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Unsure of the meaning of a

Encyclopædia Britannica

volcano

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Mount St. Helens volcano, viewed from the south during its eruption on May 18, 1980.
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Volcanic activity at Kilauea in Hawaii.
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vent in the crust of the Earth or other planet or satellite, from which issue eruptions of molten rock, hot rock fragments, and hot gases. A **volcanic eruption** is an awesome display of the Earth's power. Yet while eruptions are spectacular to watch, they can cause disastrous loss of life and property, especially in densely populated regions of the world. Sometimes beginning with an accumulation of gas-rich **magma** (molten underground rock) in reservoirs near the surface of the Earth, they can be preceded by emissions of steam and gas from small vents in the ground and by a swarm of small earthquakes. In some cases, magma rises in conduits to the surface as a thin and fluid lava, either flowing out continuously or shooting straight up in glowing fountains or curtains. In other cases, entrapped gases tear the magma into shreds and hurl viscous clots of lava into the air. In more violent eruptions, the magma conduit is cored out by an explosive blast, and **solid fragments are ejected** in a great cloud of ash-laden gas that rises tens of thousands of metres into the air. One feared phenomenon accompanying some explosive eruptions is the *nuée ardente*, or **pyroclastic flow**, a fluidized mixture of hot gas and incandescent particles that sweeps down a volcano's flanks, incinerating everything in its path. Great destruction also can result when ash collects on a high snowfield or glacier, melting large quantities of ice into a flood that can rush down a volcano's slopes as an unstoppable mudflow.

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Lava fountains at Mauna Loa volcano, Hawaii. The lava fountains form a

Strictly speaking, the term volcano means the vent from which magma and other substances erupt to the surface, but it can also refer to the landform created by the accumulation of solidified **lava** and volcanic debris near the vent. One can say, for example, that large lava flows erupt from **Mauna Loa** volcano in Hawaii, referring here to the vent; but one can also say that Mauna Loa is a gently sloping volcano of great size, the reference in

word? Double-click it to look it up in *Merriam-Webster's Dictionary*.

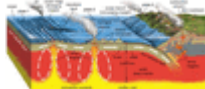
curtain of fire
about ...
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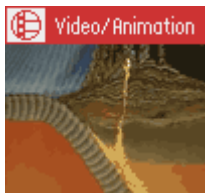
Mount Fuji,
Japan.
*Earl and Nazima
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Volcanoes and
thermal fields
that have been
active during the
past 10,000 years.

this case being to the landform. Volcanic [landforms](#) have evolved over time as a result of repeated volcanic activity. Mauna Loa typifies a shield volcano, which is a huge, gently sloping landform built up of many eruptions of fluid lava. [Mount Fuji](#) in Japan is an entirely different formation. With its striking steep slopes built up of layers of ash and lava, Mount Fuji is a classic stratovolcano. Iceland provides fine examples of volcanic plateaus, while the seafloor around Iceland provides excellent examples of submarine volcanic structures.

Volcanoes figure prominently in the mythology of many peoples who have learned to live with eruptions, but science was late in recognizing the important role of [volcanism](#) in the evolution of the [Earth](#). As late as 1768, the first edition of *Encyclopædia Britannica* gave voice to a common misconception by defining volcanoes as “burning mountains, which probably are made up of sulphur and some other matter proper to ferment with it, and take fire.” Today geologists agree that volcanism is a profound process resulting from the thermal evolution of planetary bodies. Heat does not easily escape from large bodies such as the Earth by the processes of conduction or radiation. Instead, heat is transferred from the Earth's interior largely by convection—that is, the partial melting of the Earth's crust and mantle and the buoyant rise of magma to the surface. Volcanoes are the surface sign of this thermal

process. Their roots reach deep inside the Earth, and their fruits are hurled high into the atmosphere.

Volcanoes are closely associated with [plate tectonic](#) activity. Most volcanoes, such as those of Japan and Iceland, occur on the margins of the enormous solid rocky plates that make up the Earth's surface. Other volcanoes, such as those of the Hawaiian Islands, occur in the middle of a plate, providing important evidence as to the direction and rate of plate motion.



Table

The study of volcanoes and their products is known as volcanology, but these phenomena are not the realm of any single scientific discipline. Rather, they are studied by many scientists from several specialties: [geophysicists](#) and [geochemists](#), who probe the deep roots of volcanoes and monitor signs of future eruptions; geologists, who decipher prehistoric volcanic activity and infer the likely nature of future eruptions; biologists, who learn how plants and animals colonize recently erupted volcanic rocks; and meteorologists, who determine the effects of volcanic dust and gases on the atmosphere, weather, and climate.

Clearly the destructive potential of volcanoes is tremendous. But the risk to people living nearby can be reduced significantly by assessing volcanic hazards, monitoring volcanic activity and forecasting eruptions, and instituting procedures for evacuating populations. In addition, volcanism affects humankind in beneficial ways. Volcanism provides beautiful scenery, fertile soils, valuable mineral deposits, and geothermal energy. Over geologic time, volcanoes recycle the Earth's hydrosphere and atmosphere.



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Introduction

Lava, gas, and other hazards



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