

## Volcanoes

A **volcano** is a weak spot in the crust where magma has come to the surface.

**Magma** is the molten mixture of rock-forming substances, gases, and water from the mantle.

Magma that has reached the surface is called **lava**.

After lava has cooled, it forms solid rock.

Lava released during volcanic activity builds up Earth's surface.

### I. Volcanoes and Plate Boundaries

A. There are about 600 active volcanoes on land.

Many more lie beneath the sea, where it is difficult for scientists to observe & map them.

B. Volcanoes occur in belts that extend across continents & oceans.

1. **Ring of Fire**: A major belt of volcanoes that rims the Pacific Ocean.

2. Volcanic belts form along the boundaries of Earth's plates.

### C. Diverging Boundaries

1. When huge pieces of crust diverge, the crust often fractures, allowing magma to reach the surface.

a. Volcanoes can form along **mid-ocean ridges**: long, underwater mountain ranges that have a rift valley down their center; lava pours out of cracks in the ocean floor, gradually building new mountains.

b. Volcanoes can also form along diverging plate boundaries on land.

### D. Converging Boundaries

1. Volcanoes can form where 2 oceanic plates collide or where an oceanic plate collides with a continental plate.

a. Through subduction, the upper denser plate sinks beneath a deep-ocean trench into the mantle.

b. Some of the rock above the subducting plate melts & forms magma; because the magma is less dense than the surrounding rock, it rises toward the surface; eventually, the magma breaks through the ocean floor, creating volcanoes.

c. **Island arc**: a string of islands formed by the volcanoes along a deep-ocean trench.

### E. Hot Spot Volcanoes

1. A **hot spot** is an area where magma from deep within the mantle melts through the crust above it.

2. A volcano forms above a hot spot when magma erupts through the crust & reaches the surface.

3. A hot spot in the ocean floor can gradually form a series of volcanic mountains.

a. The Hawaiian Islands formed one by one over millions of years as the Pacific plate drifted over a hot spot.

4. Hot spots can also form under continents.

a. Yellowstone National park in Wyoming marks a hot spot under the North American plate.