



KAMARAJ IAS ACADEMY
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Volcanic eruption

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Why in News: On November 27, 2022, Mauna Loa, the world's largest active volcano erupted on the island of Hawaii. For days, fountains of lava, boiling at more than 2,000 degrees Fahrenheit (1,100 degrees Celsius), spewed upward and flowed down the mountain's sides.

About Volcano

The center of the Earth is called the core; the next layer up is the mantle; the outermost layer is the crust.

Over time, magma — which is melted rock mixed with gas and mineral crystals — accumulates in an underground chamber beneath the volcano. The magma at Mauna Loa forms when a hot mantle plume — think of a conveyor of heat — partly melts rock in the mantle.

The volcano is essentially an opening that lets magma out onto the surface of the Earth. Once released from the volcano, the magma is called lava.

Most of the world's volcanoes are found around the edges of tectonic plates, both on land and in the oceans.

Causes of Volcanic eruption

On land, volcanoes form when one tectonic plate moves under another. Usually a thin, heavy oceanic plate subducts, or moves under, a thicker continental plate. When this happens, the ocean plate sinks into the mantle.

Water trapped in the rocks in this plate gets squeezed out. This causes some of the rocks to melt. The melted rock, or magma, is lighter than the surrounding rock and rises up. This magma collects in magma chambers, but it is still miles below the surface.

When enough magma builds up in the magma chamber, it forces its way up to the surface and erupts, often causing volcanic eruptions.

In the ocean, volcanoes erupt along cracks that are opened in the ocean floor by the spreading of two plates called mid-ocean ridge

Magma from Earth's upper mantle rises up to fill these cracks. As the lava cools, it forms new crust on the edges of the cracks. These mid-ocean ridges are actually long chains of underwater volcanoes that circle the planet like the seams on a baseball.

About 80 to 90 percent of all volcanic eruptions occur where the plates spread apart

Types of Volcanoes

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1. SHIELD VOLCANOES

Shield volcanoes are built up slowly by the accretion of thousands of highly fluid lava flows called basalt lava that spread widely over great distances, and then cool as thin, gently sloping sheets. Their name comes from the fact that they look like a shield when viewed from above.

The tallest volcano on Earth, Hawaii's **Mauna Kea** with an elevation of 4,207 meters (13,800 ft) above sea level, is a shield volcano. Its top is over 10,203 meters (33,470 ft) above the deep ocean floor, higher than Mount Everest.

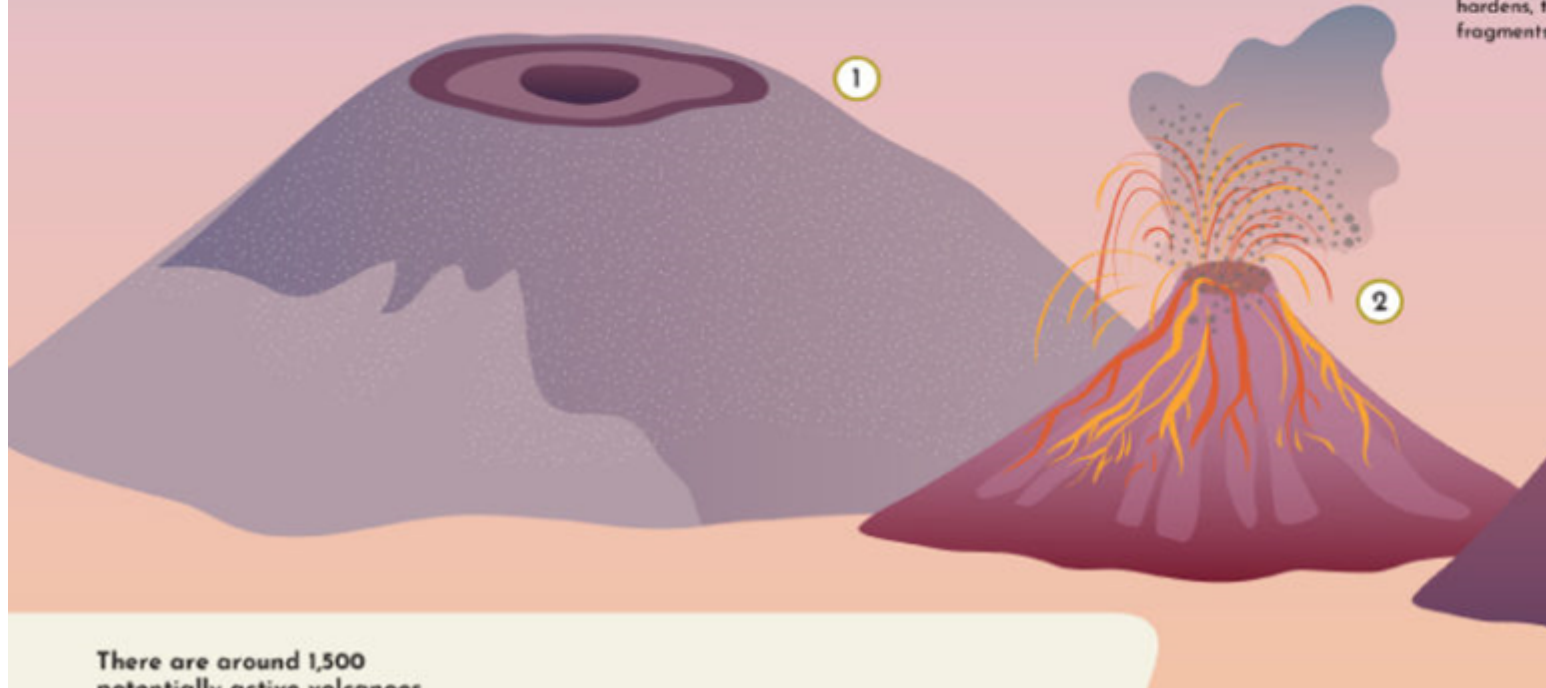
2. STRATOVOLCANOES

Stratovolcanoes, or composite volcanoes, alternate explosive lava eruption with emissions of pyroclastic products (ash and rocks). They have a relatively narrow base, fairly steep slopes and they easily reach great heights. Some of the most beautiful mountains in the world are composite volcanoes, including **Mount Fuji** in Japan, **Mount Cotopaxi** in Ecuador, **Mount Shasta** in California, and **Mount St. Helens** in Washington.

Stromboli, a stratovolcano located off the western coast of southern Italy, is called the "Lighthouse of the Mediterranean". It has been erupting almost continuously for over 2000 years.

3. VOLCANIC DOMES

Volcanic domes, or cinder cones, are bulbous mounds of lava that flow any distance from the vent and then expand and harden, fragmenting into small pieces.



Cinder Cones: Cinder cones are circular or oval cones made up of small fragments of lava from a single vent that have been blown up. Cinder cones result from eruptions of mostly small pieces of scoria and pyroclastics that build up around the vent. Most cinder cones erupt only once. Cinder cones may form as flank vents on larger volcanoes, or occur on their own.

Composite Volcano: Composite volcanoes are steep-sided volcanoes composed of many layers of volcanic rocks, usually made from high-viscosity lava, ash and rock debris. These types of volcanoes are tall conical mountains composed of lava flows and other ejecta in alternate layers, the strata that give rise to the name.

Shield Volcano: Shield volcanoes are volcanoes shaped like a bowl or shield in the middle with long gentle slopes made by basaltic lava flows. These are formed by the eruption of low-viscosity lava that can flow a great distance from a vent.

Effects of Volcanism

Volcanism can be a greatly damaging natural disaster. The damage is caused by advancing lava which engulfs whole cities. Habitats and landscapes are destroyed by lava flows.

Showers of cinders and bombs can cause damage to life.

Violent earthquakes associated with volcanic activity and mud flows of volcanic ash saturated by heavy rain can bury nearby places.

Sometimes ash can precipitate under the influence of rain and completely cover the surrounding regions.

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Health concerns after a volcanic eruption include infectious disease, respiratory illness, burns, injuries from falls, and vehicle accidents related to the slippery, hazy conditions caused by ash.

Further effects are the deterioration of water quality, fewer periods of rain, crop damages, and the destruction of vegetation.

In coastal areas, seismic sea waves called tsunamis are an additional danger which are generated by submarine earth faults where volcanism is active.