

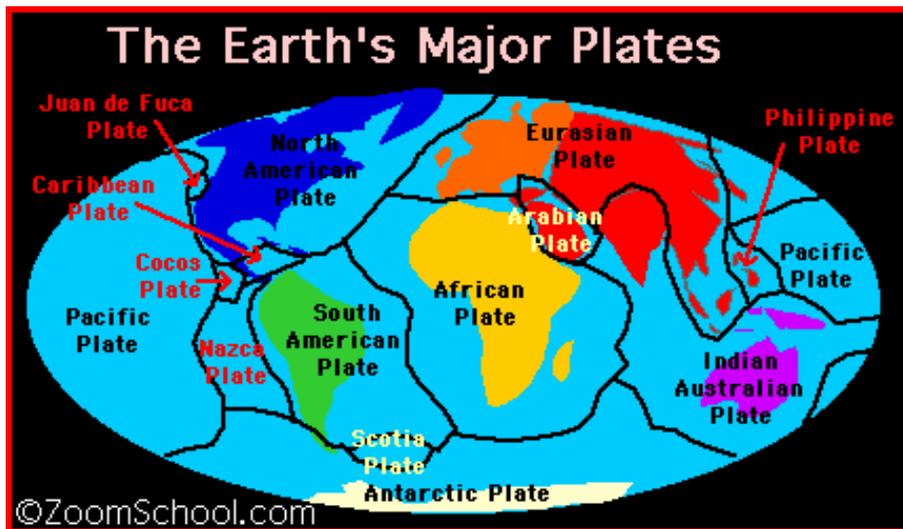
The Earth

The Earth's rocky outer crust solidified billions of years ago, soon after the Earth formed. This crust is not a solid shell; it is broken up into huge, thick plates that drift atop the soft, underlying mantle.

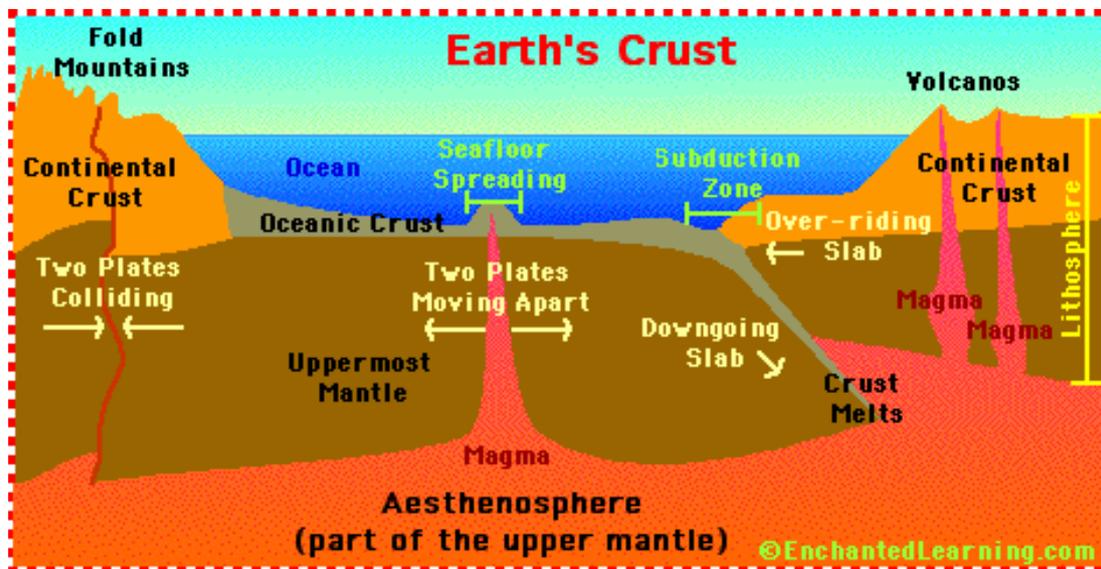
The plates are made of rock and drift all over the globe; they move both horizontally (sideways) and vertically (up and down). Over long periods of time, the plates also change in size as their margins are added to, crushed together, or pushed back into the Earth's mantle. These plates are from 50 to 250 miles (80 to 400 km) thick.

The map of the Earth is always changing; not only are the underlying plates moving, but the plates change in size. Also, the sea level changes over time (as the temperature on Earth varies and the poles melt or freeze to varied extents), covering or exposing different amounts of crust.

Plates



The current continental and oceanic plates include: the Eurasian plate, Australian-Indian plate, Philippine plate, Pacific plate, Juan de Fuca plate, Nazca plate, Cocos plate, North American plate, Caribbean plate, South American plate, African plate, Arabian plate, the Antarctic plate, and the Scotia plate. These plates consist of smaller sub-plates.



The theory of plate tectonics (meaning "plate structure") was developed in the 1960's. This theory explains the movement of the Earth's plates (which has since been documented scientifically) and also explains the cause of earthquakes, volcanoes, oceanic trenches, mountain range formation, and many other geologic phenomenon.

The plates are moving at a speed that has been estimated at 1 to 10 cm per year. Most of the Earth's seismic activity (volcanoes and earthquakes) occurs at the plate boundaries as they interact.

Divergent Plate Movement: Seafloor Spreading

Seafloor spreading is the movement of two oceanic plates away from each other (at a divergent plate boundary), which results in the formation of new oceanic crust (from magma that comes from within the Earth's mantle) along a mid-ocean ridge. Where the oceanic plates are moving away from each other is called a zone of divergence. Ocean floor spreading was first suggested by Harry Hess and Robert Dietz in the 1960's.

Convergent Plate Movement:

When two plates collide (at a convergent plate boundary), some crust is destroyed in the impact and the plates become smaller. The results differ, depending upon what types of plates are involved.

Oceanic Plate and Continental Plate - When a thin, dense oceanic plate collides with a relatively light, thick continental plate, the oceanic plate is forced under the continental plate; this phenomenon is called subduction.

Two Oceanic Plates - When two oceanic plates collide, one may be pushed under the other and magma from the mantle rises, forming volcanoes in the vicinity.

Two Continental Plates - When two continental plates collide, mountain ranges are created as the colliding crust is compressed and pushed upwards.