

Forces that Shape the Earth

Section 3: Volcanoes

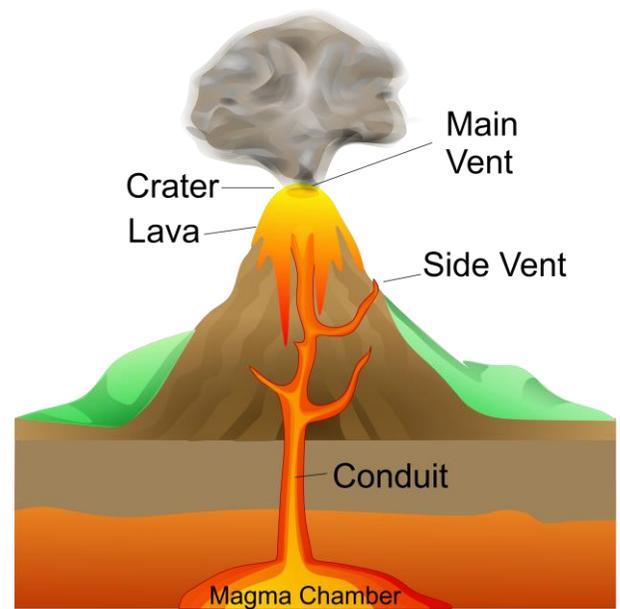
A **volcano** is a weak spot in Earth's crust where molten material, or magma, comes to the surface. **Magma** is the molten mixture of rock-forming substances, gases, and water from the mantle. When magma reaches the Earth's surface, it is called **lava**. Once lava cools, it forms solid rock.



At plate boundaries, the crust often fractures due to the pulling and pushing of plates. As a result, these fractures allow magma to reach the surface, forming volcanic belts along the boundaries of the Earth's plates. One major belt is **the Ring of Fire**, which is formed by volcanoes that rim the Pacific Ocean.

An **island arc** is a string of islands created by volcanoes near boundaries where two oceanic plates collide and one sinks beneath the other. A **hot spot** is an area where material from deep within the mantle rises then melts, forming magma. A volcano forms above a hot spot when magma erupts through the crust and reaches the surface. The Hawaiian Islands were formed as the Pacific plate drifted over a hot spot.

Inside a volcano is a system of passageways through which magma moves. This system includes a magma chamber, pipe, vent, lava flow, and a crater. When a volcano erupts, magma is pushed from the magma chamber through the pipe until it flows out of the vent. First, **magma** collects in a pocket called a **magma chamber**. It then moves up through a **pipe**, which connects the magma chamber to Earth's surface. Rock and gas leave the volcano through an opening called a **vent**. Usually there is one central vent at the top of a volcano; however, many volcanoes also have vents on the sides. A **lava flow** is the area that is covered by lava as it flows out of a vent. A **crater** is a bowl-shaped area that forms at the top of the volcano around the vent.



Forces that Shape the Earth

Section 3: Volcanoes Continued

Geologists classify volcanic eruptions as either quiet or explosive. A **quiet eruption** occurs when gases bubble gently and lava oozes quietly due to it having a low silica content. This type of eruption can produce **pahoehoe** (fast-moving, hot lava) and **aa** (lava that is cooler and slower moving). An **explosive eruption** has magma with high silica content. It is too sticky to flow very far and has high viscosity. Because of the high viscosity, trapped gases build up pressure until they explode, causing **pyroclastic flow**, or an eruption that hurls out ash, cinders, and bombs.

Scientists also categorize volcanoes based on the likeliness that they will ever erupt again. An **active volcano** is currently erupting or shows signs of potentially erupting again soon. A **dormant volcano** is one that is not active but may become active. An **extinct volcano** is unlikely to erupt again.

Review:

1. What is the difference between magma and lava?
2. Where is the Ring of Fire located?
3. Explain the difference between a quiet eruption and an explosive eruption.