

The Dynamic Earth

Chapter 3.1 The GeoSphere

Earth is an Integrated system

- Interaction between
 - Rock Geosphere
 - Air Atmosphere
 - Water Hydrosphere
 - Living things Biosphere
- Can you name some interactions?

Earth's Interior

Seismic waves change both speed and direction as they pass from one physical layer to another.

- How do we know what's inside?
 - Core samples
 - Surface features
- Direct Evidence - drilling down to 12 km
 - Core samples
 - Surface features
- Indirect Evidence - observing seismic wave patterns

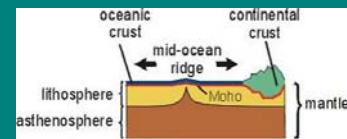
Path of seismic wave

Earth Structure

Lithosphere - the crust and upper mantle

Crust

1. Continental
 - Made of granite
 - Density of 2.7 g/ml
2. Oceanic
 - Made of Basalt
 - Density of 3.0 g/ml

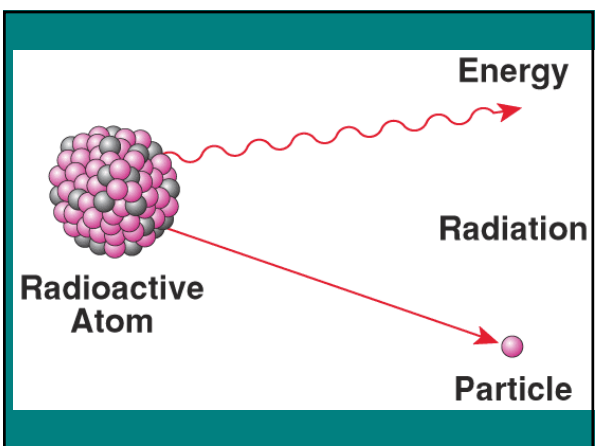


Upper Mantle - rigid layer that crust sits on

- Crust and upper mantle are split into sections called plates that move about the surface of earth

Core - center of earth

- Source of heat and convection
 - Radioactivity
 - Pressure
 - Still hot from earth's formation



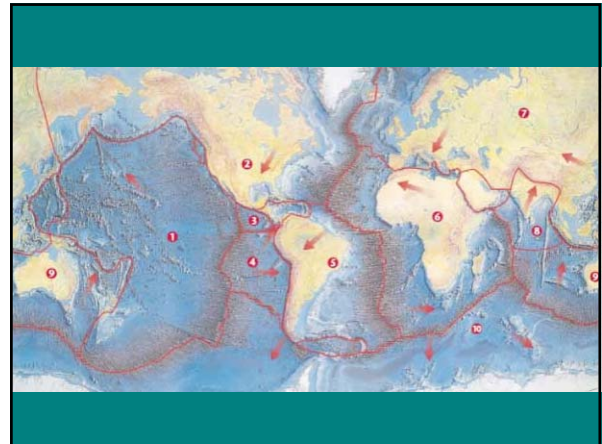
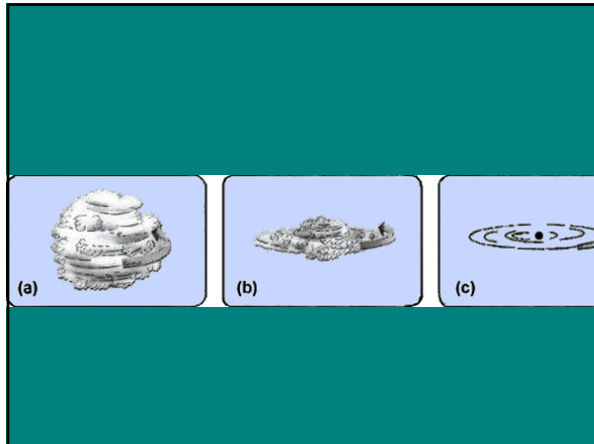
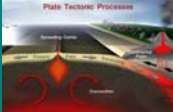


Plate Tectonics

- **Lithosphere** is divided into separate pieces called tectonic plates.
 - Move in different directions
 - Powered by convection currents
- **Plate boundaries**
 - **Convergent** - come together
 - Mountain building - Himalayan Mts.
 - Subduction zones - volcanic island chains - Japan
 - **Divergent** - move apart
 - Mid ocean ridges - under the oceans - Mid Atlantic
 - Rift valley - on land - Africa
 - **Transform** - slide sideways
 - Faulting - San Andreas Fault, CA

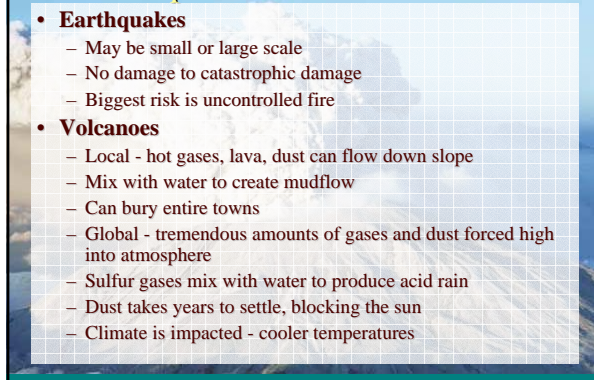


Earthquakes & Volcanoes

- Both occur along plate boundaries
- **Earthquakes**
 - Vibrations of earth due to slippage or movement of lithosphere
- **Volcanoes**
 - Magma is forced out of earth
 - At Subduction Zones, mid ocean ridges
 - Hot Spots
 - Ring of fire
 - [Video \(26min\)](#)

Impact on Environment

- **Earthquakes**
 - May be small or large scale
 - No damage to catastrophic damage
 - Biggest risk is uncontrolled fire
- **Volcanoes**
 - Local - hot gases, lava, dust can flow down slope
 - Mix with water to create mudflow
 - Can bury entire towns
 - Global - tremendous amounts of gases and dust forced high into atmosphere
 - Sulfur gases mix with water to produce acid rain
 - Dust takes years to settle, blocking the sun
 - Climate is impacted - cooler temperatures



Earth's Surface

- Rock Cycle -