

Lesson 3: Physical Features of the Earth

Landforms:

- **Mountains:** Formed by tectonic movement/volcanism (e.g., Himalayas, Mount St. Helens).
- **Valleys:** Low areas between mountains, often with rivers (e.g., Great Rift Valley).
- **Plateaus:** Elevated flatlands, often from volcanic activity.
- **Plains:** Flat areas ideal for agriculture.
- **Deserts:** Dry areas with extreme temperatures.
- **Caves:** Formed by erosion or volcanic activity.
- **Rivers:** Flowing water channels leading to lakes/oceans.
- **Lakes:** Large freshwater bodies surrounded by land.
- **Oceans:** Saltwater bodies covering 71% of Earth.
- **Bays:** Smaller bodies of water connected to larger sources.
- **Glaciers:** Large ice masses shaping the landscape.
- **Wetlands:** Areas covered by water, supporting unique ecosystems.

Water Bodies:

- **Rivers, Lakes, Oceans, Bays, Wetlands:** Crucial for freshwater supply, habitat, and ecosystems.

Natural Forces Shaping Landforms:

- **Internal Forces:** Tectonic plate movements (mountains, volcanoes), rift valleys (e.g., Great Rift Valley), earthquakes (e.g., San Andreas Fault).
- **External Forces:** Weathering, erosion, and deposition (canyons, dunes, glaciers, coastal landforms).

Human Impact:

- **Construction & Urbanization:** Deforestation, mining, land reclamation (e.g., Amazon rainforest, Mir Mine, Dubai Palm Islands).
- **Agriculture:** Terracing, irrigation, soil erosion, desertification (e.g., Aral Sea, Dust Bowl).
- **Water Management:** Dams, coastal engineering, coral reef destruction (e.g., Three Gorges Dam, Miami Beach, Great Barrier Reef).

Effects on Human Life:

- **Mountains:** Limit settlement but provide resources.
- **Plains:** Ideal for farming and urban development.
- **Rivers:** Provide freshwater, support trade.
- **Coasts:** Support industries like fishing and tourism.

Climate Change Impact:

- Rising sea levels, shifting weather patterns, and ecosystem changes.

Human Modifications:

- Activities like construction, agriculture, and urbanization alter natural landscapes, leading to challenges such as erosion and biodiversity loss.
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Lesson 4: Tectonic Plates & Boundaries

Tectonic Plates:

- Large, rigid pieces of Earth's lithosphere that float on the semi-molten asthenosphere.
- Responsible for earthquakes, volcanic activity, mountain formation, and ocean trench development.

Earth's Structure:

- **Crust (Lithosphere):** Solid rock outermost layer; divided into continental (thicker, less dense) and oceanic (thinner, denser) crust.
- **Mantle (Asthenosphere):** Semi-fluid layer beneath the crust; convection currents push and pull plates.
- **Core:** Outer core is liquid metal, inner core is solid; heat from the core drives mantle convection, causing plate movement.

Tectonic Plate Composition:

- **Continental Plates:** Made of granite, thicker but less dense (e.g., North American Plate, Eurasian Plate).
- **Oceanic Plates:** Made of basalt, thinner but denser (e.g., Pacific Plate).

Plate Movement:

- **Convection currents:** Heat from Earth's core causes rising and sinking motions in the mantle.

- **Slab pull:** Denser oceanic plates sink, pulling the rest of the plate with it.
- **Ridge push:** Magma rises at mid-ocean ridges, forcing plates apart.

Plate Boundaries:

1. Divergent Boundaries (Plates Move Apart):

- New crust forms as magma rises (seafloor spreading).
- Example: Mid-Atlantic Ridge (Iceland splitting apart).

2. Convergent Boundaries (Plates Collide):

- **Oceanic-Continental:** Oceanic plate sinks (subduction), forming volcanoes.
 - Example: Andes Mountains, Peru-Chile Trench.
- **Oceanic-Oceanic:** One plate subducts, forming deep ocean trenches and island arcs.
 - Example: Mariana Trench, Japan.
- **Continental-Continental:** Plates crumple, forming mountains.
 - Example: Himalayas (Indian Plate colliding with Eurasian Plate).

3. Transform Boundaries (Plates Slide Past Each Other):

- Causes earthquakes due to friction.
- Example: San Andreas Fault (California).

Plate Tectonic Features:

- Deep ocean trenches, volcanoes, island arcs, submarine mountain ranges, and fault lines form along plate boundaries.