

## Consult 4 Kids Lesson Plans

<b>Component:</b>	Science
<b>Grade Level:</b>	K-5
<b>Lesson Title:</b>	Erupting Volcano
<b>Focus:</b>	Volcanoes

**Materials:** Large paper plate, bathroom 3 oz. disposable cup, aluminum foil, scotch tape, scissors, water, baking soda, vinegar, tablespoon, cup, pan or tray

### Opening

#### State the Objective

Children will understand that there are different ways to conduct an erupting volcano experiment.

#### Gain prior knowledge by asking students, “What do you know about \_\_\_\_\_?”

Review with students what they have learned about volcanoes. Include the following information: At Earth’s center is a core of hot liquid iron and nickel. The Earth is made up of interlocking pieces of land called tectonic plates. Heat from the Earth’s core can escape to the outside through a gap between tectonic plates, or heat can “punch” through the middle of a tectonic plate, releasing pressure and heat to the outside.

### Content (the “Meat”)

#### Instruction / Demonstration (“I do” – “We do”)

1. Tell students they are going to create a model volcano that will help them visualize what a real volcanic eruption is like.
2. There are three different types of volcanoes: Cinder Cone, Composite, and Shield.
3. This volcano is a Cinder Cone. Lava ejects from a single vent and flows down the sides of the Cone.
4. Most cinder cones have a bowl-shaped crater at the summit.
5. Demonstrate the activity for the whole group. See procedure below.

#### \*Activity → Teachable Moment(s) *throughout*

Tip: Teachers, listen for questions that begin with “what” or “how.”

- How would you rate this activity?
- How would you explain what made the volcano erupt?

#### Students practice (“You do”)

1. Attach the paper cup to the plate by taping the bottom of the cup to the middle of the plate.
2. Tear off a piece of foil large enough to completely cover the cup and plate.
3. Place the foil over the cup and plate and turn the foil under the plate edge. Tape the foil in place.
4. Poke a hole through the foil into the middle of the cup.
5. Use scissors to make slits from the middle of the cup to the inside edge of the cup.
6. Tape the foil to the inside of the cup.
7. Place the volcano on a pan or tray.

## Consult 4 Kids Lesson Plans

<ol style="list-style-type: none"> <li>8. Fill the volcano with 2 tablespoons of water and stir in a tablespoon of baking soda until it dissolves.</li> <li>9. Measure 2 tablespoons of vinegar into a separate cup.</li> <li>10. Pour the vinegar, all at once, into the water/baking soda mixture and watch the lava bubble up.</li> </ol>	
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### Closing

<b>Review</b>
<ol style="list-style-type: none"> <li>1. Build the aluminum foil volcano.</li> <li>2. Add water and baking soda to the cup.</li> <li>3. Measure 2 tablespoons vinegar.</li> <li>4. Pour the vinegar into the cup.</li> </ol>

<b>Debrief</b>
<p><b>Liked Best, Next Time (LBNT)</b>          Students talk about the activity and share what they enjoyed most and/or what else they would have liked to have done, or what they would have liked to have spent more time on. Students get to express an opinion about the day.</p>

<p><b>Reflection (Confirm, Tweak, Aha!)</b></p> <p>Sample: I didn't know that the bubbles that are created are filled with carbon dioxide gas; that when you add an acid (vinegar) and a base (baking soda) carbon dioxide is formed.</p> <p>Your Reflection:</p>
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<p><b>Modification</b></p> <p>Have volunteers ready to help younger students create the foil volcano. Better yet, have volunteers make the volcanoes ahead of time.</p>
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## Consult 4 Kids Lesson Plans

<b>Component:</b>	Science
<b>Grade Level:</b>	Grades 4-6
<b>Lesson Title:</b>	Cake Batter Lava
<b>Focus:</b>	Volcanoes

**Materials:** Boxed cake mix without pudding added, water, wire whisk, bowl, baking sheet or wooden inclined board, grid with 10-cm spacing onto paper, plastic wrap, data tables, ruler

### Opening

#### State the Objective

In this activity, students will use cake batter to simulate surface lava flows.

#### Gain prior knowledge by asking students, “What do you know about \_\_\_\_\_?”

Real lava flows are complicated. They have a prominent lava channel confined between levees. Shear zones, places where one portion of the flow is moving faster than an adjacent portion, usually occur. Levees form on the outer part of the flow. Inside the levees, the lava moves downhill. Ridges may develop in the flowing portions. The thickness of the flow varies with slope, time, and amount of lava.

### Content (the “Meat”)

#### Instruction / Demonstration (“I do” – “We do”)

1. Mix the dry cake mix with water only. Smooth with a wire whisk to the consistency of thick cream.
2. The final mixture should be fairly uniform with only a few lumps.
3. Draw a grid with 10-cm spacing onto paper taped to the baking sheet or wooden board. Then cover with plastic wrap.
4. Angle the baking sheet or board propped up to an angle of 15 degrees.

#### \*Activity → Teachable Moment(s) throughout

Tip: Teachers, listen for questions that begin with “what” or “how.”

- How do you know that . . . ?
- What would happen if . . . ?

#### Students practice (“You do”)

1. Have a group of students model the activity for the whole class.
2. Students should pour the batter slowly and at a constant rate down the inclined board.
3. First and foremost, is to observe the formation of distinct features in the flow: levees, ridges, and interior channel.
4. At each 10 cm mark the students will record the time the flow passes the mark, measure the length of the flow, measure the width of the flow, and measure the center dept of the flow. Record these values on a data sheet.
5. When the batter is flowing down the slope, look for areas near the edges where the flow rate is low or zero. These are the levees of the channel.
6. The part in the middle that is moving faster is called the channel interior.

## Consult 4 Kids Lesson Plans

### Closing

#### Review

1. Prepare the cake mix, baking pan, or wooden board.
2. Look for levees, ridges and the interior flow.
3. Record the time the flow front passes the 10-cm mark.
4. Measure the length, width and center depth of the flow.
5. Record the data.

#### Debrief

##### Likes and Dislikes

Create a chart and list what students liked and what students didn't like about the activity.

#### Reflection (Confirm, Tweak, Aha!)

Sample: We learned that lava doesn't flow at the same rate.

Your Reflection:

#### Modification of lesson:

1. Sprinkle red confetti onto the flow to get a better view of the movement between the channel and the levees.
2. Add more flour to the batter to see the behavior of a thick flow.
3. How do the two flows compare?
4. Ask questions based on the information in Prior Knowledge.

## Consult 4 Kids Lesson Plans

<b>Component:</b>	Science
<b>Grade Level:</b>	K-5
<b>Lesson Title:</b>	Giant Cooling Vent
<b>Focus:</b>	Volcanoes

**Materials:** Newspaper, modeling clay, salt dough, or soil, small empty plastic soda bottle, baking pan, red food coloring, liquid detergent, two tablespoons baking soda, funnel, and vinegar

### Opening

#### State the Objective

Children will understand that a volcano can act as a giant cooking vent for Earth's inner core.

#### Gain prior knowledge by asking students, "What do you know about \_\_\_\_\_?"

Review with students what they have learned about volcanoes. Include the following information: At Earth's center is a core of hot liquid iron and nickel. The Earth is made up of interlocking pieces of land called tectonic plates. Heat from the Earth's core can escape to the outside through a gap between tectonic plates, or heat can "punch" through the middle of a tectonic plate, releasing pressure and heat to the outside.

### Content (the "Meat")

#### Instruction / Demonstration ("I do" – "We do")

1. Tell students they are going to create a model volcano that will help them visualize what a real volcanic eruption is like.
2. Demonstrate the lesson to the whole group. See procedure below.
3. Divide class into groups, distributing materials to each group.

#### **\*Activity → Teachable Moment(s) throughout**

Tip: Teachers, listen for questions that begin with "what" or "how."

Here are sample questions to ask students:

- What questions would you ask?
- How would you improve this activity?

#### Students Practice ("You do")

1. Cover the work area with newspaper.
2. In each group, place the soda bottle on the baking pan.
3. Mold the clay, dough, or soil into a "mountain" around the bottle. Do not cover the bottle opening.
4. Fill the bottle almost to the top with warm water mixed with a little red food coloring.
5. Add 6 drops of liquid detergent to the bottle.
6. Add two tablespoons baking soda to the bottle, using the funnel.
7. Also using the funnel, have students pour the vinegar slowly into the bottle.
8. Watch for a volcano explosion!

## Consult 4 Kids Lesson Plans

### Closing

#### Review

1. First we covered the work space with newspaper. We placed a soda bottle on a baking tray.
2. Then we molded clay, dough, or soil around the bottle to make a mountain.
3. Next we filled the bottle almost to the top with warm water and red food coloring.
4. Then we added 6 drops of liquid detergent and two tablespoons of baking soda to the bottle.
5. Finally we watched a volcanic explosion.

#### Debrief

##### Three What's

1. What did you enjoy most about this activity?
2. What was the biggest challenge with this activity?
3. What did you learn from the group?

#### Reflection (Confirm, Tweak, Aha!)

Sample: We learned that the volcano did not erupt until we added the vinegar.

Your Reflection:

#### Modification of Lesson:

With younger students, do the activity with the whole group.

## Consult 4 Kids Lesson Plans

<b>Component:</b>	Science
<b>Grade Level:</b>	K-5
<b>Lesson Title:</b>	Submarine Volcanoes
<b>Focus:</b>	Volcanoes \

**Materials:** Classroom white board, dry erase markers, individual white boards, white butcher paper, markers

### Opening

#### State the Objective

In this activity, students will learn that volcanoes can be submerged under the ocean.

**Gain prior knowledge by asking students, “What do you know about \_\_\_\_\_?”**

Volcanoes are one of the most destructive forces in nature. They are found all over the world. Volcanoes are on land and under the sea. There are nine stages of development for submarine volcanoes. This lesson is all about how volcanoes develop, first as submarines, then as volcanoes above sea level. Here is an internet resource of Submarine Volcano Stages - [Kamalli.k12.hi.us/CyberFair%2099/volcano\\_stages.htm](http://Kamalli.k12.hi.us/CyberFair%2099/volcano_stages.htm)

### Content (the “Meat”)

#### Instruction / Demonstration (“I do” – “We do”)

1. Ask students, “What is a volcano? Where is the closest volcano? Is there a volcano that would erupt near your home? Can you touch lava? What would happen if lava touched a car?”
2. There is an idiom which is “Blow your top off.” What does the idiom mean? (When a person gets very angry, he is letting off steam) Can you compare the idiom to a volcano?
3. Draw a picture of a volcano erupting and a person erupting, or blowing off steam.

#### \*Activity → Teachable Moment(s) throughout

Tip: Teachers, listen for questions that begin with “what” or “how.”

- “How do volcanoes get underwater?”
- “What would happen if we plugged up the hole in the middle of the volcano?”

#### Students practice (“You do”)

1. Provide students with white boards or drawing paper. Tape a large piece of butcher paper on the wall. The teacher draws each stage on the white board, and then students draw each stage of submarine volcanoes. Here are the stages:
  - Deep Submarine – The volcano is completely submerged below sea level.
  - Shallow Stage – The volcano is just below the surface of the water.
  - Shield Building Stage – A broad, gently sloping cone with a flat top emerges above sea level.
  - Capping Stage – With each lava eruption, the cone continues to grow above sea level.
  - Erosion Stage – The volcano begins to wear down. In warm waters,

## Consult 4 Kids Lesson Plans

<p>reefs begin to grow around the sides.</p> <ul style="list-style-type: none"> <li>▪ Secondary Atoll Stage - New eruptions occur with an ash cloud.</li> <li>▪ Atoll Stage – Land above sea level has eroded away. The reefs are still growing.</li> <li>▪ Guyot (Underwater Mountain) Stage – The top is so eroded that the mount is left below sea level.</li> </ul> <p>2. Students share drawings. If done on paper, glue them to the butcher paper.</p>	
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<b>Closing</b>
<b>Review</b>
<ol style="list-style-type: none"> <li>1. Talk about the idiom “blowing your top off.”</li> <li>2. Discuss the difference between land and submarine volcanoes.</li> <li>3. Teacher and students draw each stage of a submarine volcano.</li> <li>4. Share drawings of each stage.</li> </ol>
<b>Debrief</b>
<p><b>Three Whats</b></p> <p>Ask the following three “what” questions:</p> <ol style="list-style-type: none"> <li>1. What did you enjoy most about this activity?</li> <li>2. What was the biggest challenge with this activity?</li> <li>3. What was one thing you learned about submarine volcanoes?</li> </ol>

<p><b>Reflection (Confirm, Tweak, Aha!)</b></p> <p>Sample: “I learned that submarine volcanoes can be active and have lava flows.”</p> <p>Your Reflection:</p>
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<p><b>Modification of lesson:</b></p> <ol style="list-style-type: none"> <li>1. Younger students might choose one stage and paint a picture of that stage to be displayed on the butcher paper.</li> <li>2. It isn’t necessary to draw all the stages in one session. Divide the lesson over two or three days.</li> </ol>
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## Consult 4 Kids Lesson Plans

<b>Component:</b>	Science
<b>Grade Level:</b>	K-5
<b>Lesson Title:</b>	Toothpaste Chain Volcanoes
<b>Focus:</b>	Volcanoes

**Materials:** Poster board or a thin cardboard (24" x 12"), marker, toothpaste, squeezable bottles of ketchup or mustard (optional), tool to punch several holes in the cardboard

### Opening

#### State the Objective

Students will describe how chain volcanoes form over a hotspot.

#### Gain prior knowledge by asking students, "What do you know about \_\_\_\_\_?"

Unlike most volcanoes, which are found at plate boundaries, Hawaiian volcanoes are found in the middle of the Pacific Plate. A hotspot below the plate provides a source of magma that fuels volcanic eruptions. Long-lasting eruptions from the hotspot produced the Hawaiian Islands. In this activity, students will see how a plate moving over a hotspot can produce a chain of island volcanoes.

### Content (the "Meat")

#### Instruction / Demonstration ("I do" – "We do")

1. Check for understanding of these words: volcano (formed from lava flows), Hawaii (The big island in the Hawaiian chain of volcanoes), Hawaiian (anything from Hawaii), hotspot (hot lava close to the surface), plates (interlocking land masses on Earth. Show two pieces of a puzzle and how they fit together), magma (liquid rock or lava), chain of volcanoes (volcanoes connected in a chain-like formation).
2. Punch several holes resembling a chain, in the cardboard. On the last opening, punch 3 holes close together.
3. Explain that the cardboard represents one of the Earth's plates. The holes represent weak points in the crust that allow the formation of volcanoes.
4. The toothpaste and ketchup represents a hotspot.
5. Using student helpers, demonstrate this lesson for the whole class.

#### **\*Activity → Teachable Moment(s) throughout**

Tip: Teachers, listen for questions that begin with "what" or "how."

- "How can one mountain be a volcano, and another mountain not a volcano?"
- "What do you mean by Pacific Plate? Are there paper plates out in the Pacific Ocean?"

#### Students Practice ("You do")

1. Hold the toothpaste under the cardboard.
2. While squeezing the toothpaste tube, move the cardboard over the top to represent a plate moving over a hotspot to form a chain of volcanoes.
3. The toothpaste should squeeze up through the holes and form mounds.
4. A large mound should form over the three holes punched close together.
5. Ask students to discuss the shape and form of the toothpaste volcanoes you made.

## Consult 4 Kids Lesson Plans

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| <ol style="list-style-type: none"> <li>6. Repeat the process using ketchup as the hotspot.</li> <li>7. How does the thickness or thinness of the toothpaste and ketchup affect how the volcano looks?</li> </ol> |  |
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### Closing

#### Review

1. Punch holes in a piece of cardboard.
2. Squeeze toothpaste under the cardboard as you move the cardboard.
3. Talk about how the toothpaste forms mounds. Do they look like volcanoes?
4. Repeat the process with ketchup.
5. Do the mounds or volcanoes look the same as toothpaste mounds?

#### Debrief

##### **Best Learning**

1. What was your best learning from this activity?
2. What didn't you like about the activity?
3. How can we change the activity to make it better?

#### **Reflection (Confirm, Tweak, Aha!)**

Sample: "I learned that the Hawaiian Islands are all volcanoes, or mountains which started below sea level in the Pacific Ocean."

Your Reflection:

#### **Modification of Lesson:**

1. Model the lesson for younger students.
2. If you divide students into groups to do the activity, have volunteers to monitor the squeezing of the toothpaste and ketchup tubes.