



# Volcanologist: Volcanoes and Geysers

**Time:** 45 Minutes

**Skill Level:** Elementary (age 6–11), Middle School (age 12–14)

## Background

### What is Science Inquiry?

Children are natural scientists. From a very early age they explore the world, ask questions and seek answers. This journey of exploration and discovery is Science Inquiry. Science Inquiry helps young people understand their environment, solve problems and gain knowledge about scientific ideas and processes.

## Next Generation Science Standards (NGSS)

### Science and Engineering Practices

1. Asking questions
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking

### Disciplinary Core Ideas

ESS2: Earth's systems

### Crosscutting Concepts

2. Cause and effect:  
Mechanism and explanation
3. Scale, proportion, and quantity

## Objective

In this activity, students will learn about volcanoes and geysers. They will create their own geysers and perform an experiment to test which soda creates the largest geyser.

## About the Scientist

Volcanologists are geologist that study volcanoes. The word volcano is derived from the name of a god of fire in Roman mythology, *Vulcan*. Volcanoes form from melted rock under the Earth's crust called *magma*. This magma can pool together to form a *magma chamber*, which is under extreme pressures and temperatures. If the magma finds a crack through the Earth's crust up to the surface (i.e., a *vent*), the magma is forced out of the Earth and is then called *lava*. As the lava hardens and the ash and rock pile up, a volcano is formed.

## Science of Geysers

In addition to forming volcanoes, magma can also heat underground water. If the water becomes hot enough, the water boils and bursts to the surface as a geyser, spraying steam and hot water high into the air. Students may have heard of Yellowstone National Park, where magma still bubbles and boils underground, causing over 300 geysers.

## Materials List:

### Volcano demo

Volcano kit  
Dish soap  
Vinegar  
Red food coloring  
Baking soda  
Measuring Spoons  
Volcanoes book

### Geysers

Different brands of soda (in plastic bottles), all the same volume  
Mentos® candy  
Geyser Tube™  
Dropcloth  
Chalk  
Goggles

**Prep** ...Prepare a launch site for the soda geysers. An outdoor location with grass works best, or you can use the included dropcloth if needed. A nearby wall is preferable, where you can include foot and half-foot chalk markings, to allow students to measure the height of the geyser.

**Discuss** ...What do students know about volcanoes? Perform the volcano demo.

**Demo** ...Demonstrate a volcano eruption using the volcano kit. To do this, set the volcano into the clear tray. Add  $\frac{1}{2}$  **Tbsp. baking soda** to lava tube. Mix  $\frac{1}{4}$  **c. vinegar**, **4–5 drops red food coloring** and  $\frac{1}{2}$  **Tbsp. clear dish soap** together thoroughly. Add liquid solution to lava tube. Stand back and watch the lava erupt!

**Discuss** ...What did students observe? What other phenomena occur because of volcanoes (e.g., Volcanic earthquakes, volcanic tsunamis, and geysers)? What's a geyser? Has anyone seen one? How can students imagine using the provided materials to make a geyser? Which soda will create the tallest geyser?

**Predict** ...Generate Ideas. Select a Solution

## Experience “What to Do”- What is the plan for the investigation?

Wearing goggles, demonstrate each geyser as follows:

1. Open the bottle of soda and attach the Geyser Tube to the top of the bottle.
2. Push the trigger pin through the holes and load one Mentos into the tube. Remove the top cap of the Geyser Tube—this makes it easier to record how high the soda goes because it's not spraying everywhere. The column of soda is bigger and stays together better when the cap is not in place.
3. Now pull the pin.
4. Record the height.

**Share** ...Encourage students to discuss their observations.

**Reflect** ...**Analyze and interpret the data and results. Discuss among the group.** Why did some sodas create big geysers whereas others were hardly geysers at all? Which brand is best?

**Generalize** ...**to real world examples. Construct explanations.** Discuss how the experiment was designed. What were the controls? What variable did we change?

**Apply** ...**outside the classroom or club meeting.** Have students discuss alternative experiments. Focus on controls vs. variables.

## Additional resources:

- This experiment is based on an activity designed by Steven Spangler, available on his website, <http://www.stevespanglerscience.com/lab/experiments/mentos-geyser-science-project>
- For more information on volcanoes, see the included book, Volcanoes.

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Agriculture Sciences & Natural Resources, Family & Community Health, 4-H Youth, Forestry & Natural Resources, and Extension Sea Grant programs. Oregon State University Extension Service offers its programs and materials equally to all people.