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# Cooking Up a Volcano

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## Hawai'i Volcanoes National Park Quarter

### Grades Four through Six

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### OBJECTIVES

Students will understand and describe how volcanoes are formed and how they function. Students will research basic features of volcanoes, specifically the volcanoes of Hawaii. Students will demonstrate an understanding of volcanoes through creative writing.



### MATERIALS

- 1 overhead projector or other classroom technology (optional)
- 1 overhead transparency (or equivalent) of the “Hawai'i Volcanoes National Park Quarter” page
- Copies of the following:
  - “Volcanoes 3+3” worksheet
  - “Volcano Research Guide” worksheets (2 pages)
  - “Writing a Scientific Recipe” worksheet
- 1 copy of an age-appropriate text that gives basic information about volcanoes, such as:
  - *Volcanoes (Let's Read and Find Out Science)* by Franklyn Branley
  - *Volcanoes (Wonders of Our World)* by Neil Morris
  - *Volcanoes: The Science Behind Fiery Eruptions* by Alvin Silverstein
- Access to video clips or images of volcanoes
- Age-appropriate materials for partner research that provide additional information about volcanoes (including Hawaiian volcanoes) and recipes, such as internet web sites, videos, textbooks, reference materials, and other texts.
- Internet access (optional)
- Chart paper
- Markers, pencils, and crayons



### PREPARATIONS

- Make an overhead transparency (or equivalent) of the “Hawai'i Volcanoes National Park Quarter” page.
- Make copies of the following:
  - “Volcanoes 3+3” worksheet (1 per student)
  - “Volcano Research Guide” worksheets (1 of each page per student)
  - “Writing a Scientific Recipe” worksheet (1 per student)



# Cooking Up a Volcano

- Locate a text that that gives basic information about volcanoes (see examples under “Materials”).
- Prepare a chart labeled “Views on Volcanoes” to use in Session 1.
- Locate a variety of video clips and/or images of volcanoes.
- Locate materials for partner research that provide additional information about volcanoes, including Hawaiian volcanoes and recipes (see examples under “Materials”).



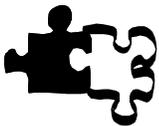
## GROUPINGS

- Whole group
- Pairs
- Small group
- Individual work



## CLASS TIME

Four 45- to 60-minute sessions



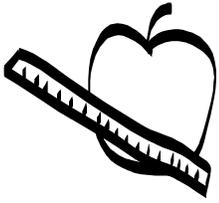
## SUBJECT AREA CONNECTIONS

- Science
- Language Arts



## TERMS AND CONCEPTS

- |                                   |                    |                  |
|-----------------------------------|--------------------|------------------|
| • Quarter                         | • Obverse (front)  | • Reverse (back) |
| • Hawai'i Volcanoes National Park | • Volcano          | • Lava           |
| • Erupt                           | • Plate tectonics  | • Cinder cones   |
| • Composite volcanoes             | • Shield volcanoes | • Lava volcanoes |
| • Active                          | • Dormant          | • Extinct        |
| • Ash                             | • Pumice           | • Basalt         |
| • Vent                            | • Fumaroles        | • Summit         |
| • Throat                          | • Flank            | • Parasitic cone |
| • Sill                            | • Ring of Fire     | • Pahohoe lava   |



# Cooking Up a Volcano



## BACKGROUND KNOWLEDGE

Students should have a basic knowledge of:

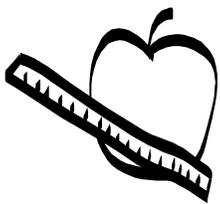
- Earth's surface
- Writing process



## STEPS

### Session 1

1. Display the “Hawai’i Volcanoes National Park Quarter” overhead transparency or photocopy. Locate this site on a class map. As background information, explain to the students that the United States Mint began to issue the quarters in the America the Beautiful Quarters® Program in 2010. By the time the program ends in 2021, there will be a total of 56 designs on the back of the coin. Each design will focus on a different national site—one from each state, territory, and the District of Columbia.
2. Tell the students that the back of a coin is called the reverse, and “obverse” is another name for the front.
3. Ask the students to examine the coin image and tell you what they see in this image. Tell the students that they are going to be learning about general characteristics of volcanoes, as well as the volcanoes of Hawaii.
4. Tell the students that they will use the Think-Pair-Share format to discuss volcanoes. Ask the students to think about what they already know about volcanoes, then briefly share with a partner, and finally share out with the entire class. Record student ideas on the “Views on Volcanoes” class chart.
5. To build additional interest and activate background knowledge, show the students a variety of images and/or video clips of volcanoes. After viewing, continue using Think-Pair-Share to add to the “Views on Volcanoes” class chart.
6. Introduce the students to the selected text about volcanoes. Explain that they will be learning about how volcanoes are formed, the parts of a volcano, and different types of volcanoes. Read the text aloud. As a group, add new information to the “Views on Volcanoes” class chart.
7. Distribute the “Volcano 3+3” worksheet. To summarize learning, ask the students to record three new facts they learned and three questions they have about volcanoes and then update the chart as a class.
8. Explain to the students that in the next session they will be researching additional information about volcanoes.



# Cooking Up a Volcano

## Session 2

1. Display the “Hawai’i Volcanoes National Park Quarter” page. Review the material and chart covered in the previous session with the students.
2. Explain to the students that, as they learn more about the science of volcanoes, they will be demonstrating their knowledge through creative writing.
3. Distribute the “Volcano Research Guide” worksheets and briefly discuss as needed. Allow students time to work with partners to conduct additional research about the volcanoes in Hawaii and around the world. The students should complete the worksheet as they conduct their research.
4. After allowing time for the research, ask the pairs to share their findings and add any new information to the “Views on Volcanoes” class chart as appropriate.
5. Explain to the students that in the next session they will be applying their knowledge of volcanoes in a creative writing project.

## Sessions 3 and 4

1. Display the “Hawai’i Volcanoes National Park Quarter” overhead transparency. Review with the students the material and charts covered in the previous sessions.
2. Explain to the students that they will be using their new knowledge of volcanoes to create a “recipe” for making a volcano. To prepare for writing, ask the students to name common characteristics of a recipe (list of ingredients, amounts, steps, title) and list them on the board.
3. Distribute the “Writing a Scientific Recipe” worksheet. Review the sample and all components of the assignment together.
4. Provide the students with time to write, revise, and edit their volcano recipes. After editing, ask the students to create a final illustrated project. The students will share their final projects with the class.



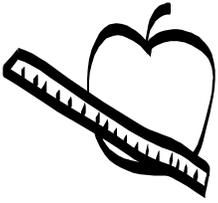
## ASSESSMENT

- Take anecdotal notes about the students’ participation in class discussions.
- Evaluate the students’ worksheets and projects for understanding of the lesson objectives.



## ENRICHMENTS/EXTENSIONS

- Have students research recent volcanic events through media sources.
- Have students examine the connection between volcanoes and earthquakes through research on plate tectonics.



# Cooking Up a Volcano

- Have students create a model to teach others about the key characteristics of volcanoes.
- Have students write recipes for other geologic or weather events and assemble into a class book.
- Have students display their knowledge about volcanoes through additional creative writing or poetry formats (haiku, biopoem, acrostic).



## DIFFERENTIATED LEARNING OPTIONS

- Allow students to work in pairs to create their recipes.
- Allow students to dictate written responses.
- Provide more structured materials for research to limit the amount of sources needed to review.
- Provide extended time to complete research and written tasks.



## CONNECTION TO [WWW.USMINT.GOV/KIDS](http://WWW.USMINT.GOV/KIDS)

- Have students practice volcano related vocabulary by playing the “Volcanic Words” Bingo game at [www.usmint.gov/kids/teachers/classActivities/classGadgets.cfm](http://www.usmint.gov/kids/teachers/classActivities/classGadgets.cfm).
- Have students learn more about the state of Hawaii by visiting the 2008 Hawaii quarter lesson plan for grades 4 through 6 at [www.usmint.gov/kids/teachers/lessonPlans/50sq/2008/0203-5.pdf](http://www.usmint.gov/kids/teachers/lessonPlans/50sq/2008/0203-5.pdf).
- Have students learn more about how the Earth’s layers interact to cause changes in the Earth’s surface by visiting the 2005 Oregon quarter lesson plan for grades 4 through 6 at [www.usmint.gov/kids/teachers/lessonPlans/50sq/2005/0406-3.pdf](http://www.usmint.gov/kids/teachers/lessonPlans/50sq/2005/0406-3.pdf).
- Have students learn more about the formation of the Earth’s surface and layers of the Grand Canyon by visiting the 2008 Arizona quarter lesson plan for grades 4 through 6 at [www.usmint.gov/kids/teachers/lessonPlans/50sq/2008/0406-3.pdf](http://www.usmint.gov/kids/teachers/lessonPlans/50sq/2008/0406-3.pdf).
- Have the students learn more about the identifying and classifying common rock types by visiting the 2005 California quarter lesson plan for grades 4 through 6 at [www.usmint.gov/kids/teachers/lessonPlans/50sq/2005/0406-1.pdf](http://www.usmint.gov/kids/teachers/lessonPlans/50sq/2005/0406-1.pdf).



Name \_\_\_\_\_

# Volcano 3+3

**Directions:** After learning about volcanoes, record three things you learned about volcanoes and three questions you have about volcanoes in the boxes below.



Three things I learned:

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Three questions I have:

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Name \_\_\_\_\_

# Writing a Scientific Recipe

**Directions:** After researching volcanoes, you will apply the information to write a creative “recipe” to “cook up” a volcano. Be sure to use your creativity to explain this scientific concept. Use the example “Recipe for an Earthquake” below as a guide.



## SCIENTIFIC RECIPE CHECKLIST

Examine a variety of recipes and cookbooks. Use your imagination to turn a scientific concept into a realistic sounding recipe. At the minimum, your recipe must include:

- Title
- Ingredients
- Easy-to-follow instructions

All recipes should:

- Be well-written and free of mechanical errors.
- Show creativity in interpreting the scientific concept.
- Be written in the format modeled above.
- Include at least **five** key vocabulary words about the scientific concept.
- Include one main illustration or illustrated steps.

### RECIPE

## Earthquake

### INGREDIENTS

- 1 Earth's crust (thick, with many layers and a fault)
- 1 Earth's mantle
- 2 plates
- A LOT of energy (found deep beneath the earth)

### INSTRUCTIONS

1. Carefully examine the Earth's crust and find a fault in the Earth's surface above the mantle. For a very large earthquake, choose a longer, deeper fault.
2. Under the fault, you'll find two large plates (pieces of the Earth's crust). Slowly apply energy, pushing the plates together to build up stress.
3. Gradually rub the two plates together stronger and faster for 30 to 60 seconds. Watch carefully; the crust on your earthquake may crack quickly.
4. After the earthquake is complete, briefly rub the plates together occasionally to create aftershocks.

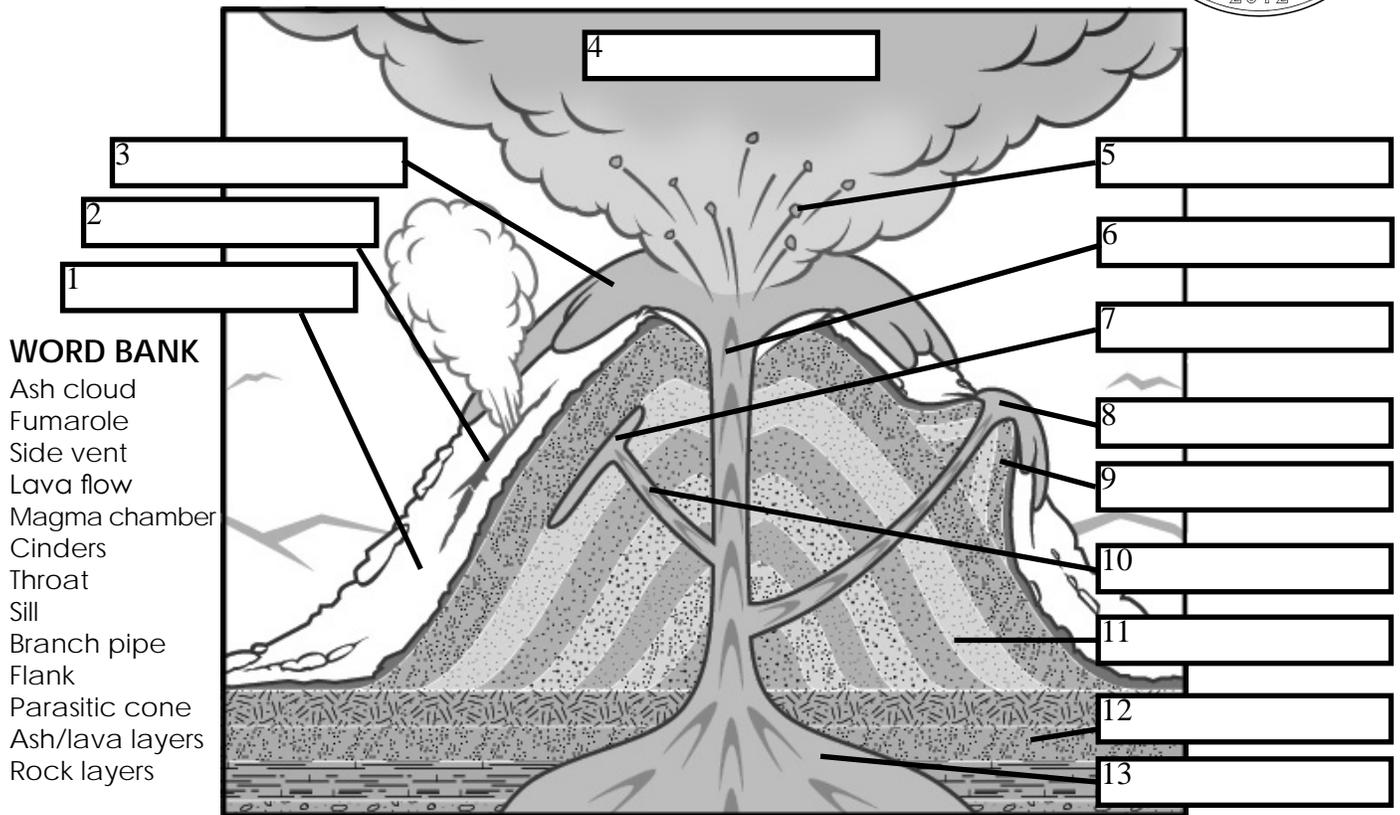


Name \_\_\_\_\_

# Volcano Research Guide

## Page 1

**Directions:** Using class discussions and information gathered from the Internet, various books, and reference materials, make notes about volcanoes in Hawaii and around the world. Then label the parts of a volcano in the diagram below and complete the worksheets.



Define the following terms:

- Ash \_\_\_\_\_
- Pumice \_\_\_\_\_
- Basalt \_\_\_\_\_
- Vent \_\_\_\_\_
- Fumarole \_\_\_\_\_
- Summit \_\_\_\_\_
- Throat \_\_\_\_\_
- Flank \_\_\_\_\_
- Parasitic cone \_\_\_\_\_
- Sill \_\_\_\_\_



Name \_\_\_\_\_

# Volcano Research Guide

## Page 2

1. Describe the characteristics of the three different types of volcanoes.

- Active \_\_\_\_\_
- Dormant \_\_\_\_\_
- Extinct \_\_\_\_\_

2. Name, describe, and illustrate the 4 different shapes of volcanoes.

<b>1</b>	<b>2</b>
<b>3</b>	<b>4</b>

3. Explain the difference between **magma** and **lava**. \_\_\_\_\_

4. What is the branch of geology known as **plate tectonics**? \_\_\_\_\_

5. List three things that cause volcanoes to erupt. \_\_\_\_\_

6. Where do the most active volcanoes exist in the United States? Why are they found there?

7. How many volcanoes are there in the world? \_\_\_\_\_

8. Explain what the "Ring of Fire" is. \_\_\_\_\_

9. Where is the world's largest volcano? \_\_\_\_\_

10. Describe **pahoehoe** lava. \_\_\_\_\_



# Hawai'i Volcanoes National Park Quarter



# The United States of America

