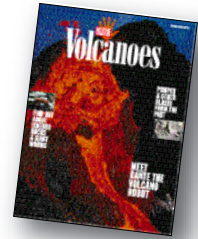




# Teacher's Guide



# Volcanoes

## Dear Educator,

Investigate sleeping giants from the inside out and see what happens when they erupt! While reading **KIDS DISCOVER** *Volcanoes*, your young volcanologists will learn about the fascinating topics at right.

This Teacher's Guide is filled with activity ideas and blackline masters to help your students enjoy and learn more from *Volcanoes*. Select or adapt the activities that suit your students' needs best.

Thank you for making **KIDS DISCOVER** a part of your classroom.

Sincerely,

**KIDS DISCOVER**

P.S. We would love to hear from you! E-mail your comments and ideas to [teachers@kidsdiscover.com](mailto:teachers@kidsdiscover.com)

## Meeting the Standards

✓ Earth and Space Science  
– *National Science Education Standards*

✓ Visit [www.kidsdiscover.com/standards](http://www.kidsdiscover.com/standards) to find out more about how **KIDS DISCOVER** meets state and national standards.

## PAGES WHAT'S IN VOLCANOES

- **2–3 Volcanoes**  
Active, dormant, and extinct volcanoes
- **4–5 Volcanoes Inside Out**  
A diagram of an active volcano, plus igneous rocks
- **6–7 Rifts, Rafts, and Hotspots**  
Earth's jigsaw of major plates and America's most active volcanoes
- **8–9 History Makers**  
Historic volcanic eruptions
- **10–11 Flowing Lava**  
An up-close look at flowing lava and a Hawaiian legend
- **12–13 Volcanic Treasures**  
Homes for animals and plants, valuable elements, and sources of electricity
- **14–15 Volcanic America**  
Old Faithful, Crater Lake, and other landmarks
- **16–17 Living with Volcanoes**  
Geologists, volcanologists, and the Hawaiian goddess of volcanoes
- **18–19 Student Activities**  
Make a volcano in a bottle and a volcano pie, plus a crossword, resources, and more

## • IN THIS TEACHER'S GUIDE •

**2** Prereading Activities

**3** Get Set to Read (Anticipation Guide) 

**4** Discussion and Writing Questions

**5–6** It's in the Reading (Reading Comprehension) 

**7** Everything Visual (Graphic Skills) 

**8** Cross-Curricular Extensions

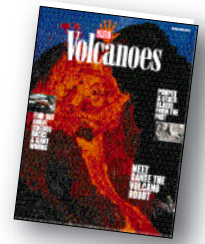
**9–12** Answer Keys to Blackline Masters

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# PREREADING ACTIVITIES



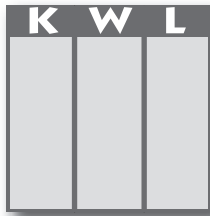
**B**efore distributing **KIDS DISCOVER *Volcanoes***, activate students' prior knowledge and set a purpose for reading with these activities.

## Discussion

To get students thinking about how this topic relates to their interests and lives, ask:

- ✓ *Have you ever seen a volcano? What was it like?*
- ✓ *Would you like to visit a volcano? Why or why not?*

## KWL Chart



On chart paper, draw three columns and label them **K** ("What we Know"), **W** ("What we Want to know" or "What we think we Will learn"), and **L** ("What we Learned"). Ask: *What do you already know about volcanoes?*

List students' responses in the **K** column. In the **W** column, list students' questions and comments about what they want to learn or what they think they will learn by reading *Volcanoes*. (See box below for key terms students may bring up.) At the end of the unit, have students fill in the **L** column listing what they learned. Finally, ask students to correct any inaccurate information written in the **K** column.

### KEY TERMS

- |           |             |
|-----------|-------------|
| ✓ active  | ✓ rift zone |
| ✓ dormant | ✓ strata    |
| ✓ extinct | ✓ hotspot   |
| ✓ lava    | ✓ basalt    |
| ✓ ash     | ✓ igneous   |
| ✓ mantle  | ✓ magma     |

## Get Set to Read (Anticipation Guide)



Copy and distribute the **Get Set to Read** blackline master (page 3 of this Teacher's Guide). Explain to students that this **Anticipation Guide** will help them find out what they know and what misconceptions they have about the topic. **Get Set to Read** is a list of statements—some true, some false. Ask students to write whether they think each statement is true or false in the **Before Reading** column. Be sure to tell students that it is not a test and they will not be graded on their answers. The activity can be completed in a variety of ways for differentiated instruction:

- ◆ **Have students** work on their own or in small groups to complete the entire page.
- ◆ **Assign pairs** of students to focus on two statements and to become "experts" on these topics.
- ◆ **Ask students** to complete the **Before Reading** column on their own, and then tabulate the class's answers on the chalkboard, on an overhead transparency, or on your classroom computer.
- ◆ **Review the statements** orally with the entire class.

If you predict that students will need assistance finding the answers, complete the **Page Number** column before copying **Get Set to Read**.

## Preview

Distribute *Volcanoes* and model how to preview it. Examine **titles, headings, words in boldface type, pictures, charts, and captions**. Then have students add new information to the **KWL** chart. If students will only be reading a few pages at one sitting, preview only the selected pages.

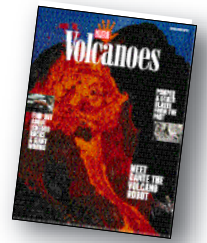
## BE WORD WISE WITH POWER VOCABULARY!

**Y**ou have exclusive access to additional resources including Power Vocabulary blackline masters for every available KIDS DISCOVER title! These activities introduce students to 15 specialized and general-use vocabulary words from each KIDS DISCOVER title. Working with both types of words helps students develop vocabulary, improve comprehension, and read fluently. Follow the links from your Teacher's Toolbox CD-ROM and find your title to access these valuable resources:

- ◆ Vocabulary cards
- ◆ Crossword puzzle
- ◆ Word find
- ◆ Matching
- ◆ Cloze sentences
- ◆ Dictionary list

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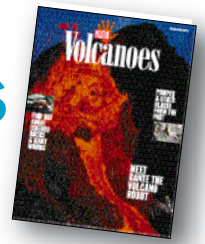
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## Get Set to Read

What do you know about volcanoes? Let's find out. In **Before Reading**, write *true* if you think the statement is true. Write *false* if you think the statement is not true. Then read **KIDS DISCOVER Volcanoes**. Check back to find out if you were correct. Write the correct answer and the page number where you found it.

**CHALLENGE:** Rewrite each false sentence in a way that makes it true.

| Before Reading |   | After Reading | Page Number |
|----------------|---|---------------|-------------|
| _____          | 1. People avoid living near active volcanoes.   | _____         | _____       |
| _____          | 2. Magma, or liquid rock, that reaches the earth's surface is called lava.                  | _____         | _____       |
| _____          | 3. Volcanoes exist because of the movement of the Earth's plates.                           | _____         | _____       |
| _____          | 4. The ring of fire on which most active volcanoes lie circles the Atlantic Ocean.          | _____         | _____       |
| _____          | 5. An eruption of Mt. Vesuvius destroyed the Roman city of Milan in A.D. 79.                | _____         | _____       |
| _____          | 6. Magma can heat underground water that can be used to produce heat.                       | _____         | _____       |
| _____          | 7. The Yellowstone National Park has more active geysers than any other place on the earth. | _____         | _____       |
| _____          | 8. Scientists who study volcanoes are called geologists.                                    | _____         | _____       |



Use the following questions as oral discussion starters or for journaling. For additional in-class discussion and writing questions, adapt the questions on the reading comprehension blackline masters on pages 5 and 6.

### Pages 2–3

- ✓ Why do you think the author compared volcanoes to sleeping giants? How are they similar? What else can you compare a volcano to? An active volcano? A dormant volcano? An extinct volcano?

### Pages 4–5

Ask students to look at the picture of Mount Fuji and, if possible, bring in other photographs of this volcano. Ask:

- ✓ Why do you think Mount Fuji has inspired Japanese artists for centuries?
- ✓ Are there any other places in the world that you think similarly inspire artists? What are they?

### Pages 6–7

The eruptions of subduction-zone volcanoes, like Mount St. Helens, and volcanoes over hotspots, like Kilauea, are different. Ask:

- ✓ What are some words you could use to describe each type of eruption?
- ✓ What are some similes you could use to describe each eruption?

### Pages 8–9

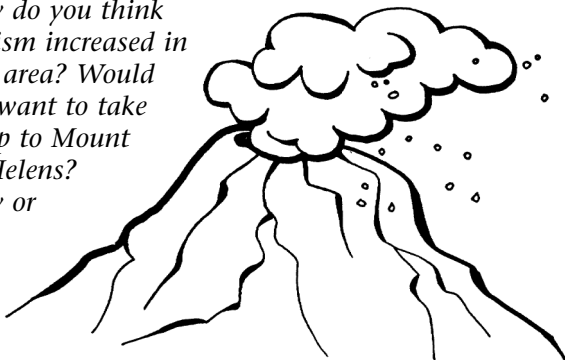
Mount St. Helens in Washington State was called Fire Mountain by Native Americans many years ago. Ask:

- ✓ Why is that name a suitable one? What are some other names that might also be appropriate to describe Mount St. Helens?

### Pages 8–9

After the 1980 eruption of Mount St. Helens, tourism in the area increased greatly. Ask:

- ✓ Why do you think tourism increased in that area? Would you want to take a trip to Mount St. Helens? Why or why not?



### Pages 10–11

Hawaiian legends and folklore include stories about Pele, the goddess of volcanoes. When she is angry, she unleashes waves of lava from the underworld. Ask:

- ✓ What fanciful explanation can you think of to explain volcanoes and volcanic eruptions? From what culture or country do you picture this legend to be from?

### Pages 12–13

Volcanoes give us many things, just a few of which are mentioned on pages 12–13. Ask:

- ✓ What do you think is the greatest benefit of volcanoes? What do you think is the greatest risk?
- ✓ Do you think the benefits of volcanoes outweigh their risks?

### Pages 14–15

- ✓ How do you think Old Faithful, the geyser in Yellowstone National Park, got its name? What other names can you suggest for it?
- ✓ What other names can you suggest for the other places mentioned on pages 14–15?

### Pages 16–17

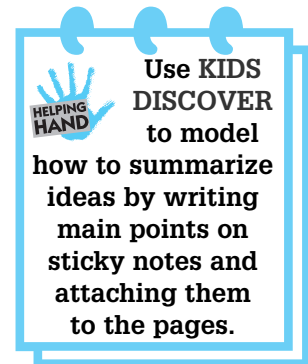
Some people live near volcanoes. Ask:

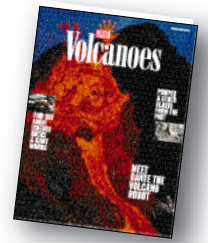
- ✓ Why do you think people living near active volcanoes don't move? Would you want to live near a volcano? Explain.

### Pages 16–17

Volcanologists study the day-to-day life of volcanoes. This work can be extremely dangerous, as well as physically and mentally challenging. Ask:

- ✓ What qualities do you think would be important to have in this line of work? Would you like to have this kind of job? Why?





Name \_\_\_\_\_ Date \_\_\_\_\_

## It's in the Reading

After reading **KIDS DISCOVER *Volcanoes***, choose the best answer for each question.  
Fill in the circle.



*Find your answers on the pages shown in the book icon next to each question.*

**1. Why is Mt. Everest considered the earth's tallest mountain although Mauna Kea is taller?**

- A. Mt. Everest is partly under water.
- B. Mt. Everest is entirely on land.
- C. People have just learned about the height of Mauna Kea.
- D. Mt. Everest has been measured, but Mauna Kea has not.



**2. What does the term *volcano* describe?**

- A. the eruption of lava
- B. the buildup of magma underground
- C. the hole through which lava erupts and the mountain lava builds
- D. lava and magma



**3. How are obsidian and granite alike?**

- A. Both are formed underground.
- B. Both have a smooth, glassy texture.
- C. Both have large crystals.
- D. Both are formed from magma.



**4. Which of these statements is true?**

- A. Magma can become rock, but rock cannot become magma.
- B. Volcanoes can form only where two plates meet.
- C. Volcanoes can form in the middle of plates over hotspots.
- D. A rift zone is a place where two plates collide.



**5. Which of the following statement expresses an opinion?**

- A. Benjamin Franklin was the first scientist to suggest that volcanoes can change climate.
- B. He linked Europe's cold winter of 1784 with the fog from Mount Laki's eruption.
- C. The fog may have blocked enough sunlight to cause the cold.
- D. Mount Laki erupted in 1784.





# It's in the Reading (continued)

6. What does the term *routed* mean?

- A. forced out
- B. chased
- C. angered
- D. searched



7. Why does the magazine mention that geothermal energy is clean and renewable?

- A. to encourage people to use geothermal energy
- B. to point out additional benefits of geothermal energy
- C. to discourage use of other sources of energy
- D. to identify the only benefit of geothermal energy



8. Mount Rainier last erupted in the 1800s, would it be classified as an active volcano?

- A. No it has not erupted for over one hundred years.
- B. No, it is now an extinct volcano.
- C. Yes, it has erupted since written records have been kept.
- D. Yes, it is in the ring of fire.



9. What can you infer about spiders from their comparison to Dante the robot?

- A. Spiders live in Antarctica.
- B. Scientists use spiders to study volcanoes.
- C. Spiders crawl into volcanoes
- D. Spiders have eight legs.



10. Do the benefits of volcanoes outweigh their destructiveness? Explain.

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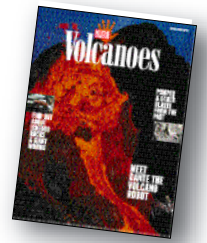
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Name \_\_\_\_\_ Date \_\_\_\_\_

## Everything Visual

A diagram with labels can help you visualize and understand structures and events. Study the diagram of a volcano on pages 4 and 5. Then answer the questions.

1. What does the diagram show as the source of magma?

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2. How are the central vent of a volcano and a fissure alike? How are they different?

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3. Where is the crater of a volcano?

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4. How do lava in ash and bombs differ?

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5. What is the purpose of the diagram?

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6. Why does the diagram show the magma and lava as red?

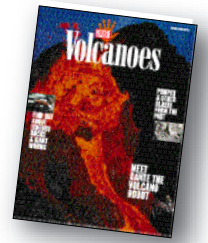
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7. Look at how the term *molten* is used in the captions for bomb and lava flow in the diagram. What do you think *molten* means?

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Have students try these activities to expand their knowledge and interest in volcanoes.

## Social Studies, Math

The heights of Mauna Kea and Mount Everest are shown on page 2. Have students find the heights of other tall mountains and make a chart comparing them. Make sure that students specify whether the height is from the ocean floor, as with Mount Kea, or how much is visible above sea level. Students should also be sure to present the heights in the same measurement. If needed, introduce to students how to convert feet and mile measurements to meter and kilometer measurements.

## Language Arts

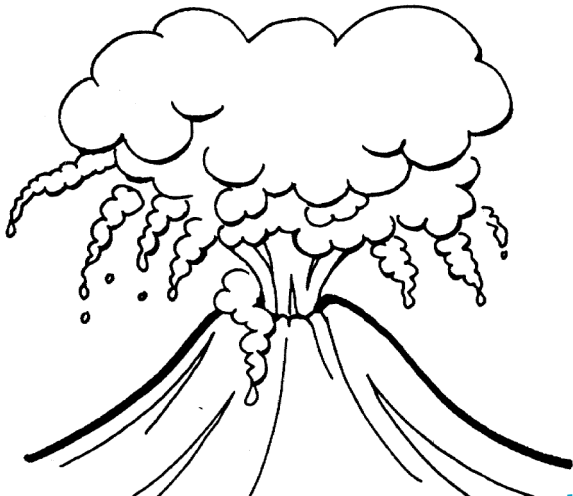
Have students do some research to find how some volcanoes and mountains around the world got their names and what they mean, such as Mount Everest, Mount St. Helens, and Kilauea. Encourage students to share stories they find about the names. They can also name a new volcano and create their own story about how it got its name.

## Science

Volcanoes can do great destruction, but they can also serve useful purposes. What threats to human and animal life do volcanoes pose? What benefits do volcanoes provide? Make a class chart of both the negative and positive aspects of volcanoes.

## Art

Many Japanese artists have been inspired by Mount Fuji. Have students search art books and books about Japan for artistic images of Mount Fuji. Ask students to compare the artwork. Have students try their hand at creating a piece of art based on Mount Fuji using a similar style to a Japanese piece or a different style, such as pop art or collage.



## Science

In what ways are earthquakes like volcanoes? Have students research each for a class chart comparing and contrasting volcanoes and earthquakes.

## Social Studies

Have students consult a globe to locate volcanic sites around the world, mentioned on pages 8–9. Students should also locate the most volcanically active countries, mentioned on page 6 of the issue.

## Social Studies

Have students use the library or the Internet to find newspaper or magazine articles telling about the eruption of Mount St. Helens on May 18, 1980. Articles can be brought to class and discussed.

## Science, Language Arts

Have students imagine that they are reporters at the site of a volcanic eruption. They should give a one-minute oral report on what they see, hear, and smell.

## Science

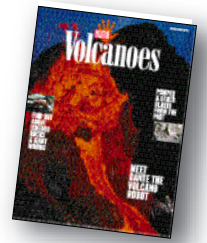
A geothermal plant is mentioned on page 12. Students can research how these plants work and present their findings in a diagram. They can work in pairs or teams to brainstorm ways geothermal plants can be further utilized to reduce pollution and to reduce the depletion of finite resources.

## Social Studies, Language Arts

Several sites in the United States mentioned on page 14 are landmarks left by volcanoes. Encourage students to find out about the attractions of these places and write travel advertisements or brochures promoting tourism.

**Use KIDS DISCOVER to demonstrate think-aloud questioning strategies for expository text.**





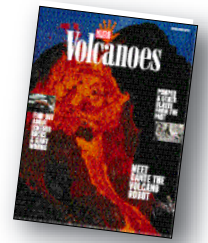
Name **ANSWER KEY** \_\_\_\_\_ Date \_\_\_\_\_

## Get Set to Read

What do you know about volcanoes? Let's find out. In **Before Reading**, write *true* if you think the statement is true. Write *false* if you think the statement is not true. Then read **KIDS DISCOVER Volcanoes**. Check back to find out if you were correct. Write the correct answer and the page number where you found it.

**CHALLENGE:** Rewrite each false sentence in a way that makes it true.

| Before Reading |  | After Reading | Page Number  |
|----------------|--|---------------|--------------|
| _____          | 1. People <del>avoid living</del> <b>often live</b> near active volcanoes.                             | <i>False</i>  | <i>p. 2</i>  |
| _____          | 2. Magma, or liquid rock, that reaches the earth's surface is called lava.                             | <i>True</i>   | <i>p. 4</i>  |
| _____          | 3. Volcanoes exist because of the movement of the Earth's plates.                                      | <i>True</i>   | <i>p. 6</i>  |
| _____          | 4. The ring of fire on which most volcanoes lie circles the <del>Atlantic</del> <b>Pacific</b> Ocean.  | <i>False</i>  | <i>p. 6</i>  |
| _____          | 5. An eruption of Mt. Vesuvius destroyed the Roman city of <del>Milan</del> <b>Pompeii</b> in A.D. 79. | <i>False</i>  | <i>p. 8</i>  |
| _____          | 6. Magma can heat underground water that can be used to produce heat.                                  | <i>True</i>   | <i>p. 13</i> |
| _____          | 7. The Yellowstone National Park has more active geysers than any other place on the earth.            | <i>True</i>   | <i>p. 15</i> |
| _____          | 8. Scientists who study volcanoes are called <del>geologists</del> <b>volcanologists</b> .             | <i>False</i>  | <i>p. 16</i> |



Name **ANSWER KEY** \_\_\_\_\_ Date \_\_\_\_\_

## It's in the Reading

After reading **KIDS DISCOVER *Volcanoes***, choose the best answer for each question.  
Fill in the circle.



Find your answers on the pages shown in the book icon next to each question.

**1. Why is Mt. Everest considered the earth's tallest mountain although Mauna Kea is taller?**

- A. Mt. Everest is partly under water.
- B. Mt. Everest is entirely on land. (*comparison and contrast*)
- C. People have just learned about the height of Mauna Kea.
- D. Mt. Everest has been measured, but Mauna Kea has not.



**2. What does the term *volcano* describe?**

- A. the eruption of lava
- B. the buildup of magma underground
- C. the hole through which lava erupts and the mountain lava builds (*details*)
- D. lava and magma



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- C. Volcanoes can form in the middle of plates over hotspots. (*synthesis*)
- D. A rift zone is a place where two plates collide.



**5. Which of the following statement expresses an opinion?**

- A. Benjamin Franklin was the first scientist to suggest that volcanoes can change climate.
- B. He linked Europe's cold winter of 1784 with the fog from Mount Laki's eruption.
- C. The fog may have blocked enough sunlight to cause the cold. (*fact and opinion*)
- D. Mount Laki erupted in 1784.



**6. What does the term *routed* mean?**

- A. forced out (*meaning from context*)
- B. chased
- C. angered
- D. searched



**7. Why does the magazine mention that geothermal energy is clean and renewable?**

- A. to encourage people to use geothermal energy
- B. to point out additional benefits of geothermal energy (*author's purpose*)
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- A. No it has not erupted for over one hundred years.
- B. No, it is now an extinct volcano.
- C. Yes, it has erupted since written records have been kept. (*synthesis*)
- D. Yes, it is in the ring of fire.



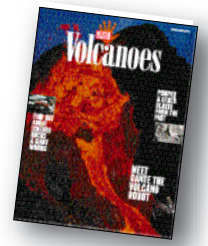
**9. What can you infer about spiders from their comparison to Dante the robot?**

- A. Spiders live in Antarctica.
- B. Scientists use spiders to study volcanoes.
- C. Spiders crawl into volcanoes
- D. Spiders have eight legs. (*inference*)



**10. Do the benefits of volcanoes outweigh their destructiveness? Explain.**

*Answers will vary, but students should provide reasons for their opinion.*



Name **ANSWER KEY** \_\_\_\_\_ Date \_\_\_\_\_

## Everything Visual

A diagram with labels can help you visualize and understand structures and events. Study the diagram of a volcano on pages 4 and 5. Then answer the questions.

1. What does the diagram show as the source of magma?

*The magma chamber is the source of the magma.*

2. How are the central vent of a volcano and a fissure alike? How are they different?

*Lava can flow through both. The central vent is the main channel through which lava flows. A fissure is a crack in the earth's crust that lava can seep through.*

3. Where is the crater of a volcano?

*The crater is a depression around the mouth of the volcano.*

4. How do lava in ash and bombs differ?

*The lava differs in size. Lava in bombs is more liquid.*

5. What is the purpose of the diagram?

*The diagram shows the structure of a volcano.*

6. Why does the diagram show the magma and lava as red?

*The color red is used to indicate the high temperatures of the magma and lava.*

7. Look at how the term *molten* is used in the captions for bomb and lava flow in the diagram. What do you think *molten* means?

*Molten means "melted."*