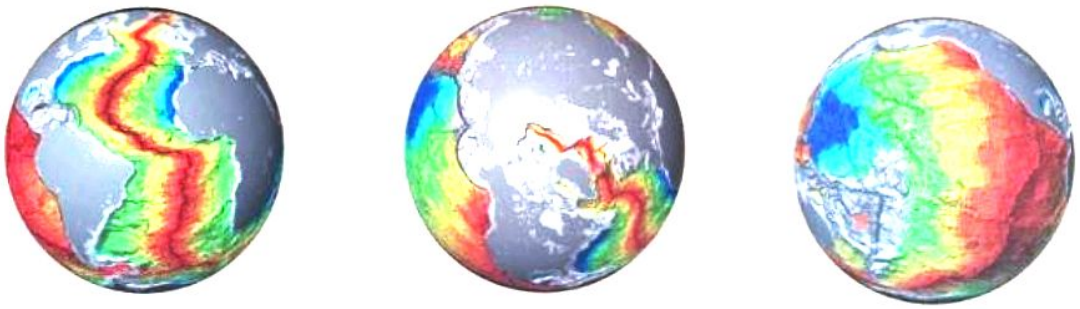
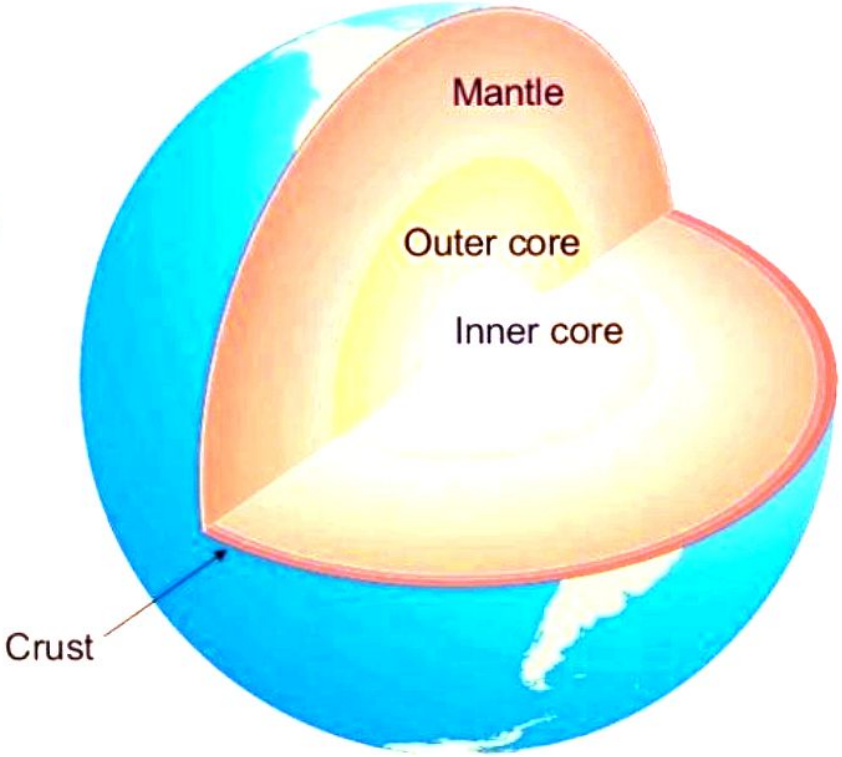
The Structure of the Earth and Plate Tectonics



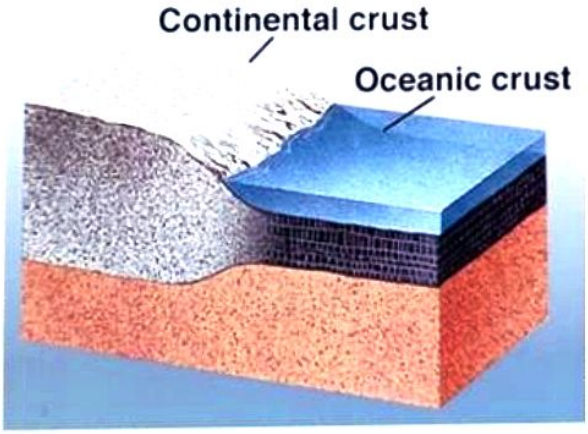
Structure of the Earth

- The Earth is made up of 3 main layers:
  - Core
  - Mantle
  - Crust



The Crust

- This is where we live!
- The Earth's crust is made of:



Continental Crust

- thick (10-70km)
- buoyant (less dense than oceanic crust)
- mostly old

Oceanic Crust

- thin (~7 km)
- dense (sinks under continental crust)
- young

What is Plate Tectonics?

- If you look at a map of the world, you may notice that some of the continents could fit together like pieces of a puzzle.

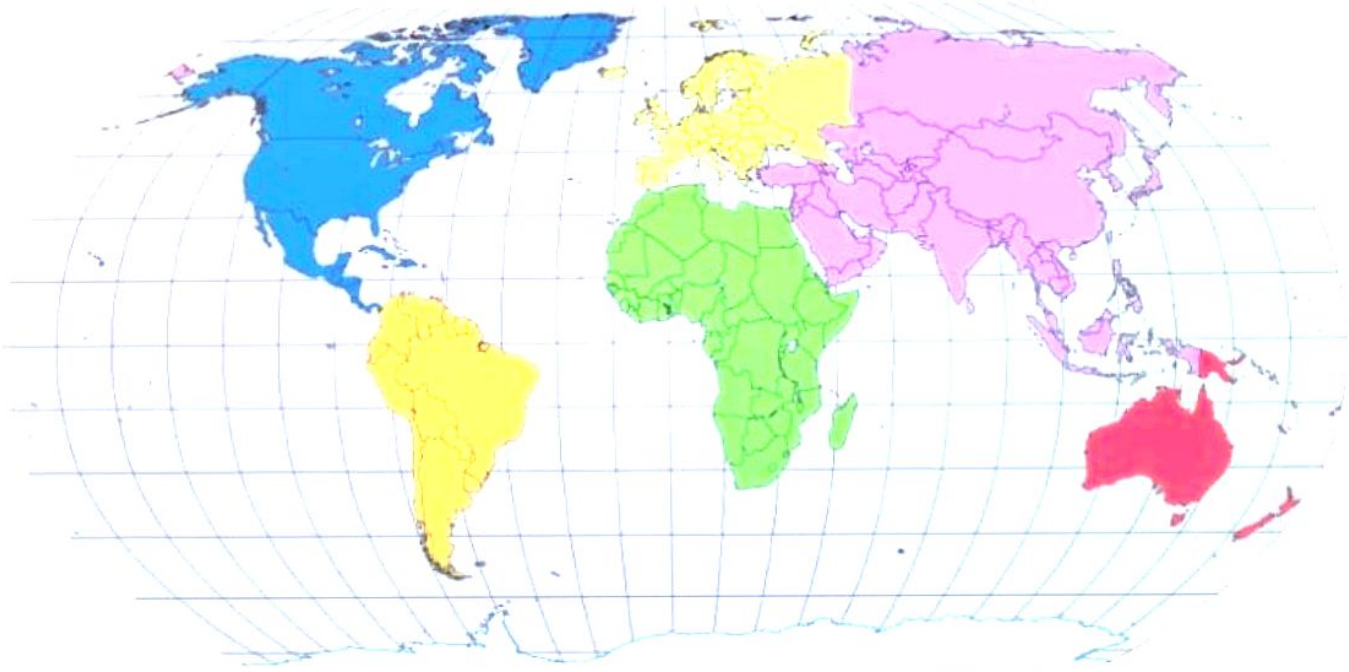
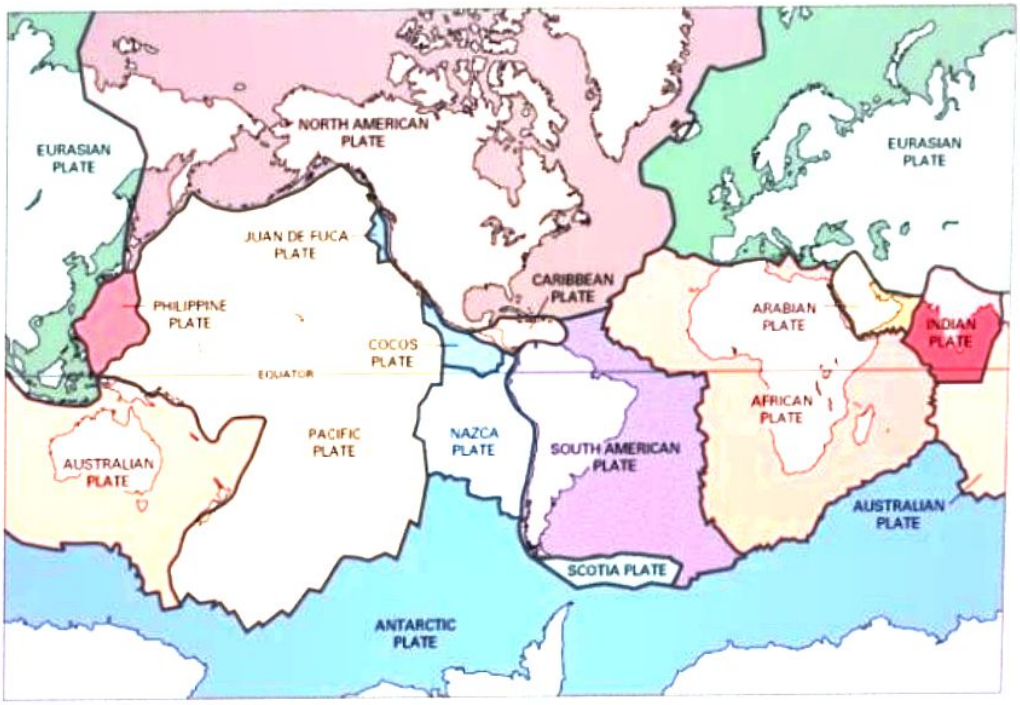


Plate Tectonics

- The Earth's crust is divided into 12 major plates which are moved in various directions.
- The plates collide, pull apart, or scrape against each other.
- Each motion causes different types of features on the Earth's crust.
- The word, tectonic, refers to changes in the crust because of plate interaction.

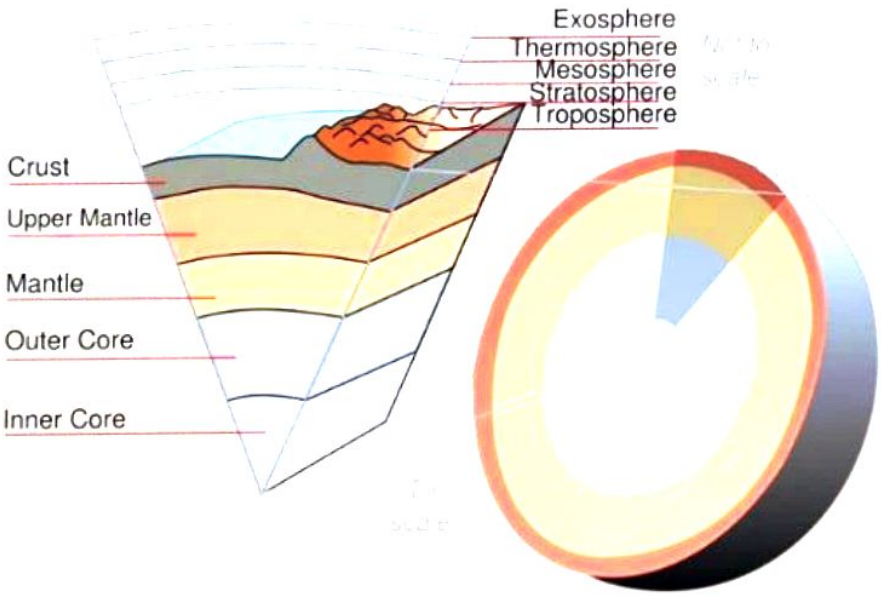
World Plates



What are tectonic plates made of?

- Plates are made of rigid **lithosphere**.

The lithosphere is made up of the crust and the upper part of the mantle.



What lies beneath the tectonic plates?

- Below the lithosphere (which makes up the tectonic plates) is the asthenosphere.

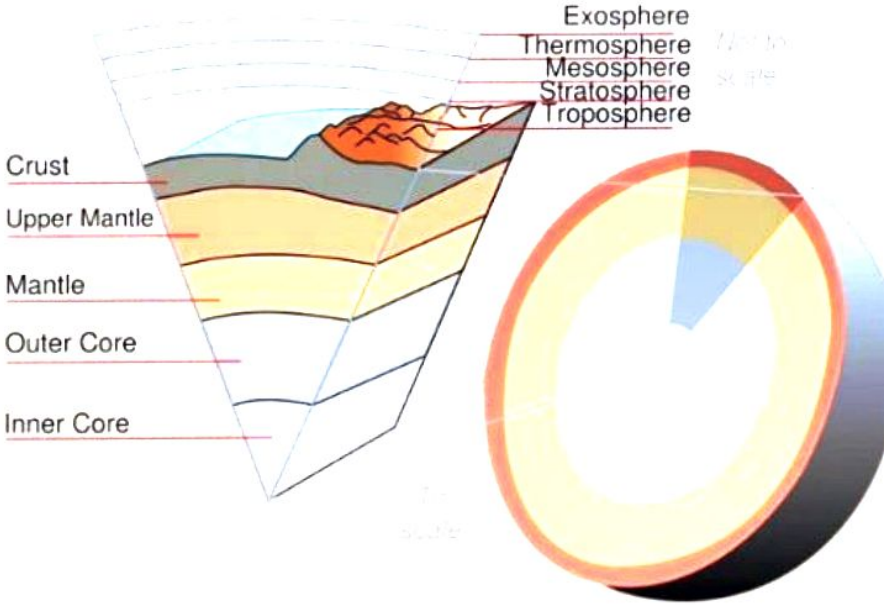
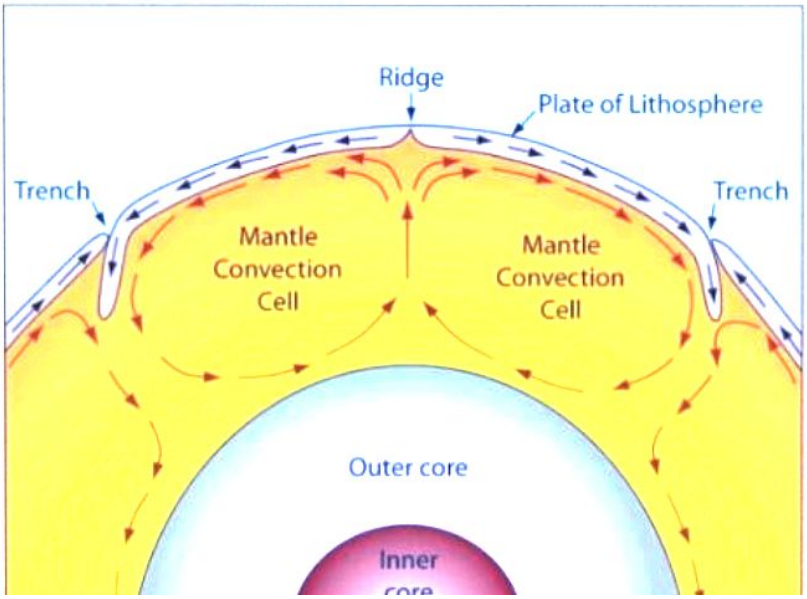


Plate Movement

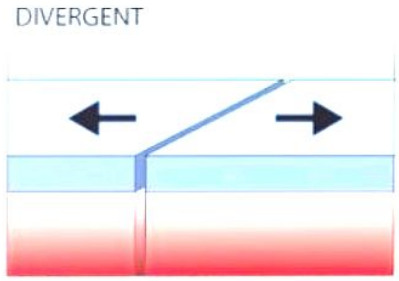
- "Plates" of lithosphere are moved around by the underlying hot mantle convection cells

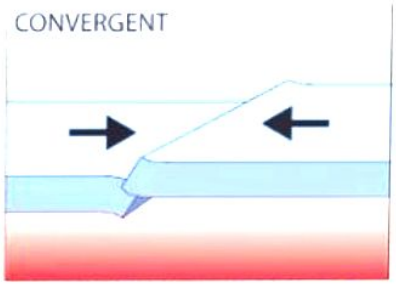


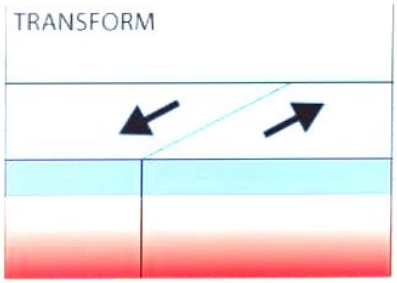
What happens at tectonic plate boundaries?

Three types of plate boundary

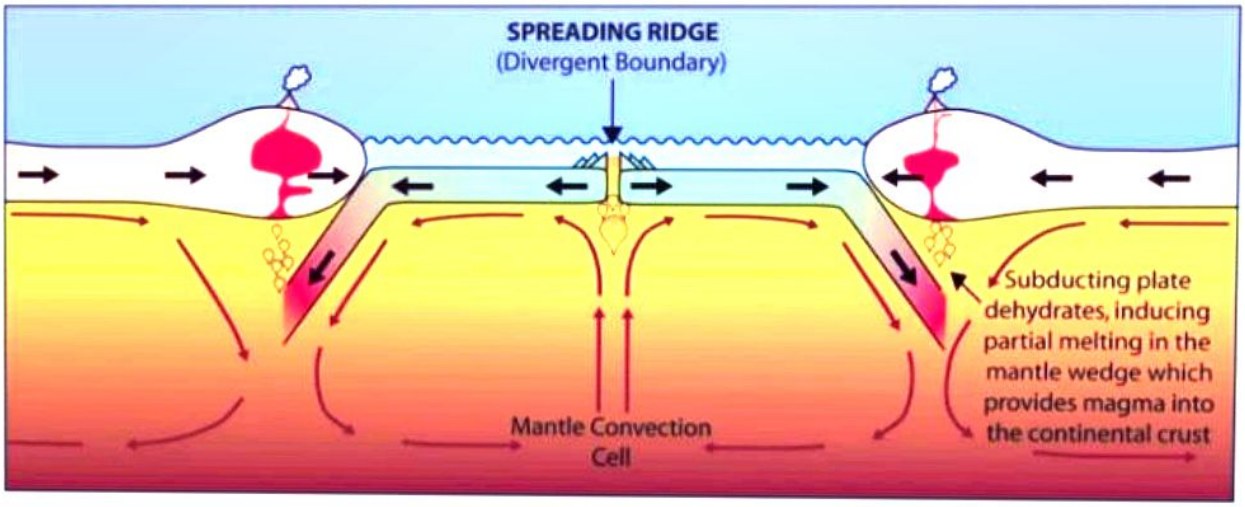
- Divergent
- Convergent
- Transform







Divergent Boundaries



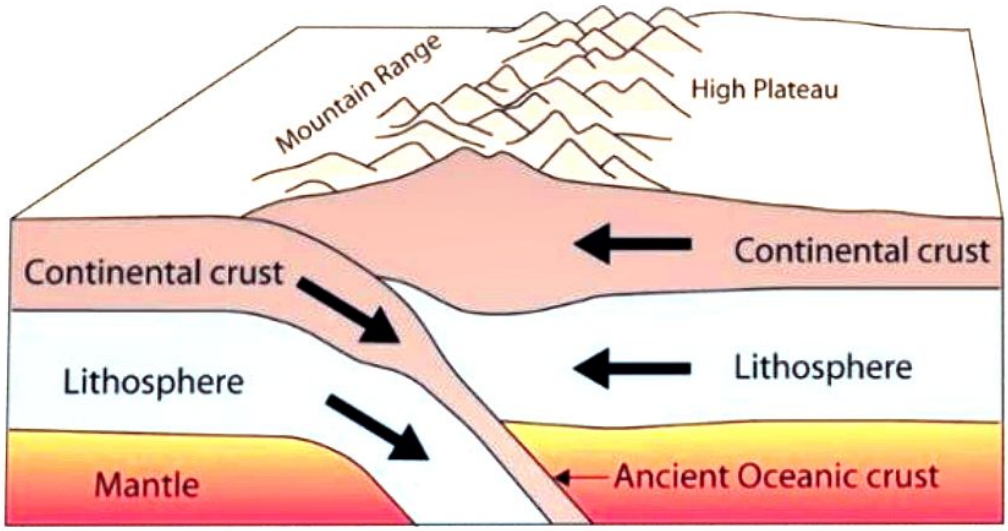
- Spreading ridges
  - As plates move apart magma fills up the gap

Convergent Boundaries

- There are three styles of convergent plate boundaries
  - Continent-continent collision
  - Continent-oceanic crust collision
  - Ocean-ocean collision

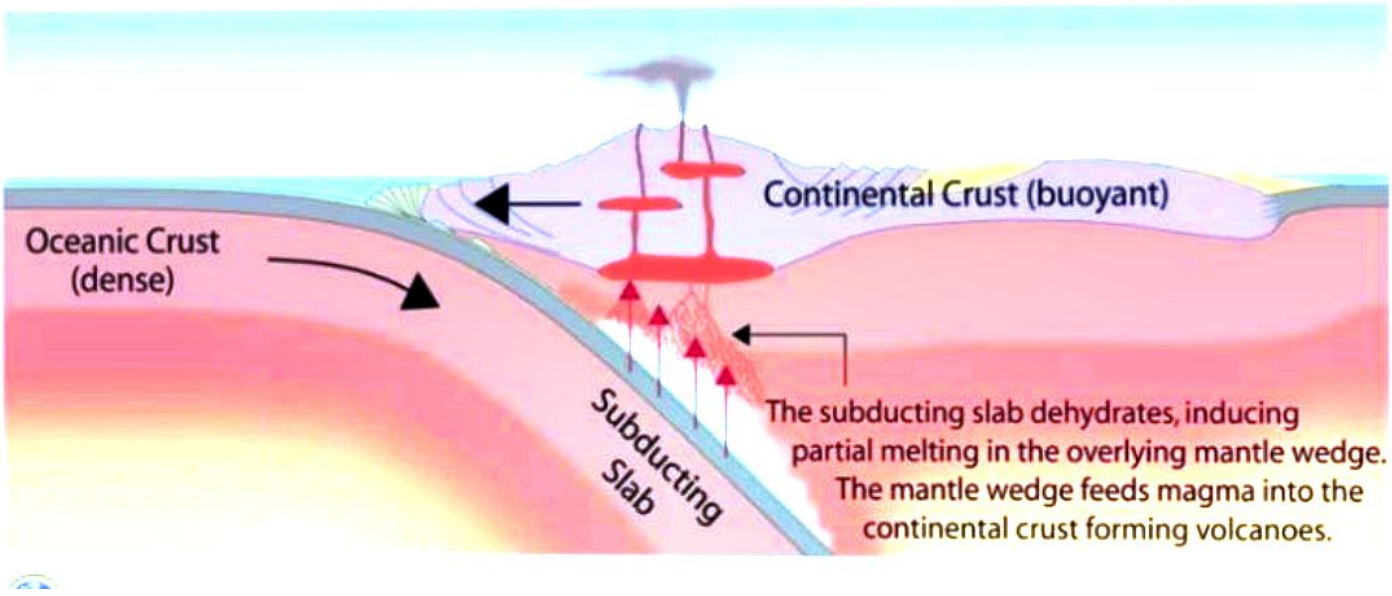
Continent-Continent Collision

- Forms mountains, e.g. European Alps, Himalayas

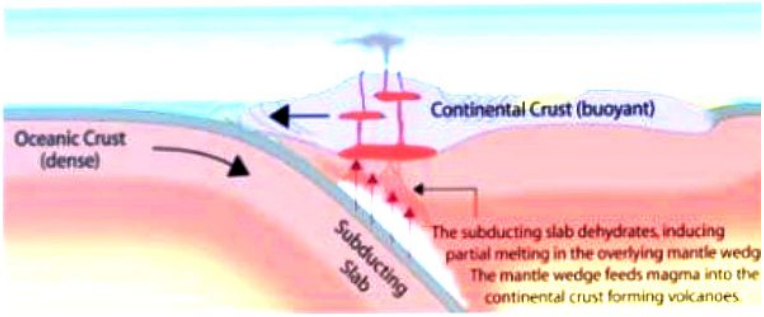


Continent-Oceanic Crust Collision

- Called SUBDUCTION



Subduction



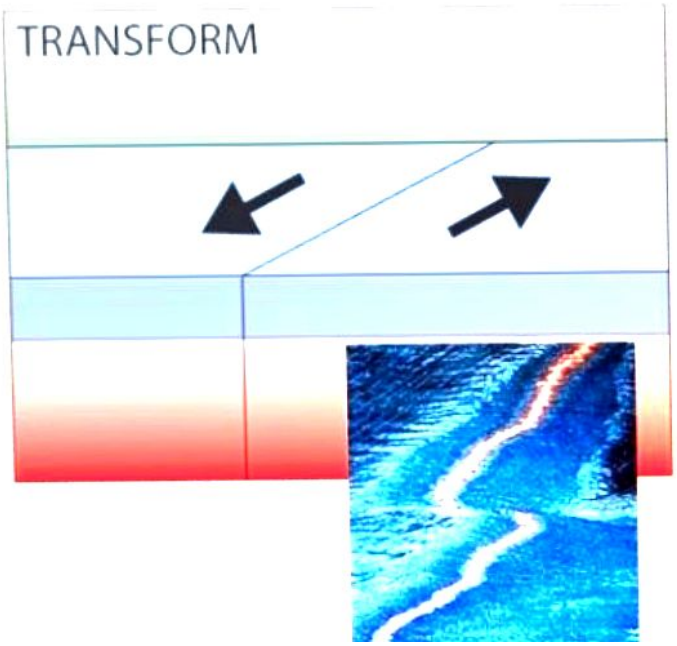
- Oceanic plates subducts underneath the continental plate
- Oceanic plate heats and melts
- The melt rises forming volcanoes
- E.g. The Andes

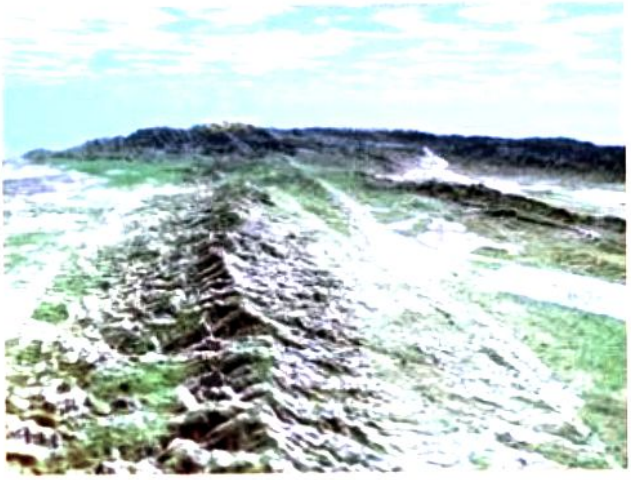
Ocean-Ocean Plate Collision

- When two oceanic plates collide, one runs over the other which causes it to sink into the mantle forming a **subduction zone**.
- The subducting plate is bent downward to form a very deep depression in the ocean floor called a **trench**.
- The worlds deepest parts of the ocean are found along trenches.
  - E.g. The Mariana Trench is 11 km deep!

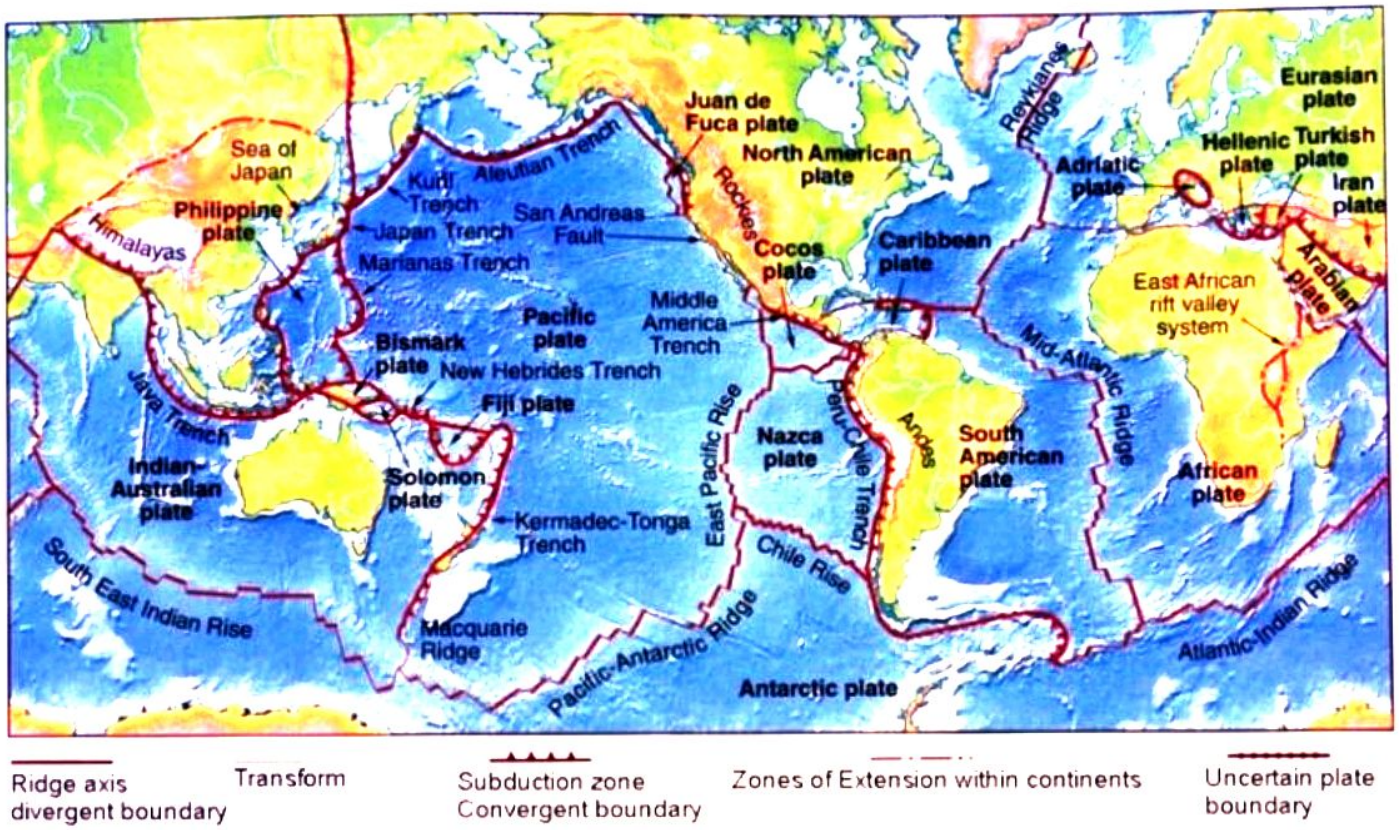
Transform Boundaries

- Where plates slide past each other





Above: View of the San Andreas transform fault


Sea of Japan
Philippine plate
Himalayas
Kuril Trench
Aleutian Trench
Japan Trench
Marianas Trench
Juan de Fuca plate
North American plate
San Andreas Fault
Rockies
Cocos plate
Caribbean plate
Reykianes Ridge
Eurasian plate
Adriatic plate
Hellenic plate
Turkish plate
Iran plate
Arabian plate
East African rift valley system
Mid-Atlantic Ridge
Pacific plate
Middle America Trench
Bismark plate
New Hebrides Trench
Fiji plate
Java Trench
Indian-Australian plate
Solomon plate
Kermadec-Tonga Trench
East Pacific Rise
Nazca plate
Peru-Chile Trench
Andes
South American plate
African plate
Chile Rise
South East Indian Rise
Macquarie Ridge
Pacific-Antarctic Ridge
Antarctic plate
Atlantic-Indian Ridge
Ridge axis divergent boundary
Transform
Subduction zone Convergent boundary
Zones of Extension within continents
Uncertain plate boundary

Earth Plate