

PELE'S FIERY PLAYGROUND

ITV SERIES

READING RAINBOW #23:
Hill of Fire

GRADES 1-3

PREVIEWING ACTIVITIES

Display a map of the western United States, Hawaii and the Pacific Rim. Ask the students, "Where do we live?" Mark the location on the map. Ask the students, "Who can show us where to find water on the map?" Select a student to identify the water. Ask, "What is the name of the ocean on the map? Where can we find land on the map?" Select a student to identify the land. "What are these little pieces of land scattered all over the water called?" (Islands.) Select a student to identify the islands.

"Today I'd like to take you on a trip to a group of islands in the middle of the Pacific Ocean. These islands are called Hawaii; they are a state in the United States. How could we travel to Hawaii?" Help the students locate Hawaii on the map; mark or highlight the location. Locate their home state on the map. Draw a line between the students' home state and Hawaii.

Open the Volcano World website on the Internet. <http://volcano.und.nodak.edu/>

Click "Volcanoes" on the tool bar. Open up "Exploring Earth's Volcanoes." Explain to the students that each red triangle is an active volcano; active means a volcano is erupting. "Who would like connect the volcanoes?" Choose a student to connect the volcanoes, dot-to-dot style. (Use a vis-a-vis overhead marker. Window cleaner will wipe the ink off the monitor.) Explain that this circle of volcanoes is called the Ring of Fire. Many of the active volcanoes are located in narrow zones. The circle or ring of volcanoes is where many of these volcanoes are located. Using the triangle shaped stickers, find and mark the locations of some of the volcanoes on the map.

FOCUS FOR VIEWING

The focus for viewing provides an introduction to the tape segment by asking a question or assigning a specific task; the students may be asked to listen for specific information or participate in an activity that will make the video content clearer or more meaningful.

"Today we will be watching a *READING RAINBOW* video called *Hill of Fire*. It's about volcanoes. Watch and listen for the names of the three layers of the earth."

OVERVIEW

In this lesson students will be introduced to volcanoes. Students will locate active volcanoes in the Ring of Fire using either a topographical map or globe, and/or the Internet web site Volcano World. They will learn about the layers of the earth. The students will build several models of volcanoes using various chemical mixtures.



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LEARNING OBJECTIVES

Students should be able to:

- Locate their home state, oceans, and Hawaii on either a topographical map or globe.
- Define and locate the Ring of Fire.
- Name the number of active volcanoes in the world.
- List the layers of the earth.
- Define magma and lava.
- Name the three elements of erosion.
- Locate sites of active volcanoes.
- Construct and observe chemical reactions of volcano models.

VIEWING ACTIVITIES

BEGIN THE VIDEO after the reading of the feature book. LeVar has just told about volcanologists and their instruments. The starting text is, "...measure the forces inside the earth."

PAUSE THE VIDEO at the words, "...the crust." Ask the students, "If we could cut the earth open, how many parts would we see?" (The earth has three parts.) "What did the illustration remind you of?" (An egg or an apple.) "What were the names of each part of the earth?" (The crust, the mantle and the core.) (If the students are unable to name the three layers, **REWIND THE VIDEO** to the beginning point. This segment is extremely short.)

Parts of the Earth Activity

Cut a cupcake in half vertically. Explain to the students, that each part of the cupcake represents a layer of the earth, the crust, the marshmallow, the mantle, the cake, and the core, the filling. Give each student a napkin, a plastic knife and a cream-filled marshmallow-covered cup cake. Instruct the students to cut their cupcake in half. Ask the students to identify the crust, the mantle and the core.

Explain that the crust of the earth is not smooth and even like the marshmallow covering on the cupcake, rather the crust is very uneven. The crust is made of rocks that go under the continents and the oceans. The crust is about 4 miles thick. On top of this crust is another, thicker layer of rocks that form the land or continents. This crust is about 25 miles thick in some places. The highest or thickest point on the earth's crust is Mount Everest, the lowest or thinnest point is found in the Mariana Trench located in the south Pacific. Point out these locations on the map.

We know from mining the earth that as we tunnel closer to the mantle, the temperature becomes hotter. The mantle is made of hotter, heavier rocks than those in the crust. Parts of the mantle are so hot that the rocks melt and flow. This melted rock is called magma. Magma in the mantle is similar in consistency to peanut butter. It is this magma that moves to the surface or the crust and becomes lava when a volcano erupts.

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VIEWING ACTIVITIES (continued)

Unlike the cupcake with just one layer of filling, the earth's core is divided into two parts. Scientists believe that both are made of metal, possibly iron and nickel. They think the inner core is solid, but the outer core is so hot it is liquid. Allow the students to eat the cupcake.

REFOCUS the students' attention to the video. "In the next segment, we will learn how the melted rock or the magma in the mantle moves to the surface of the earth." **RESUME THE VIDEO.**

PAUSE THE VIDEO after LeVar says, "...until the volcano explodes." Draw the students' attention to the paused frame of the video. Explain to the students that the magma that travels up the tunnels or fissures under the surface of the earth come from the mantle, not from the outer core. Tell the students that they will be building a simple model of a volcano. This model will allow them to observe how the magma moves to the surface of the earth.

Magma Activity

Instruct each group to take the clear container, the small bottle, the small container of paint and the piece of string from their work baskets. One student will need to fill the container with cold water. Another student will need to tie the string around the neck of the small bottle. Instruct the students to fill the small bottle just to the neck, with very hot tap water. Caution the students to be careful handling the hot water and the small bottle, they can be burned or scalded. Teachers of first grade students may wish to have a parent, an educational aide or an older student help with this experiment. Instruct the students to stir paint into the hot water until it is very dark in color. Instruct the students to lower the small bottle of hot colored water into the container of cold water. Instruct the students to watch carefully. Ask the students, "What happened when the small bottle was lowered into the container of cold water?" (The colored water/magma flowed up the neck of the bottle and erupted out into the container of cold water.)

REFOCUS the students' attention to the video. Inform the students, "In the next segment of the video, we will learn about the formation of a volcano." **RESUME THE VIDEO.**

MATERIALS

Previewing and Viewing Activities

Per class:

- a map of the western United States, Hawaii, and the Pacific Rim
- 1 red felt tip marker or highlighter pen
- triangle shaped stickers

Parts of the Earth Activity

Per student:

- 1 napkin
- 1 plastic knife
- 1 marshmallow covered cream-filled cupcake

Magma Activity

Per group:

- 1 clear glass or plastic container (4 pound peanut butter jar, or straight sided beaker)
- 1 small clear glass or plastic bottle (mini or single serving liquor bottle)
- 12 inches of string
- 1 tablespoon liquid tempera paint
- 1 small paint brush
- container of hot water

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MATERIALS (continued)

Build a Volcano Activity

Per group:

- 1 9 x 12 inch foil cake pan and clay recipe
- 1 cup fine sand
- $\frac{1}{2}$ cup cornstarch
- $\frac{1}{2}$ cup boiling water
- double boiler

Mix the sand and the cornstarch thoroughly in the top of the double boiler. Add the boiling water and mix well. Cook until the sand clay until thickened. (If too thick, add a little boiling water.) Cool; store in a plastic bag.

Lava Fountain Activity

Per group:

- 1 cork to fit the neck of the bottle
- 1 cup of vinegar in a 500 ML or 1 pint plastic bottle
- 3 tablespoons baking soda in a small zip lock bag

Hissing Volcano Activity

Per group:

- 1 package quick-rising yeast
- $\frac{1}{2}$ to $\frac{1}{3}$ cup hydrogen peroxide
- 1 stirring stick
- $\frac{1}{2}$ teaspoon measuring spoon
- 1 half-pint mason jar or jelly glass
- $\frac{1}{2}$ recipe sand clay

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VIEWING ACTIVITIES (continued)

PAUSE THE VIDEO as LeVar says, "...coating its slopes with new layers of rock. Draw the students' attention to the paused frame of the volcano. Explain to the students that there are several types of volcanoes. The volcano in the frame is called a cone volcano; it is built up from layers of ash and lava. The tunnels coming out the sides are called vents. When lava coming from the cone hardens slowly as it slides away from the crater, the volcano is called a shield volcano. Mauna Loa, on Hawaii, is a shield volcano.

Build a Volcano

Instruct the students to take the half-pint jar, the foil baking pan, the newspapers, and the clay from the workbasket. Instruct the students to spread the newspapers on the desk. Place the jar in the baking pan. Instruct the students to use the clay to build an inverted cone around the jar. The neck of the jar needs to extend slightly above the cone's mouth. Inform the students that later in the lesson they will make their volcanoes erupt.

REFOCUS the students' attention to the video. "During this segment of the video, listen for three elements/things needed to turn lava from rock to soil." **RESUME THE VIDEO.**

PAUSE THE VIDEO when LeVar says, "...return to live there." Ask the students "What are the three elements that are needed to turn lava to soil?" (Wind, rain, and sun.) "Why are each necessary in order for rocks to become soil?"

REFOCUS the students' attention to the video. In next segment listen for the number of active volcanoes there are in the world. **RESUME THE VIDEO.**

PAUSE THE VIDEO at the words, "The rest are scattered all over the earth." Ask the students, "How many active volcanoes are there in the world today? How many are located in Hawaii?" Refocus the students' attention to the web site. Remind them that each of the red triangles, represents an active volcano. "What volcanoes are close to where we live?" Draw the students' attention to Mount Saint Helens, located in the state of Washington. Explain that this volcano erupted on May 18, 1980. This volcano is still active. Draw the students'

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VIEWING ACTIVITIES (continued)

attention to Mexico on the map; explain that this volcano, named Paricutin or El Monstro is the volcano that the feature book, "Hill of Fire" is written about. It was born in February of 1943.

REWIND THE VIDEO to the beginning to the tape, just past the opening credits, the segment opens with Hawaiian chanting. **RESUME THE VIDEO.**

PAUSE THE VIDEO when LeVar says, "As you can see, she is really erupting." Ask the students, "Where is the volcano?" (Hawaii Volcanoes National Park) Locate the park on the island of Hawaii. "What is its name?" (Kilauea)

REFOCUS the students' attention to the video. Say, "In the next segment of the video, listen for what the spray of lava is called and the distance the lava is shooting in the air."

RESUME THE VIDEO.

PAUSE THE VIDEO when LeVar says, "It's just incredible!" Ask, "What was the tower of lava called?" (A fountain) "How many feet in the air was the lava shooting?" (1,100 feet) Explain to the students that when magma moves to the surface of the earth, it is under tremendous pressure. This is a lot like a pressure cooker, if the cooker is not vented, the pressure will continue to build until it explodes.

Lava Fountain Activity

Ask the students to take out the 500 ML/pint bottle, the foil pan, and the cork, the zip lock bag of white powder and the bottle of liquid. Tell the students that they are going to construct a lava fountain. Direct the students to place the bottle in the pan. Ask them to pour the contents of the small zip lock bag into the bottle (baking soda); then add the liquid from the small bottle (vinegar) and quickly push the cork into the mouth of the bottle. (Caution the students to stand back. The baking soda reacts with vinegar to produce carbon dioxide, which builds up enough pressure to force the foaming liquid out of the top of the bottle. The chemical reaction will cause the cork to pop, and the soda vinegar mixture to spray. First grade teachers may wish to demonstrate this experiment for the students.)

ACTION PLAN

Plan a field trip to the Craters of the Moon National Monument, Arco, Idaho. Visit the Interpretive Center the cinder cones, the lava tubes. Craters of the Moon National Monument, 208-527-3257

Invite a local geologist or rock hound into the classroom to talk about igneous rocks.

Take the class on a rock trip to collect samples of volcanic rock common to your community.

Plan a field trip to the Shoshone Ice Caves north of Shoshone, Idaho. The cave is a lava tube located in extinct lava flows. Shoshone Ice Caves, 208-886-2058.

Go on virtual field trips using the Internet:

<http://stargate.jpl.nasa.gov:1084/volcano/talkstry.htm/>

<http://stargate.jpl.nasa.gov:1084/volcano/talkstry.htm/>

[http://vulcan.usgs.gov/volcanoes/cascades/framework.htm./](http://vulcan.usgs.gov/volcanoes/cascades/framework.htm/)

[http://vulcan.usgs.gov/volcanoes/cascades/framework.htm./](http://vulcan.usgs.gov/volcanoes/cascades/framework.htm/)

<http://www.gps.caltech.edu/seismo/seismo.page.html/>

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VIDEO AVAILABLE FROM

Can be taped off-air. Consult your local PBS station for broadcast schedule.

Available on loan from:
Idaho State Library Film & Video
Department
325 West State Street
Boise, ID 83702

May be purchased from:
GPN
PO Box 80669
Lincoln, NE 68501-0669
1-800-228-4630
Fax: (402) 472-4076

Scholastic's *"THE MAGIC SCHOOL BUS BLOWS ITS TOP"* can be taped off-air. Consult your local PBS station for broadcast schedule.

This tape may be purchased from:
DEMCO
PO Box 7488
Madison, WI 53707-7488
1-800-356-1200
Fax: 1-800-245-1329

EYEWITNESS Volcano may be purchased from local book and video retailers.

VIEWING ACTIVITIES (continued)

REFOCUS the students' attention to the video. "In the next segment of the video, just watch and listen to the sights and sounds of the river of lava." **RESUME THE VIDEO.**

STOP THE VIDEO when LeVar says, "...sticking up in the middle of the sea." Ask, "Who remembers the name of the molten magma?" (Lava) "How far did the magma have to travel to come to the surface?" (About 40 miles) "What did the river of lava remind you of? Where you surprised that it moved so fast? What did the river sound like? What can you think of that might look and sound like the river of lava?"

POST VIEWING ACTIVITIES

Say to the students, "We have constructed two models of volcanoes. One was with the bottle and the hot water, the second was with the bottle and the baking soda and vinegar. Now we are going to build a third type of volcano." Ask the students to take out the packet of quick-rising yeast, the measuring spoon, the hydrogen peroxide, the measuring cup and the stirring stick.

Demonstrate for the students, as the students are instructed to fill the jar of the volcano they constructed earlier with hydrogen peroxide, (about 1/3 to 1/2 cup.) Instruct the students to quickly stir in 1 1/2 teaspoons of quick-rising yeast. Stir the mixture thoroughly with the stirring stick. For best results, continue to stir the mixture until the reaction stops. (The mixture of hydrogen peroxide and yeast causes foam, steam, and a hissing noise to come from the volcano.)

EXTENSIONS

Science: Go to the web site <http://volcano.und.nodak.edu/> There are currently at least 10 different recipes for volcanoes on the sight. Assign each group of students to try a different recipe. Demonstrate for parents or another classroom.

Library Skills: Research and report on the myths and legends surrounding volcanoes. Vulcan, Pele, and Poseidon are good starting points.

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EXTENSIONS (continued)

Language Arts: Provide a collection of fiction and non-fiction literature.

Volcano: The Eruption and Healing of Mount St. Helens by Patricia Lauber

Volcanoes & Earthquakes by Susanna Van Rose (Eyewitness Books)

Volcanoes and Earthquakes by Terry Jennings

Volcanoes by Seymour Simon

Volcanoes: Mountains That Blow Their Tops by Nicholas Nirgiotis

Volcanoes by Norman Barrett

View the feature book from *READING RAINBOW 23: Hill of Fire* by Thomas P. Lewis

View the following videos:

Scholastic's **THE MAGIC SCHOOL BUS BLOWS ITS TOP EYEWITNESS "Volcano."**

Play Scholastic's "The Magic School Bus Explores Inside the Earth" CD-ROM. Games include a land volcano, and an underwater volcano.

VIDEO AVAILABLE FROM

VOLCANO may be purchased from:

Oregon Public Broadcasting
503-244-9900

Or from:

DEMCO

PO Box 7488

Madison, WI 53707-7488

1-800-356-1200

Fax: 1-800-245-1329

Scholastic's "The Magic School Bus Explores Inside The Earth" CD-ROM may be purchased from local book and video retailers.

Lesson plan developed by Master Teacher Penny Jean Morrison, Bliss School, Bliss, Idaho.



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