Plate Tectonic Boundaries

Types of plate boundaries
- convergent
- divergent
- transform

Divergent Plate Boundaries
- continental rift
- incipient ocean basin
- mid-ocean ridge
Divergent Plate Boundary

- Central rift valley
- Shallow earthquakes
- Volcanoes

African continental rift and incipient ocean basins
African Volcanoes

Kilimanjaro

African rift valley - Lake Turkana

Global system of mid-ocean ridge
divergent plate boundaries
Seafloor Age - Mid-Atlantic Ridge

Mid-ocean ridge is visible where it crosses Iceland

Rifting and volcanism in Iceland
Central Rift Valley - Iceland

Convergent Plate Boundaries

Wadati-Benioff Zone - region of earthquake activity at a subduction zone
Seismicity - South America

What is the orientation of subduction?

Convergent Boundary: Ocean - Continent
Convergent Plate Boundary
Ocean – Continent

- Shallow – intermediate – deep earthquakes
- Wet mantle volcanism – stratovolcanoes
- Continental compression – high mountain range with volcanoes

Seismicity - South America
Mt. Rainier, Seattle, Washington

Convergent Boundary: Ocean - Ocean

- Shallow - intermediate - deep earthquakes
- Wet mantle volcanism - stratovolcanoes
- Volcanic island arc

![Convergent Plate Boundary: Ocean - Ocean](image)
Volcanic Island Arcs - East Asia and Indonesia

Seismicity - Southern Asia

Volcanism - Central America / Caribbean

Seismicity

Volcanoes of the Lesser Antilles
Seismicity - Southern Asia

Convergent Boundary: Continent - Continent

- Shallow earthquakes
- No volcanism
- High mountain range and plateau due to crustal thickening
Transfome Plate Boundary

- Tectonic plates sideswipe each other
- Shallow earthquakes
- Horizontal displacement of the crust over great distances

Transform boundary

displaced stream
San Andreas Fault
Transform boundary
Hot Spots

• Localized regions of high heat flow in the mantle.
• Generates melting in the overlying crust.
• Remain fixed for between 20 million and 100 million years while plate rides over.
• Many aseismic ridges produced by hot spots.
Causes of Plate Movement

- **Ridge Push**
  - plates are moving down slope due to gravity, from high elevation at ridges to low elevation in trenches.

- **Slab Pull**
  - Subducting slab sinking into mantle pulls the rest of the plate behind it.

- **Both!**