

Earth's Structure

Plate tectonics is the theory that the Earth's outer shell is divided into several plates that glide over the mantle which is the rocky, inner layer above the core. There are nine major plates which are the: North American, Pacific, Eurasian, African, Indo-Australian, Australian, Indian, South American, and Antarctic.

In order to understand plate tectonics, we need to first explore what the Earth is made up of. There are five layers of the Earth. These five layers are the inner core, outer core, lower and upper mantle and the crust.

The Inner Core

The inner core is solid and is made up of iron and nickel. It has a temperature of 5,000°C to 6,000°C. The inner core is basically a huge metal ball that measures 2,500 km wide. The metal at the inner core stays solid because of the pressure surrounding it.

The Outer Core

The outer core is a liquid and is made up of iron, nickel, sulphur, and oxygen. The outer core has temperatures that can reach between 4,000°C to 6,000°C. The outer core flows around the centre of the Earth and the movement of the metals creates the magnetic field of the Earth.

The Lower Mantle

The lower mantle is a solid and is made up of iron, oxygen, silicon, magnesium, and aluminum. The temperature of the lower mantle is 3,000°C. The lower mantle is found between 670 km and 2,890 km below the surface and is made from solid rock. This rock is hot enough to melt, but is a solid because of the pressure pushing down on it.

The Upper Mantle

The upper mantle is both in a liquid and solid state. It is made up of iron, oxygen, silicon, magnesium and aluminum. The temperature of the upper mantle can range between 1,400°C and 3,000°C. The upper mantle is up to 670 km below the Earth's surface. The lower part of the upper mantle is made from solid and melted rock while the rock in the upper region is harder because it is cooler.

Crust

The crust is solid in state and is made up of the oceanic crust and continental crust. The oceanic crust is made up of iron, oxygen, silicon, magnesium, and aluminum. The continental crust is made up of granite, sedimentary rocks and metamorphic rocks.

The continental crust is between 8km to 70km thick and the oceanic crust is about 8km thick.

How Plate Tectonics Work

The main force behind plate tectonics is convection in the mantle. **Convection** is the movement caused within a fluid by hotter and less dense material to rise. The convection drives plate tectonics through a combination of pushing and spreading apart. Mid-ocean ridges are gaps between tectonic plates. Hot magma wells up at the ridges and it forms new ocean crust and this shoves the plates apart.

At subduction zones, two tectonic plates meet and one slides beneath the other back into the mantle, the layer underneath the crust. The cold, sinking plate pulls the crust behind it downward. Many volcanoes are found along subduction zones.