain, only the island of Hawaii, which is directly above the hot spot, has active volcanoes.

Cross-Curricular Extensions

READING

Identify Cause and Effect: Make a cause-and-effect chart on a sheet of notebook paper. Write the causes and have students write the effects to complete the chart.

Provide more depth with trade books. These books contain information about changes in Earth's surface. *Volcano: The Eruption and Healing of Mount St. Helens* by Patricia Lauber; *The Secrets of Vesuvius* by Sara C. Bisel

SOCIAL STUDIES

Archeology: In A.D. 79 the city of Pompeii, Italy was destroyed by the eruption of Mount Vesuvius. The ash from the volcano combined with rain, and this substance

sealed the entire town. Homes, shops, theatres, and other buildings were preserved intact, as well as the skeletons of the victims. Ask students to research life in Pompeii in A.D. 79 and present the information to the class.

VISUAL ART

Volcanic Display: Challenge students to make a display of models and/ or drawings of the different types of volcanoes and eruptions.

Community Connections

- Contact a local geologist and arrange for a visit to the classroom to discuss other destructive or constructive forces that change the features of the land.
- Contact the United States Geological Society and arrange for a USGS representative to visit your classroom to discuss qualifications and requirements that are needed to become a volcanologist.

Student Materials

Individual copies of world maps. They may be laminated maps where they can use white board markers and be able to erase; or use consumable world maps.