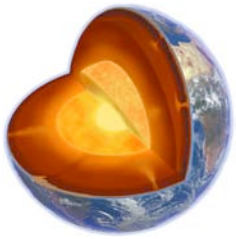
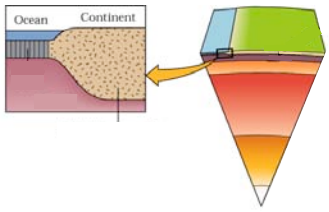
Class 6: Earth & Plate Tectonics



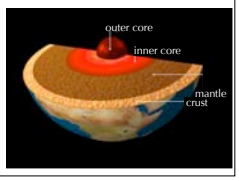
Earth's Compositional Layers

Earth's Atmosphere & Hydrosphere

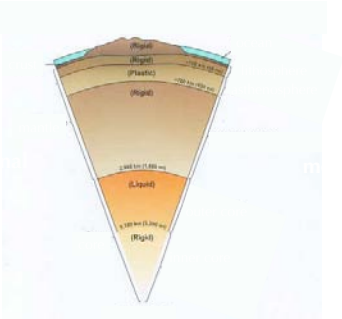
Earth's Layers



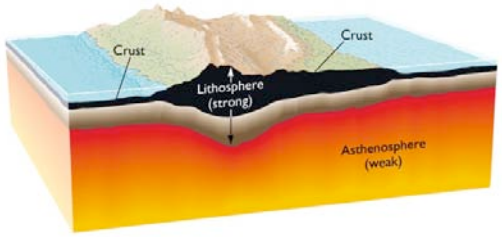
Compositional vs. Mechanical Layering



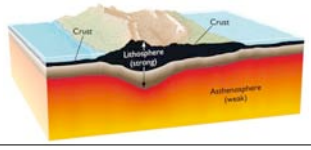
Compositional vs. Mechanical Layering



Lithosphere & Asthenosphere
(mechanical boundaries)



Earth's Lithosphere - Plates



Earth's Tectonic Plates

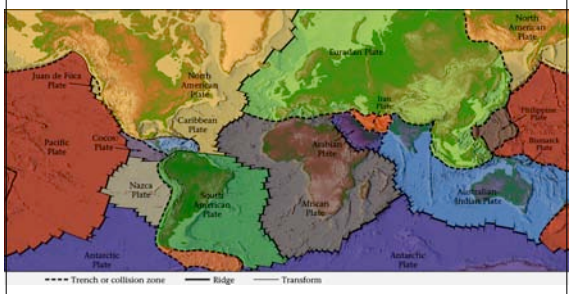
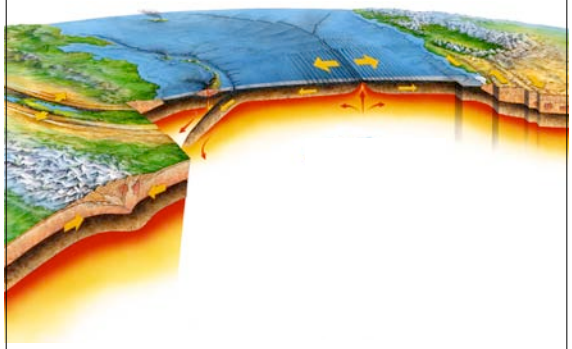
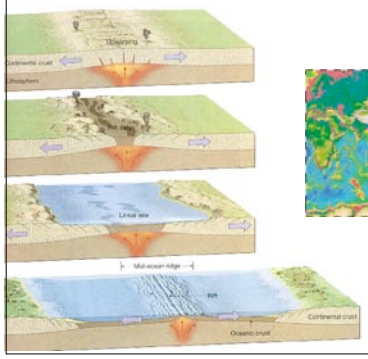
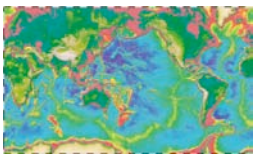


Plate Boundaries

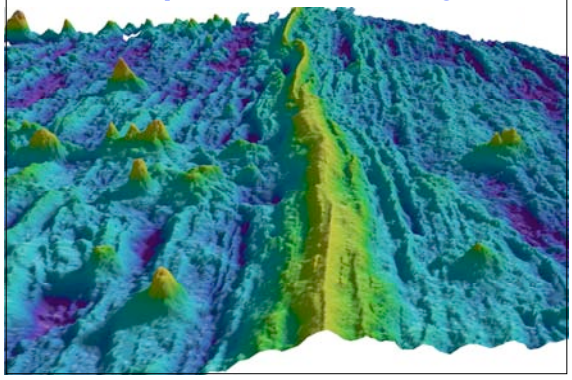


Divergent Plate Boundaries

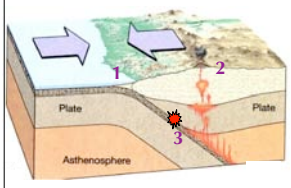


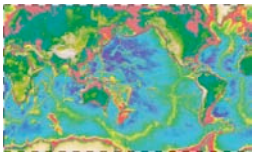


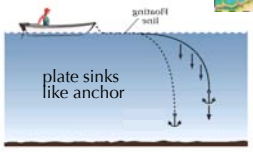
Example: Mid-Ocean Ridges



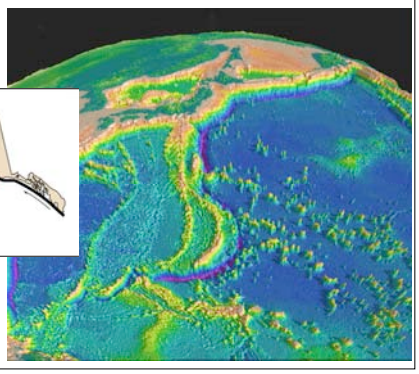
Convergent Plate Boundaries



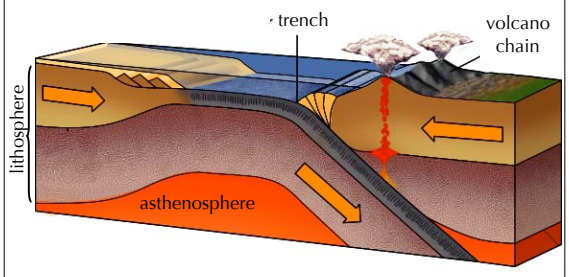




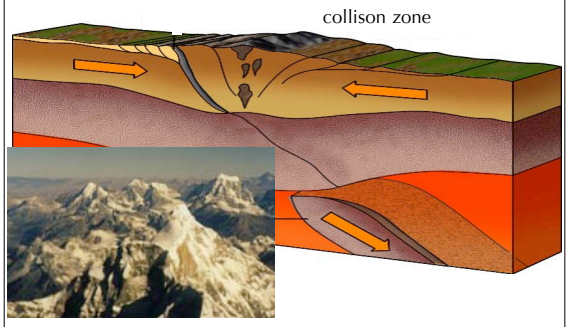
Example: Alaskan Trench



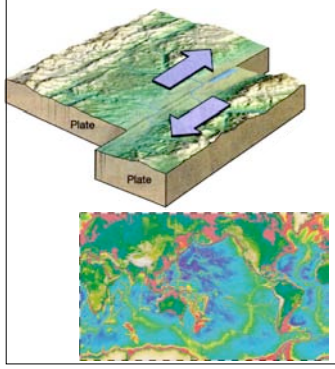
Death of a Convergent Boundary



Continental Collision Zone

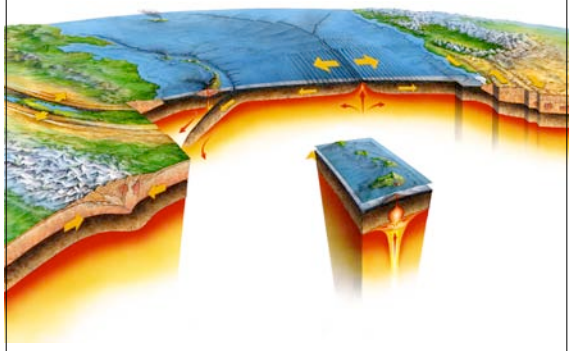


Transform Plate Boundary

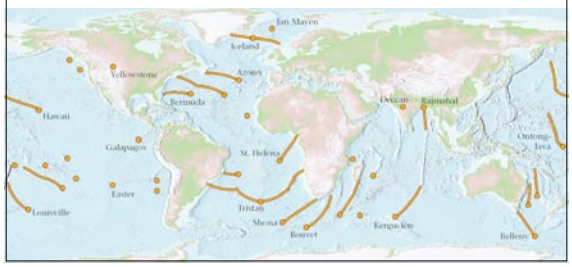


Example: San Andreas Fault

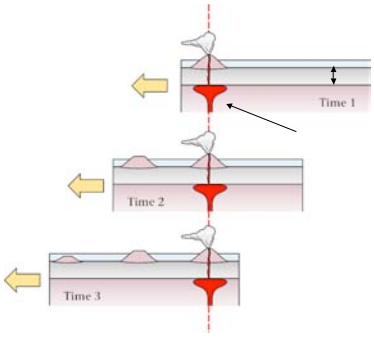
Plate Boundaries



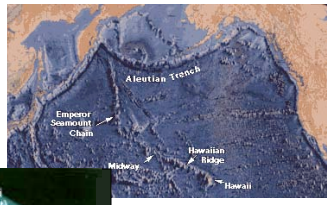
Hot Spots

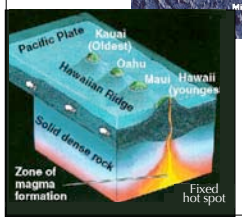


Formation of Island Chains



Example: The Hawaiian Chain





How do we explore Earth's interior?

1. **Examine volcanic rocks**
   Q: what was the source for magma?

2. **Observe seismic waves from earthquakes**
   Q: where are the layers, what are their densities?

3. **Examine meteorites**
   Q: what are they made of? like the core?

4. **Existence and behavior of geomagnetic field**
   Q: what is the core doing?

Basic Premise of Plate Tectonics

- Earth's crust is divided into plates
- Plates move relative to one another at 1-15 cm/yr
- Plate interiors are largely undisturbed
- Deformation is concentrated at plate boundaries

Consequences:
- Plate tectonics constantly change Earth's surface
- Earthquakes occur mostly at plate boundaries
- Volcanoes occur mostly at plate boundaries

Earth

• Satellites	1 (Moon)
• Size (radius)	6378 km
• Bulk density	5.5 g/cm^3 (4.1 g/cr
• Surface gravity	9.8 m/s^2
• Tectonism, volcanism	yes (today)
• Rotation	1 day
• Orbit	365.25 days
• Atmosphere	78% N_2, 21% O_2
• Surface pressure	1 atm
• Surface temperature	20°C (diurnal, seasonal changes)
• Plate tectonics	yes
• Water	yes