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Volcanoes and the Power of Three

By Brenda B. Covert

Mention volcanoes, and most people picture a tall mountain spewing out red-hot lava like fireworks on Independence Day.



However, that is just one of the three types of volcanoes that exist. Interestingly enough, lava is just one of the three kinds of material emitted from an erupting volcano. Finally, volcanoes endanger three different entities in their active state. When it comes to studying volcanoes, remember the power of three.

The most common, well-known type of volcano is the composite volcano. It is a medium-sized mountain with a steep peak and sloping sides made up of a combination of layers of lava and cinders. It may have one or more vents through which lava escapes from the magma chambers within the Earth's mantle. Each eruption adds another layer of material to the volcano that is growing around the vent. Mount Vesuvius in Italy is a composite volcano.

The shield volcano is a large, gently sloping mountain formed by flowing lava that cooled and hardened. Hawaii boasts many shield volcanoes.

A cinder cone volcano is a small volcano, normally less than 1,000 feet tall. They are made up of lava chunks called cinders.

Did you know that most volcanoes are formed beneath the oceans? In recent decades scientists have been mapping out the location of volcanoes on the ocean floor. Even so, of all the land volcanoes, an average of 50 to 60 are active in any given year, with half of them being newly formed. Scientists have watched and recorded the growth of some new volcanoes!

Active volcanoes erupt with one or more of three different kinds of material. The most well known is lava, originating from magma - melted rock - in the Earth's mantle. The other two materials are tephra (rock fragments) and gases. Which type of material erupts from a

volcano depends on what the magma inside the volcano consists of.

An erupting volcano may endanger three entities: people, property, and agriculture. The danger of fast-moving, hot lava rivers is obvious, but there is also danger from explosively erupted materials such as tephra, cinder chunks, and falling ash. It will destroy everything in its path. The heat from the lava and other volcanic material can kill people, animals, and plants even from a distance. Clouds of ash and gases can suffocate humans and animals alike. Winds can carry ash clouds away from the volcano and toward populated areas, putting many lives in danger. That is what happened in the most famous of eruptions, the eruption of Mount Vesuvius in 79 A.D. that buried the town of Pompeii.

A man known as Pliny the Younger saw the eruption from 18 miles away. He left a written record of the destruction he saw. Everything he described has since been verified by archaeological excavations. Volcanologists - scientists who study volcanoes - estimate that there were times during the eruption when the column of ash was 20 miles tall! About one cubic mile of ash was emitted in less than 24 hours.

The 10 feet of tephra that fell on Pompeii buried all but the roofs of some buildings. Two thousand people died, some by suffocation, others crushed by falling buildings. After the town was buried in ash and volcanic rock, heavy rains came, and the ash became like cement, sealing everything in like a tomb. Much of Pompeii has been excavated, revealing not only how people lived during that time during the first century, but also how they died during the eruption. Archaeologists discovered holes in the rock where bodies had once been. The remains of adults, children, and animals had disintegrated, leaving behind almost perfect molds. Wet plaster was poured into the empty spaces; when the rock was chipped away, the plaster casts showed how death came. One cast was of a mother trying to protect her child from the falling ash. Another showed a dog who had been writhing in agony; it was wearing a bronze collar. People were revealed to have been shielding their faces, and some even clutched bags of jewels in their hands. Might they have lived had they fled the town without trying to save their valuables?

Italy and the year 79 A.D. may seem extremely far away. Perhaps more interesting to American students would be the eruption of Mount St. Helens in the state of Washington on May 18, 1980. That eruption took more than 1,000 feet off the top of the volcano! There had been no activity within the volcano since the mid-1800's. Early in 1980, however, a change occurred. The north face of the mountain began to bulge. The eruption on May 18 followed an earthquake that

Name _____



caused a landslide down that side of Mount St. Helens. The bulge, which had been magma looking for a way out, was suddenly set free. The eruption spewed a cloud of ash and gases up to 12 miles high. Close to 150 square miles of forest was knocked down or left dead but standing. A huge cloud of dark gray ash turned day into night. Fifty-seven people lost their lives. Though the eruption lasted nine hours, Mount St. Helens and the area around it were transformed from beauty to desolation in the blink of an eye.

Today you would not recognize Mount St. Helens as a barren land. It is again green with vegetation and teeming with wildlife. The United States Geological Survey scientists continue to monitor the volcano for signs of activity, but for now it is dormant and open to visitors.

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Questions

- _____ 1. Most volcanoes are formed on land.
- A. False
 - B. True
- _____ 2. Which of the following statements is true?
- A. A composite volcano is a small volcano made of cinders.
 - B. A composite volcano is a medium-sized volcano made up of layers of cinders and lava.
 - C. A composite volcano is a large mountain made up of layers of lava.
- _____ 3. Hawaii is an example of which type of volcano?
- A. explosive volcano
 - B. shield volcano
 - C. composite volcano
 - D. cinder cone volcano
- _____ 4. What are the three types of material that a volcano may emit?
- A. lava, tephra, gases
 - B. animal, vegetable, mineral
 - C. ash, cinders, gases
 - D. lava, magma, ash
- _____ 5. Which of the following statements is not true?
- A. Volcanic eruptions can sometimes bury towns in ash.
 - B. Volcanic eruptions can cause layers of new material to build up the volcano.
 - C. Volcanic eruptions may endanger people, property, and agriculture.
 - D. Volcanic eruptions are a danger only to creatures in the immediate vicinity.
- _____ 6. The eruption of Mount Vesuvius buried what town in 79 A.D.?
- A. Pompeii
 - B. St. Helens
 - C. Rome
 - D. Washington
- _____ 7. How did people die in the aftermath of the famous Mount Vesuvius eruption?
- A. Smothered by ash.
 - B. Burned by lava.
 - C. Crushed by falling tephra.
 - D. All of the above
- _____ 8. Mount St. Helens erupted violently in 1980. On what continent is this volcano found?
- A. Australia
 - B. South America
 - C. Europe
 - D. North America