

## Investigation Three – Volcanoes

**Standard II**

Students will understand that volcanoes, earthquakes, uplift, weathering, and erosion shape Earth's surface.

**Objective 2**

Explain how volcanoes, earthquakes, and uplift affect Earth's surface.

**Intended Learning Outcomes**

1. Use science process and thinking skills
2. Manifest scientific attitudes and interests
3. Understand science concepts and principles
5. Demonstrate awareness of social and historical aspects of science.

**Standard  
II****Objective  
2**

### Background Information

Volcanoes usually occur in predictable places. What a volcano looks like and exactly what will come pouring out of it depends on where and how it forms. On the mid-Atlantic ridge, a very liquid type of lava called basalt, oozes out of undersea volcanoes. This basalt hardens into "pillows" and flat sheets of new crust. In some places, the lava is much thicker and often creates violent eruptions as trapped gases explode and shatter the pasty lava to bits. This is what happened to Mount St. Helens in May of 1980. Although the eruption of a volcano can be one of the most destructive forces on Earth, volcanoes also build new land, produce mineral-rich ash that helps fertilize the soil, and produce gases that are important to life on Earth.

Tell students that today they will simulate what it is like to be in the path of lava flowing from a volcano. You can choose one of three options in the Instructional Procedure for this simulation.

### Pre-Assessment/Invitation to Learn

Have a discussion with the students as to what they know about volcanoes. Make a T-chart on the board listing the good and bad about volcanoes. Continue the discussion as to what people might do when a volcano is near them and begins to erupt.

### Materials

To simulate a volcanic eruption use one of the following options:

**Option A**

- Mix: 1 cup of salt  
2 cups of flour  
 $\frac{3}{4}$  cup of water

Add food coloring to simulate mountains and forests. In a tray or tin pan shape the salt dough into a volcanic mound with an empty film canister or cylinder to facilitate eruption. Pour 2 Tbs. of baking soda into the cylinder. When you are ready to simulate an eruption, add  $\frac{1}{4}$  cup of vinegar to the baking soda.

Option B:

Shake an ordinary pop bottle. Discuss what will happen when you take the lid off. Take off the lid when you are ready for this activity.

Option C:

You could also use a video or CD of a volcano erupting.

## Instructional Procedures

1. Take the students out to the playground. If you are using a salt dough volcano, have it ready. Have students line up, then place a marker 100 feet (30 meters) away. Explain that they will be trying to run faster than the hot mud and ash that flowed down Mount St. Helen's slopes after its 1980 eruption. As soon as you activate the volcano, give the signal to the students to run to the marker.
2. When they catch their breath, tell them that the volcanic avalanche beat them all. It sped down the mountain at about 100 miles (160 kilometers) per hour and would have finished the race in less than 1 second! (Point out that not all lava, mud, and other material ejected from volcanoes flows this fast.)
3. After students have returned to class, ask students what they know about volcanoes. Ask them how far away from their town or city it is to the nearest volcano? Ask students why they think people continue to live in areas where volcanoes are active, such as Hawaii, Washington State, and Central Africa.
4. Explain that in real volcanoes, the pressure is created by heat, steam, and movements beneath Earth's surface. Discuss the similarities and differences between the model and a real volcano.
5. Show a video about volcanoes. (See Resources)
6. Discuss the following points:
  - A. What causes volcanoes?
  - B. What are the effects of volcanic eruptions (mountains, valleys, new lakes, canyons, fertile soil covering fields, homes, changing environments?)
  - C. A seismograph is a device used to measure wave movement through Earth's crust. What can it predict? How is prediction helpful?
  - D. How have lava flows affected geologic formations in the state of Utah (specifically Southern Utah and Topaz Mountain near Delta?)

## Curriculum Extensions

*Language Arts* –

- Go to [askjeeves.com](http://askjeeves.com) and ask "Pompeii". Have the students read about the thriving city of Pompeii. Let them explore the site and learn about the volcano that erupted there. If possible have them do a report on the volcano as to the destruction, suddenness, and preservation of the city (Standard VII, Objectives 2, 3).

## Assessment Suggestions

Ask students to choose one of these topics and write a paragraph about it.

1. What are some of the dangers posed by volcanoes?
2. List some of the positive effects of volcanoes.
3. What are scientists doing to know more about volcanoes?

### Reference to Assessment Section

Unit Test	Multiple Choice	Constructed Response	Performance Test
1	4	3, 4	Modeling Landforms
2	4		

## Resources

### Websites –

- [www.weeklyreader.com](http://www.weeklyreader.com)
- <http://volcanoes.usgs.gov>
- <http://volcano.und.nodak.edu/vw.html>
- <http://nmnh.si.edu/gvp/>

### Videos –

- Savage Earth. Pbs.org 1-800-336-1917
- Earth Alive. Disney, 1998
- Volcanoes. Schlessinger, 2000
- Volcanoes – Exploring the Restless Earth. Encyclopedia Britannica, 1998.
- Volcanoes. Lucerne, 1994.

### Magazines –

- “Volcano Alert,” Weekly Reader. March 8, 2002, Issue 20

### Books –

- “Big Books” about Volcanoes
- Bisel, Sara C. The Secrets of Vesuvius.
- Shelley Tanaka. The Buried City of Pompeii: What It Was Like When Vesuvius Exploded.
- I Can Read About Earthquakes and Volcanoes. Troll Associates, 1972.
- Volcano & Earthquake. New York: Eyewitness Books, 1992
- Bruce, Vincent. Volcanoes. Raintree Steck-Vaughn Publishing. ISBN: 0-7398-1327-7
- Chambers, Catherine. Volcanoes. Chicago: Heinemann Library. ISBN: 1-59572-431-6.