

# Plate Tectonics

## Section 4: Theory of Plate Tectonics

In 1965, J. Tuzo Wilson, a Canadian scientist, proposed that the lithosphere is broken into large sections called **plates**. He combined the ideas of continental drift and seafloor spreading into the **theory of plate tectonics**, a well-tested theory that explains the movement of Earth's plates and many changes on Earth's surface.

According to the theory of plate tectonics, Earth's outer layer, the **lithosphere**, is broken into large pieces called **plates**. These plates float on the softer, semi-molten **asthenosphere** beneath them. Deep inside the Earth, convection currents in the mantle slowly circulate due to intense heat. As hot material rises and cooler material sinks, these currents push and pull on the plates above. Over millions of years, this steady movement reshapes Earth's surface, forming volcanoes, mountain ranges, and deep-ocean trenches.

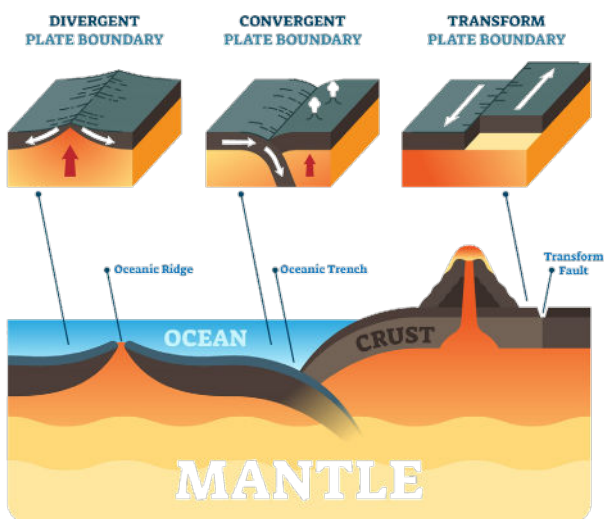


Figure 1

As the plates move, they interact at their edges, known as **plate boundaries**. These boundaries are places of intense geological activity. Stress builds up as plates grind, pull apart, or collide, sometimes causing breaks in Earth's crust called **faults**. Scientists classify plate boundaries into three main types based on how the plates move. At a **transform boundary**, plates slide past one another in opposite directions. This sideways motion often causes earthquakes as the plates suddenly slip along faults. At a **divergent boundary**, plates move away from each other.

In the ocean, this movement creates mid-ocean ridges where new crust forms. On land, divergence can split continents apart, forming long, narrow depressions called **rift valleys**. In contrast, at a **convergent boundary**, plates move toward one another. When two oceanic plates collide, or when an oceanic plate meets a continental plate, the denser plate sinks beneath the other in a process called **subduction**, creating deep-ocean trenches and often volcanic activity. However, when two continental plates collide, neither plate easily sinks. Instead, the crust crumples and folds, forming towering mountain ranges.

### Review:

1. Explain the theory of plate tectonics.
2. Explain the difference between a transform boundary and a divergent boundary.
3. What happens when two plates collide?