

5-5 What are volcanoes?

INVESTIGATE Modeling a Volcano



HANDS-ON ACTIVITY

1. Take a handful of sand and make a fist over an aluminum pie plate. Dribble a little of it out at a time onto the plate. Do not touch the sand or move the plate.
2. Take another handful of sand and make a fist. Again, dribble the sand out onto the pie plate over the first pile. Keep taking handfuls of sand until you have a good-sized pile in the plate.
3. Note the shape the sand takes as it builds up on the plate.

THINK ABOUT IT: What does the sand represent? How is the shape like that of a typical volcano?



STEP 2

Objective

Describe volcanism.

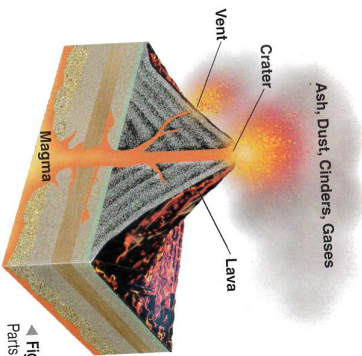
Key Terms

- volcanism** (VAHL-kuh-nih-z-uhm): movement of magma inside Earth
- lava:** magma that reaches Earth's surface
- vent:** volcano opening from which lava flows
- volcano** (VAHL-KAY-noh): vent and the volcanic material around it
- crater:** pit at the top of a volcanic cone
- caldera** (kal-DEE-uh): large hole that forms when the roof of a magma dome collapses

Volcanism Any movement of magma inside Earth is called **volcanism**. Sometimes magma flows between rock layers of the crust and hardens. This forms a sill. Magma that cuts across rock layers and hardens forms a dike.

Sometimes magma breaks through the crust and flows onto Earth's surface. Then, it is called **lava**. The opening that lava flows through is called a **vent**. Dust, ash, and rock particles are often thrown out of the vent.

The word **volcano** really refers to the volcanic mountain, or cone, that forms from the materials that collected around the vent. It also refers to the vent itself.



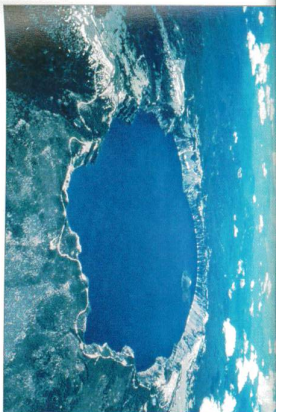
▲ Figure 5-16
Parts of a volcano

1 DEFINE: What is lava?

Craters and Calderas At the top of a volcanic cone there may be a deep pit. This pit, called a **crater**, forms as material is blown out of the volcano's vent.

The top of a volcano may also explode, emptying the vent. This can turn the mountain into a huge, hollow shell. The walls of the crater may fall back into the vent. This partly filled gaping hole is called a **caldera**.

Some calderas fill with water from rain or snow. They form large lakes such as Crater Lake in Oregon. Crater Lake is 9.6 km long and 8 km wide. It is about 600 m deep.



▲ Figure 5-17 Crater Lake in Oregon is a caldera that filled with water.

2 CONTRAST: What is the difference between a crater and a caldera?

The Story of Parícutin In 1943, a farmer in Mexico saw a mountain form! First, the ground started shaking. A few weeks later, cracks, called fissures, appeared and widened. Hot gases came out of the fissures. Soon, lava began to seep out. After several months, a volcanic cone about 400 m high and 5 km wide had formed. The volcano was called Parícutin (pah-ree-koo-TEEN).

3 DESCRIBE: What signs were there that a volcano was forming at Parícutin?

Science and Technology

PREDICTING VOLCANIC ERUPTIONS

On May 18, 1980, Mount St. Helens in Washington State blew its top! The force of the blast destroyed much of the area around the mountain. Scientists knew years before that the volcano in the Cascade Mountains might erupt. However, they could not predict when.

New technologies have now made such predictions possible. Seismometers alert scientists when a volcano rumbles. Tiltmeters and geodimeters measure the tiniest swelling of a volcano, caused by movement of magma. Correlation spectrometers (COSPECs) measure gases such as sulfur and carbon dioxide. These gases are released in increasing amounts before an eruption.

Earth-observation satellites also help in predicting volcanic eruptions. Instruments on the satellites monitor Earth's surface temperature. This data can alert scientists to any volcanic changes that may signal trouble.

Thinking Critically Why is it important to predict volcanic eruptions?



▲ Figure 5-18 Mount St. Helens erupted in 1980.

- EXPLAINING CONCEPTS**
- Explain the differences in each word pair.
1. magma, lava
 2. caldera, crater
 3. vent, volcano
 4. mountain, volcanic cone
- THINKING CRITICALLY**
5. **INFER:** How are volcanoes like windows to the inside of Earth?

Web InfoSearch

Krakatoa Krakatoa (krah-kah-TOH-uh) is a volcano found near Indonesia. In August 1883, it erupted in a huge volcanic explosion that was heard in Australia, thousands of kilometers away.

SEARCH: Use the Internet to find out more about Krakatoa. How did it change the surrounding islands? Start your search at www.conceptspandchallenges.com. Some key search words are **Krakatoa**, **Krakatoa island**, and **Krakatoa Volcano**.