



All About Volcanoes Reading

What is a Volcano?

Volcanoes are holes or vents in the Earth's crust, created when hot magma from the mantle is forced upward through the crust. The Earth's crust, called the lithosphere, is not one solid chunk of rock. Instead it consists of tectonic plates, the size of continents or larger, which overlap or strike against each other. Just below the crust is a thick layer of rock called the asthenosphere, which is so hot that in places the rock is melted. This hot, liquid rock is called magma. Most volcanoes on land occur in a subduction zone, the place where two lithospheric plates come together and one rides over the other. Some volcanoes, like the ones in Hawaii, form from a hot spot, an area in the middle of a lithospheric plate where magma rises from the mantle and erupts at the Earth's surface.

How does a volcano erupt?

Magma collects in a chamber beneath the crust, pressure builds up and forces it up through cracks. Hot gases trapped in the magma try to escape and the surface of the Earth begins to bulge. Finally, when the pressure can no longer be contained, gases and solid material, called tephra, are released in a volcanic eruption. Magma is lighter than the rock around it, so it will rush up and out of the volcano with great force. Once the magma is above ground, it is known as lava. Lava can explode from the volcano's crater, or flow from the crater and the fissures. A volcano can erupt many times in its lifetime. The material released over many eruptions gradually builds up a cone shaped mountain.

There are different types of volcanic eruptions. Some are truly explosive! Volcanic explosions depend on how much gas is trapped in the magma. When there is a lot of gas trapped in the magma the eruptions are more explosive, and when there is less gas the eruptions are less explosive. Magma oozes out of the volcano in the form of lava. The lava expelled from an erupting volcano settles on the sides of the volcanic mountain and cools forming a hard crust. Depending on the viscosity, or fluidity, of the lava different types of volcanoes can be formed.

Types of Volcanoes

There are three major types of volcanoes. Cinder cone volcanoes are small volcanic mountains made up exclusively of fragmented lava that erupts explosively and is made up of cinders. The second major type of volcano, the stratovolcano, in contrast to the cinder cone can grow much larger. One famous example of a stratovolcano volcano is Mt. Fuji in Japan. The third type of volcano is the shield volcano. Shield volcanoes are gently sloping mound shaped volcanoes formed by weak eruptions with liquid lava that spreads out around the crater.

What happens in the aftermath of a volcanic eruption?

Often, a volcanic eruption creates a volcanic cone. Sometimes when an eruption occurs, it can substantially alter the shape of the cone, cause it to collapse into a caldera. Volcanoes are constantly changing the face of Earth. Even though they are sometimes deadly, volcanoes are an important part of the Earth's geology and they help humans to better understand the internal processes that shape our planet.



Glossary

- **Asthenosphere:** plastic like layer of the upper mantle on which the lithospheric plates float.
- **Crater:** The circular depression containing a volcanic vent.
- **Calderas:** large volcanic depressions formed by the collapse of the summit of a volcano into underlying chambers evacuated by very large explosive eruptions or the effusion of large volumes of lava flows.
- **Cinder cone:** A steep-sided volcano formed by the explosive eruption of cinders that form around a vent. Cinders are lava fragments about 1 centimeter (about ½ inch) in diameter.
- **Hot spot:** An area in the middle of a lithospheric plate where magma rises from the mantle and erupts at the Earth's surface. Volcanoes sometimes occur above a hot spot.
- **Lava:** The term used for magma once it has erupted onto the Earth's surface.
- **Lithosphere:** The Earth's hard, outermost shell. It comprises the crust and the upper part of the mantle and is divided into a mosaic of 16 major slabs, or plates. A series of rigid slabs (16 major ones at present) that make up the Earth's outer shell. These plates float on top of a softer, more plastic layer in the Earth's mantle. (Also called tectonic plates.)
- **Magma:** Molten rock containing liquids, crystals, and dissolved gases that forms within the upper part of the Earth's mantle and crust. When erupted onto the Earth's surface, it is called lava.
- **Mantle:** A zone in the Earth's interior between the crust and the core that is 2,900 kilometers (1,740 miles) thick. (The lithosphere is composed of the topmost 65-70 kilometers (39-42 miles) of the mantle and the crust.)
- **Shield volcano:** A volcano that resembles an inverted warrior's shield. It has long gentle slopes produced by multiple eruptions of fluid lava flows.
- **Stratovolcano:** A steep-sided volcano built by lava flows and tephra deposits. (Also called composite volcano.)
- **Subduction zone:** The place where two lithospheric plates come together, one riding over the other. Most volcanoes on land occur parallel to and inland from the boundary between the two plates.
- **Tephra:** Solid material of all sizes explosively ejected from a volcano into the atmosphere.
- **Vent:** The opening at the Earth's surface through which volcanic materials (lava, tephra, and gases) erupt. Vents can be at a volcano's summit or on its slopes; they can be circular (craters) or linear (fissures).
- **Viscosity:** Measure of the fluidity of a substance. Taffy and molasses are very viscous; water has low viscosity.
- **Volcano:** A vent (opening) in the Earth's surface through which magma erupts; it is also the landform that is constructed by the eruptive material.



All About Volcanoes Comprehension Questions

1. Look at where you and your classmates plotted the volcanoes on the map. You should notice that many of the volcanoes are located along the crustal plate boundaries? Why do you think this is the case?

2. The “Ring of Fire” is where the North American and Pacific plates meet and it is an important area where these plate shift. Explain what can happen at the plates’ boundaries and why it is the site of frequent volcanoes?

3. Using the terms mantle, crust, plates, plasticity, magma and lava, explain the processes that contribute to increased volcanic activity along the Ring of Fire?
