

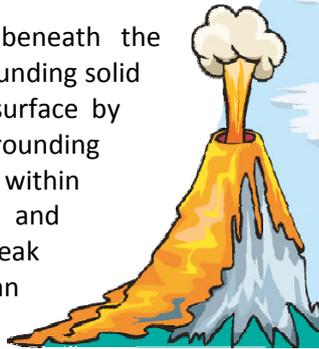


# Volcanoes

Volcanoes are openings, or vents where lava, small rocks (tephra), and steam erupt on to the Earth's surface. Many mountains form by folding, faulting, uplift, and erosion of the Earth's crust, however volcanic terrain is created by the slow build up of erupted lava.

Molten rock below the surface of the Earth that rises in volcanic vents is known as **magma**, but after it erupts from a volcano it is called **lava**. Magma is made of molten rock, crystals, and dissolved gas—imagine an unopened bottle of soda with grains of sand inside. After cooling, liquid magma may form crystals of various minerals until it becomes completely solid and forms an igneous or magmatic rock.

Originating many tens of miles beneath the ground, magma is lighter than surrounding solid rock. It is driven towards Earth's surface by buoyancy, it is lighter than the surrounding rock, and by pressure from gas within it. Magma forces its way upward and may ultimately break through weak areas in the Earth's crust. If so, an eruption begins.



## The 'Ring of Fire'

There are about 1,500 potentially active volcanoes worldwide, aside from the continuous belt of volcanoes on the ocean floor. About 500 of these have erupted in historical time. Many of these are located along the Pacific Rim—the Pacific Rim refers to the geographic area surrounding the Pacific Ocean in what is known as the 'Ring of Fire.' In the United States, volcanoes in the Cascade Range and Alaska (Aleutian volcanic chain) are part of the Ring, while Hawaiian volcanoes form over a 'hot spot' near the centre of the Ring.

## Different ways magma erupts

Magma can be erupted in a variety of ways. Sometimes molten rock simply pours from the vent as fluid lava flows. It can also shoot violently into the air as dense clouds of rock shards (tephra) and gas. Larger fragments fall back around the vent, and clouds of tephra may move down the slope of the volcano under the force of gravity. Ash, tiny pieces of tephra the thickness of a strand of hair, may be carried by the wind only to fall to the ground many miles away. The smallest ash particles may be erupted miles into the sky and carried many times around the world by winds high in the atmosphere before they fall to the ground.



Image courtesy of USGS

Geologist collecting a fresh sample of a slow-moving lava flow at Kīlauea volcano in Hawaii.

Information and photograph courtesy of the US Geological Survey