

Tectonic Plates

There are about 12 major tectonic plates and some minor ones

-2 types:

*oceanic: contain dense rock basalt

*continental: contain large amounts of granite

Cross Section of the Earth

5 layers (from inside out)

Inner core -> outer core -> lower mantle -> upper mantle -> crust

Inner core

-mostly iron, some nickel

-radius of ~1200km

-5000-6000 degrees

-Solid due to high pressure

(despite being much hotter than the melting point of iron)

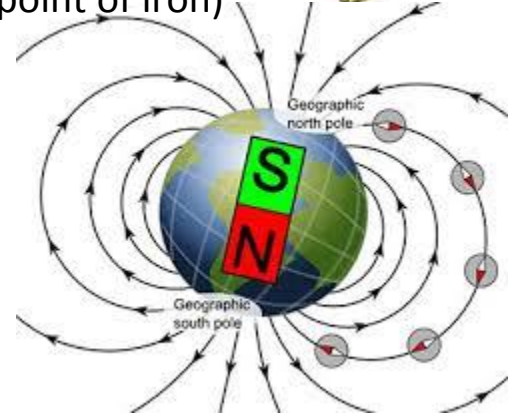
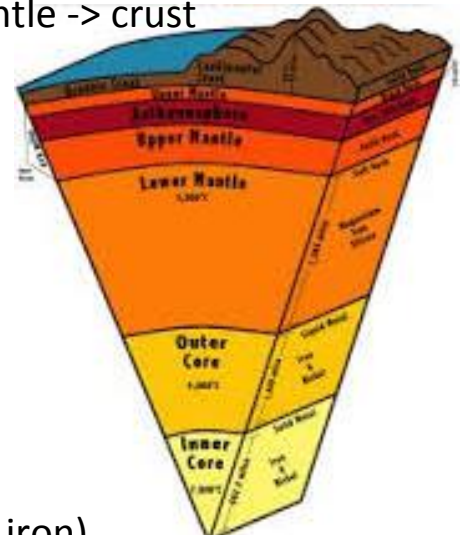
Outer Core

-liquid!

-~2300km thick

Mostly a mixture of iron and nickel

**Scientists hypothesize that the cores rotate at different speeds and that this may be what causes the Earth's magnetic field



Upper and Lower Mantle

-about 2900km thick

-70% of Earth's volume

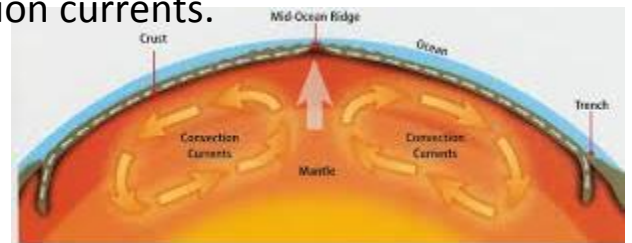
-the upper mantle is partly molten rock containing iron and magnesium (think of toothpaste)

-lower mantle is solid and dense containing magnesium and iron

Plate Motion

The upper mantle is also divided into layers (lithosphere and asthenosphere)

The temperature of the asthenosphere varies, it is thought to be partly due to radioactive materials decaying and creating hotter spots. This uneven distribution of heat causes convection currents.



Push and Pull

The rising magma eventually reaches the Earth's surface. This can happen in the ocean or on land. If it happens in the ocean, we call it a **spreading ridge** or **oceanic ridge**. If it happens above water then we call it a **rift valley**.

The pushing away of older rock as new rock forms is called **ridge push**.

Eventually, the plates meet. Oceanic plates are denser than continental. When they meet, the oceanic plate will go beneath the continental plate.

This action is called **subduction**.

The area where this occurs is a **subduction zone**.

Subduction zones typically experience large **earthquakes** and **volcanic eruptions** and may contribute to plate motion. The action of the oceanic plate going beneath the continental helps pull the rest of the oceanic plate under (**slab pull**).

Slab pull, ridge push and convection all aid in the motion of tectonic plates.

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Plate Boundaries and Interactions

Where one plate meets another plate is called a plate boundary.

3 main types:

- Divergent** (move away from each other)
- Convergent** (moving towards each other)
- Transform** (sliding by each other)

To determine what kind of interaction plates will have, we need to look at their relative directions of motion as well as the type of plate.

Divergent Plate Boundaries

- Mid-Atlantic Ridge
- Rift Valley

Convergent Plate Boundaries

Can be Oceanic-Continental

- oceanic plate forced under continental
- creates deep underwater valley called trench
- as oceanic plate moves deeper, crust melts and then may cool to create rock
- may create conic volcanoes
- Locally, we have a volcanic belt due to subduction
- If stress becomes too great, an earthquake results

Oceanic-Oceanic

- Subduction also occurs with cooling causing one plate to be more dense, moving under the other
- Produce volcanic island arc (Alaska) via same process as O-C

Continental-Continental

- Edges fold and crumble, creating mountain ranges. (Himalayas which grow a few cm a year)

Transform Boundaries

Plates slide past

- No mountains or volcanoes
- Earthquakes and faults (breaks in rock due to sliding) can happen
- Transform fault is the specific name for a fault at a transform boundary

Ex: San Andreas Fault

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