



Genre • Expository Text



Essential Question

How does the Earth change?

Read about how volcanoes change the Earth.



Go Digital!



Volcanoes

by Sandra Markle

Source: Shutterstock.com; iStockphoto.com

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One ordinary April day, something special happened. Hot liquid rock **exploded** from a volcano on Iceland. Once in the air, the bits of liquid quickly cooled and turned into ash. Then the volcano kept on erupting. Soon the air was full of ash.

Nearby, a dairy farmer herded his cows into the family's big barn. His wife said, "It was scary. I could hear the volcano rumbling like distant thunder. Soon, even though it was day, it was dark. And there were flakes falling from the sky. These were not white snowflakes, though. The flakes were black. When they touched my skin, they felt like sand."

This volcano's eruption had a big impact on the **local** people and others around the world. So why did the volcano erupt?

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Compared to the whole **Earth**, the Earth's crust is thin. The crust is broken into pieces like a cracked hardboiled egg. Each piece is called a plate. Deep inside, the Earth's core is so hot the rock around it melts.

The melted rock is called magma. As magma heats up it rises. Near the crust, the magma cools off. Then it sinks. Scientists think these magma currents make the plates move.



Below the ground and water, the Earth's crust is broken into plates. Plates are on the move, but we can't feel it. The fastest plate moves just 6 inches each year.

See Magma for Yourself!

You can model what's happening to the magma under the Earth's plates.

- With an adult's help, boil water in a pot.
- Drop a handful of raisins into the water.
- Watch. You'll see the raisins sink and rise. The water heats up at the bottom of the pan and rises. It cools at the surface and sinks. The raisins ride the currents. The currents move like magma under the Earth's crust.



If the plates move far enough apart, magma reaches the Earth's surface. Magma may explode into the air. It may flow onto the Earth's surface. When magma flows out it is called lava.

Lava flows out at different places around the world. If a lot of lava flows out at one spot on the Earth's surface, it forms a mountain—a volcano. Many are along the edge of the Pacific Ocean. No wonder this is said to be a ring of fire!

Volcanoes Around the World





Lava may have different **properties**, like being runny or stiff. If the lava is runny, it spreads out on the Earth's surface before it cools and becomes **solid**. This kind of lava forms a flat, shield-shaped volcano. Mauna Loa in Hawaii is a shield-shaped volcano. It started when lava poured out of an opening on the ocean floor. Then lava built up in layers. Once the mountaintop was above water, it formed an **island**. Mauna Loa continues to be very **active**. It has erupted 39 times since 1832.

Mauna Loa in Hawaii is the Earth's largest volcano.



This is the volcano that erupted in Iceland.

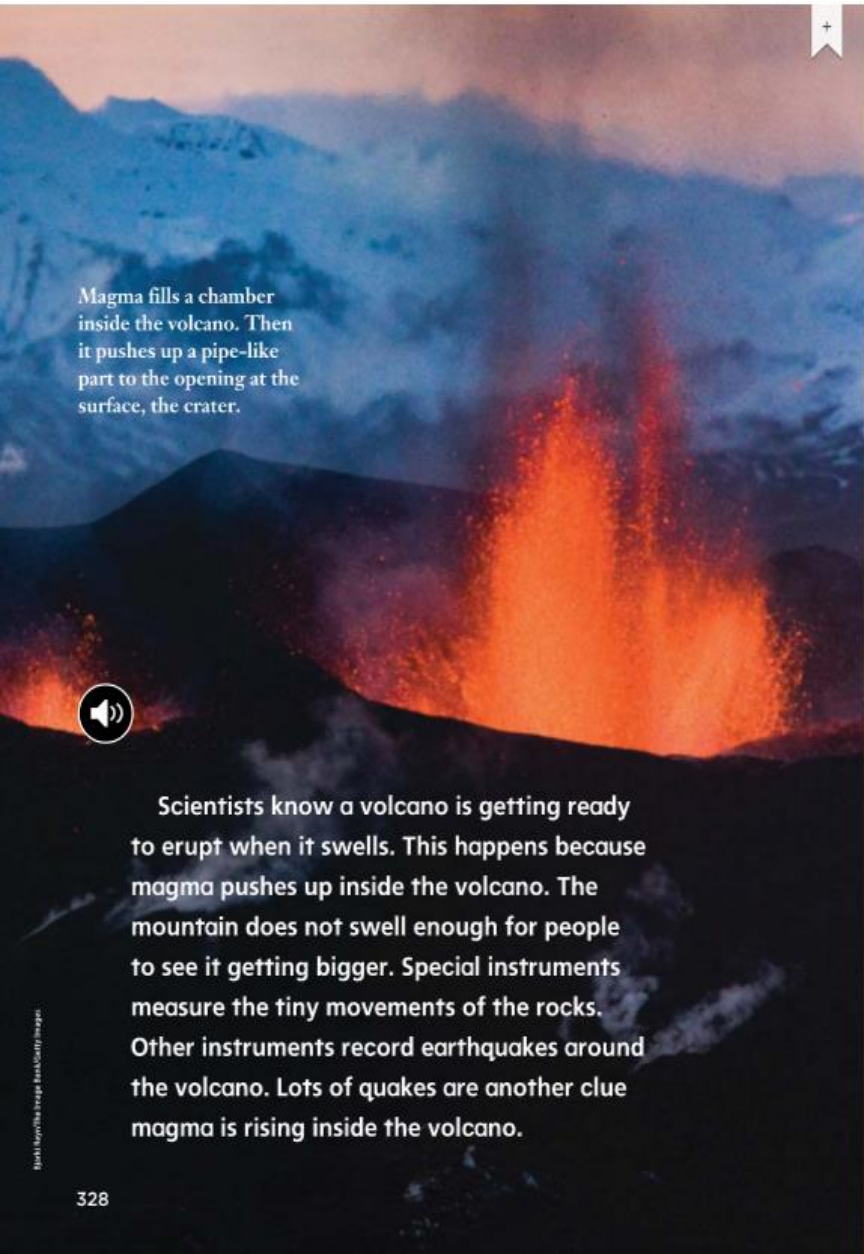


If the lava is stiff, it piles up on the Earth's surface and forms a cone-shaped volcano with **steep** sides. The volcano that erupted on Iceland is a cone-shaped volcano. It is not very active. Its last eruption was almost 200 years ago. While it was inactive, a lot of ice built up on the mountain. Then, in 2009, scientists discovered the volcano was becoming active again.



STOP AND CHECK

Reread What two shapes are volcanoes? Reread the text to find the answer.



Magma fills a chamber inside the volcano. Then it pushes up a pipe-like part to the opening at the surface, the crater.



Scientists know a volcano is getting ready to erupt when it swells. This happens because magma pushes up inside the volcano. The mountain does not swell enough for people to see it getting bigger. Special instruments measure the tiny movements of the rocks. Other instruments record earthquakes around the volcano. Lots of quakes are another clue magma is rising inside the volcano.

Photo: SuperStock Images / Back/Getty Images



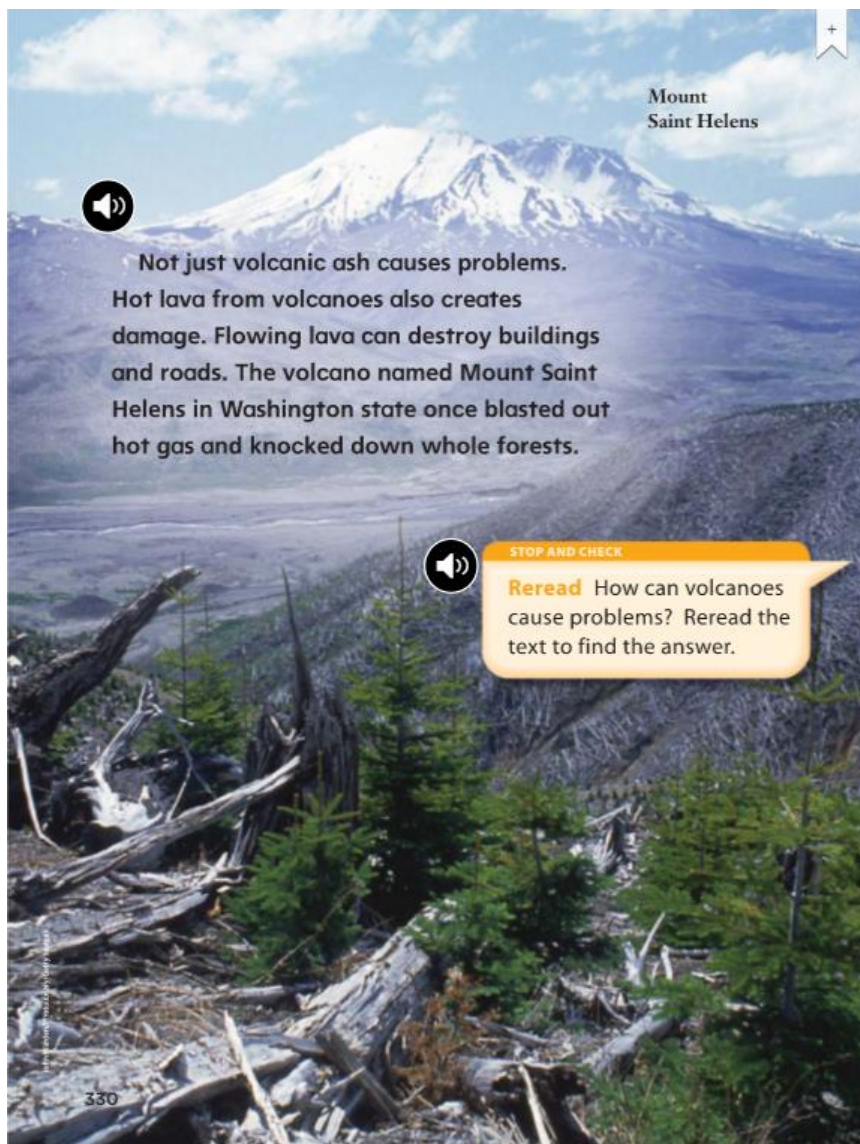
The Iceland volcano erupted lava under its ice covering. The ice melted and turned to steam. If you've ever watched steam lift the lid on a boiling pot, you know what happened next. Steam and gas escaping from the volcano blew magma high into the air. The magma exploded into millions of tiny droplets. These cooled and became ash. Winds carried the volcanic ash across Europe.

The volcanic ash could damage jet engine parts. So it was too dangerous to fly. Airplanes around the world were grounded. Some people were stranded.

After the eruption in Iceland, ash covered the ground.



Photo: Nature / Alamy



Mount
Saint Helens

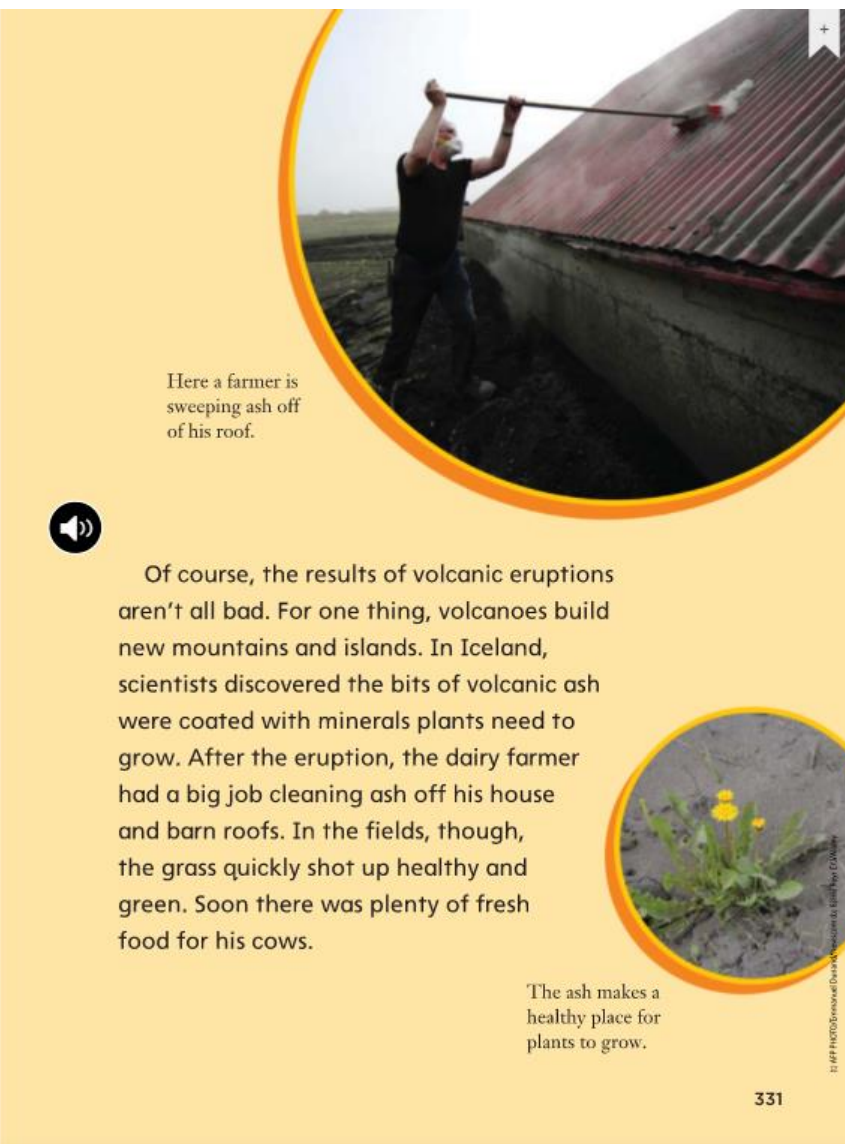


Not just volcanic ash causes problems. Hot lava from volcanoes also creates damage. Flowing lava can destroy buildings and roads. The volcano named Mount Saint Helens in Washington state once blasted out hot gas and knocked down whole forests.



STOP AND CHECK

Reread How can volcanoes cause problems? Reread the text to find the answer.



Here a farmer is sweeping ash off of his roof.



Of course, the results of volcanic eruptions aren't all bad. For one thing, volcanoes build new mountains and islands. In Iceland, scientists discovered the bits of volcanic ash were coated with minerals plants need to grow. After the eruption, the dairy farmer had a big job cleaning ash off his house and barn roofs. In the fields, though, the grass quickly shot up healthy and green. Soon there was plenty of fresh food for his cows.



The ash makes a healthy place for plants to grow.

About the Author



Sandra Markle writes books, creates TV shows, and develops online programs on all kinds of science topics. She has had many exciting adventures doing research for them. Sandra watched active volcanoes in Hawaii, New Zealand and Antarctica. "I never miss a chance to investigate volcanoes," says Sandra. "They are dramatic proof that the Earth is an ever-changing place!"

Author's Purpose

Sandra begins this selection by telling about the dairy farmer and his wife. How does their story help you understand what happens when a volcano erupts?

Image Credits: Background Image: iStockphoto.com/Steve Delaney; Photo of Sandra Markle: iStockphoto.com/Steve Delaney

Respond to Reading

Summarize

Use important details to summarize what happens in the selection. Information from your Cause and Effect chart may help you.



Text Evidence

1. How do you know *Volcanoes* is expository text? **GENRE**
2. What causes the raisins to rise and sink on page 324? **CAUSE AND EFFECT**
3. Use sentence clues to figure out the meaning of the word *swell* on page 328. **SENTENCE CLUES**
4. Write about how lava causes the creation of an island. **WRITE ABOUT READING**



Make Connections

How do volcanoes change the Earth?

ESSENTIAL QUESTION

What did you learn about volcanoes from the photos in this selection? **TEXT TO WORLD**