Warm-up

p. 700, 1. Name the 4 layers of Earth from center outward:

Inner core, outer core, mantle, crust

p.701, 2. In South Africa gold mines at depths of 2 miles the temperature is _____.

50°C or 120°F

p. 701, 3. What helps maintaining the Earth high internal temperature?

Radioactive isotopes

Warm-up

p. 702, 1. What dinosaur fossil gave evidence for Plate tectonics

Mesosaurus

p.702, 2. Wegener's theory was ignored until _____ when data discovered on ocean floor.

1960's

p. 702, 3. What Evidence came form ocean floor ?

- Rocks that had alternating magnetic polarity bands

- and age of rocks got older from mid-ocean ridges

Objectives

- **Identify** Earth's different geologic layers.
- **Explain** how the presence of magnetic bands on the ocean floor supports the theory of plate tectonics.
- **Describe** the movement of Earth's lithosphere using the theory of plate tectonics.
- **Identify** the three types of plate boundaries and the principal structures that form at each of these boundaries.

Plate Tectonics

- Around 1915, German scientist Alfred Wegener proposed the idea that the continents were once united as a supercontinent and then drifted apart.
  - He pieced the continents together like a puzzle and called the supercontinent they formed Pangaea.
  - Wegener found identical fossils on widely separate continents, which supported his idea.

End Of Slide

Plate Tectonics, *continued*

- Evidence for Wegener's ideas came later.
  - Wegener's theory of continental drift was ignored until structures discovered on the ocean floor provided evidence for a mechanism for the movement of continents.
  - Symmetrical bands on either side of a mid-ocean ridge indicate that the two sides of the ridge were moving away from each other and new ocean floor was rising up between them.

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Plate Tectonics, *continued*

- Alignment of oceanic rocks supports the theory of moving plates.
  - Iron in molten rock aligns itself with Earth's magnetic field as it cools.
  - The Earth's magnetic field reverses polarity about every 200,000 years
  - The process is recorded as magnetic bands in rock, based on the age of the rock.
  - Symmetrical bands on either side of the Mid Atlantic Ridge suggest that the crust was moving away from the ridge.

End Of Slide

Plate Tectonics, *continued*

- Earth has plates that move over the mantle.
  - The crust and upper portion of the mantle are divided into about seven large pieces called tectonic plates.
- **Lithosphere** the solid, outer layer of Earth, that consists of the crust and the rigid upper mantle

End Of Slide

Plate Tectonics, *continued*

- **Plate tectonics** the theory that explains how the outer parts of Earth change through time, and that explains the relationships between continental drift, sea-floor spreading, seismic activity, and volcanic activity

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Tectonic Plates

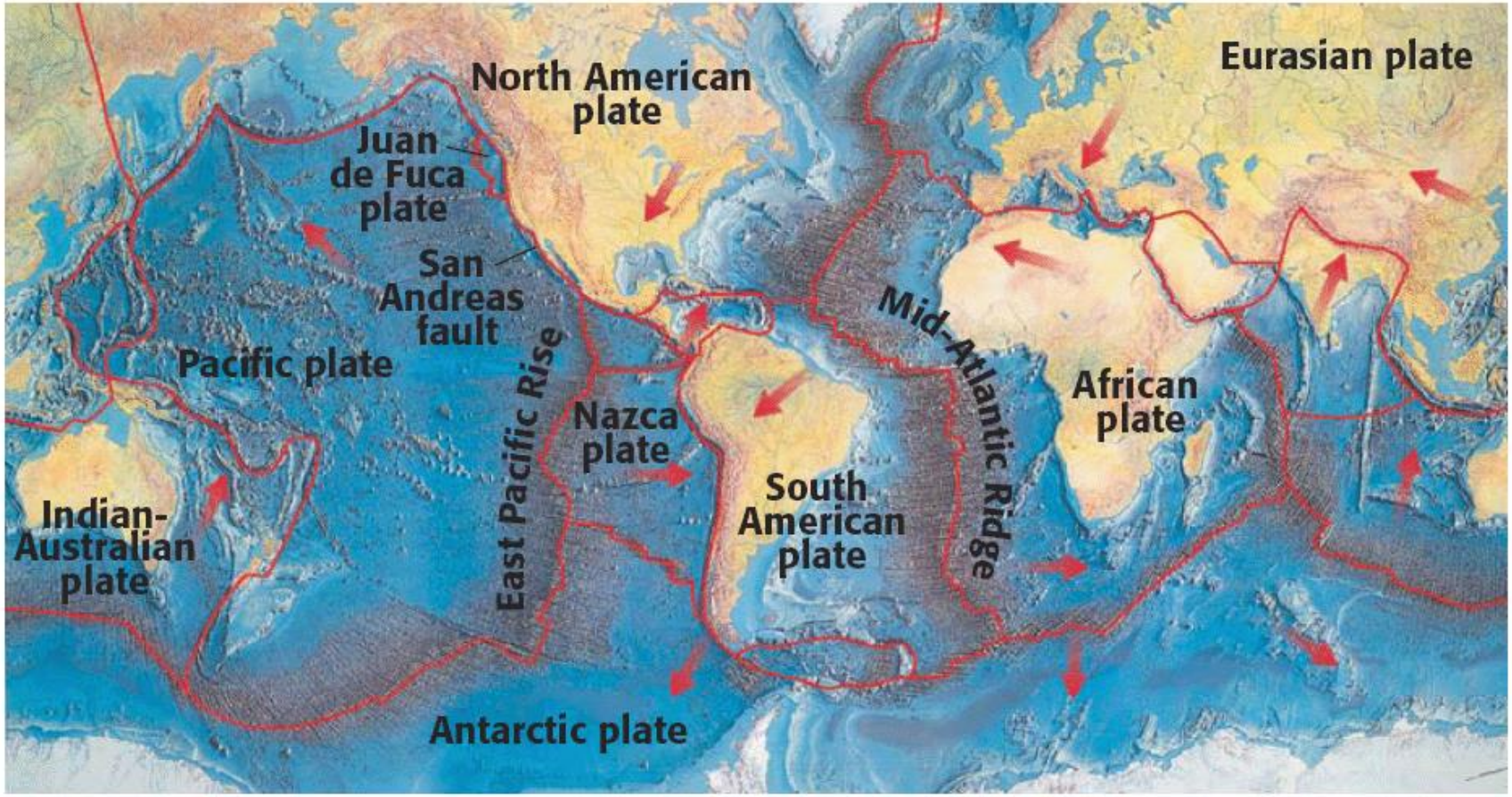

Plate Tectonics, *continued*

- It is unknown exactly why tectonic plates move.
  - One hypothesis suggests that plate movement results from convection currents in the asthenosphere, the hot, fluid portion of the mantle.
  - Another hypothesis suggests that plate movement results from the force of gravity acting on the plates.

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Plate Boundaries

- Mid-ocean ridges result from divergent boundaries.
  - The border between two plates is called a boundary.
- **Divergent boundary** a place where two plates are moving apart
- New rock forms between divergent boundaries.
- **Magma** liquid rock produced under Earth's surface

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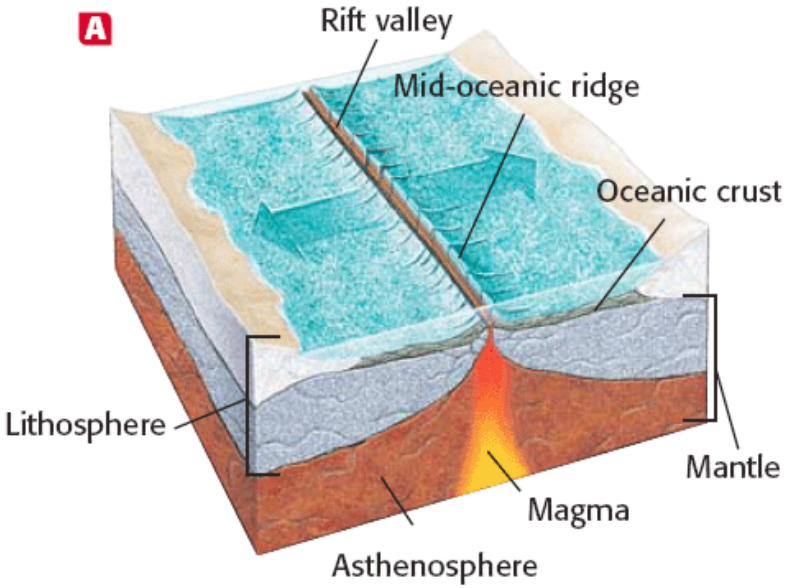
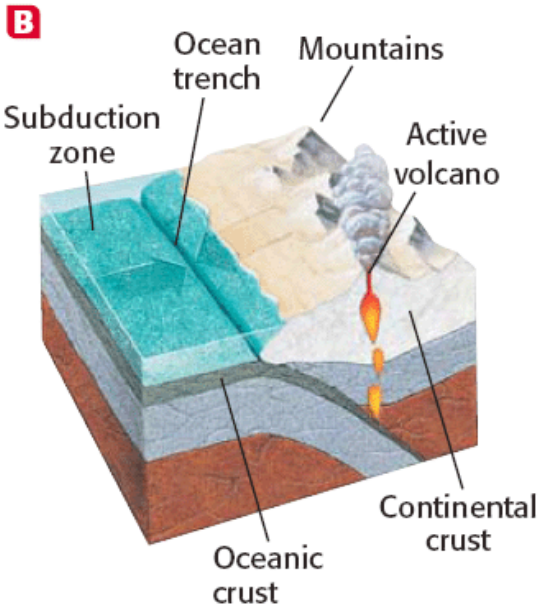
Divergent and Convergent Boundaries



A Tectonic plates move apart at divergent boundaries, forming rift valleys and mountain systems. When divergent boundaries occur in the oceanic crust they form a mid-oceanic ridge.



B Ocean trenches, volcanoes, and mountains form near the boundary where oceanic and continental plates collide.

Plate Boundaries, *continued*

- Oceanic plates dive beneath continental plates at convergent boundaries.
  - Plates slide over each other at a convergent boundary.
- **Subduction** the process by which one lithospheric plate moves beneath another as a result of tectonic forces
- The area where one plate slides over another is called a subduction zone. Subduction zones produce ocean trenches, mountains, and volcanoes.

End Of Slide

Plate Boundaries, *continued*

- Subduction of ocean crust generates volcanoes.
  - Chains of volcanoes form on the upper plate in a subduction zone.
  - These volcanoes can form far inland from their associated oceanic trench.

End Of Slide

Plate Boundaries, *continued*

- Colliding tectonic plates create mountains.
  - When two plates collide, mountains are formed at the boundary of the collision.
  - The Himalayas formed during the collision between the continental tectonic plate containing India and the Eurasian continental plate.

End Of Slide

Plate Boundaries, *continued*

- Transform fault boundaries can crack Earth.
  - Plate movement can cause breaks in the lithosphere.
- **Fault** a crack in Earth created when rocks on either side of a break move
  - Plate movement at transform fault boundaries is one cause of earthquakes.

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