

## Notes: Inside Earth 1.5 The Theory of Plate Tectonics

Wegener's theory of continental drift evolved into Tuzo Wilson's theory of plate tectonics in the 1960's.

Wilson stated that the topmost solid part of the earth, the lithosphere, is made up of many small plates.

### How Plates Move

The theory of plate tectonics links together the ideas of continental drift and ocean floor spreading, and explains how the earth has evolved over time. It helps to explain mountain building, volcanoes, earthquakes and other processes.

Convection currents found in the mantle drive the plates.

The plates usually contain both oceanic and continental crust.

7 Major Plates:

1. North American
2. South American
3. Eurasian
4. African
5. Indo-Australian
6. Pacific Plate (largest)
7. Antarctic

There are many other smaller plates.

### Plate Boundaries

Plates move at different speeds and in different directions... small plates (up to several cm per year) and large plates with continents (a few mm per year).

Plates meet and slip past one another at areas called faults.

There are three types of plate boundaries...

1. Divergent boundaries - plates move apart from one another (spread apart)
  - deep rift valleys are formed
  - example: mid-ocean ridges

2. Convergent boundaries - plates move towards one another (come together)

When two continental plates collide, the edges of the continents fold upward to form large mountain ranges.

Example: Appalachian Mountains and Himalayan Mountains

When plates converge at trenches, the denser ocean plate is subducted or pushed down into the interior of the earth, while the continental plate edge "floats" over it.

Example: Alaska Panhandle

When two oceanic plates collide, the older (more dense) plate is subducted. Many volcanoes form along this boundary because the older oceanic rock melts to form molten rock, which breaks through the thin oceanic plate.

Example: Aleutian Islands

3. Transform boundaries - slip boundaries, formed by lateral faults.

Here, two plates grind together and slip past one another horizontally. Crust is neither created nor destroyed.

Example: San Andreas Fault in California

### Plate Motion Over Time

At one time, all the continents were connected, forming a large super-continent known as Pangaea. Pangaea broke apart some 225 million years ago, which eventually formed the seven continents that exist today.