



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. Around 1915, a German scientist named _____ noticed how continents fit together.

Alfred Wegener

p.702, 2. The supercontinent that fits together is called : _
Pangaea

p. 702, 3. Using _____ evidence showed that the supercontinent was together around _____ years ago.

Fossil, 200 million



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.





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.



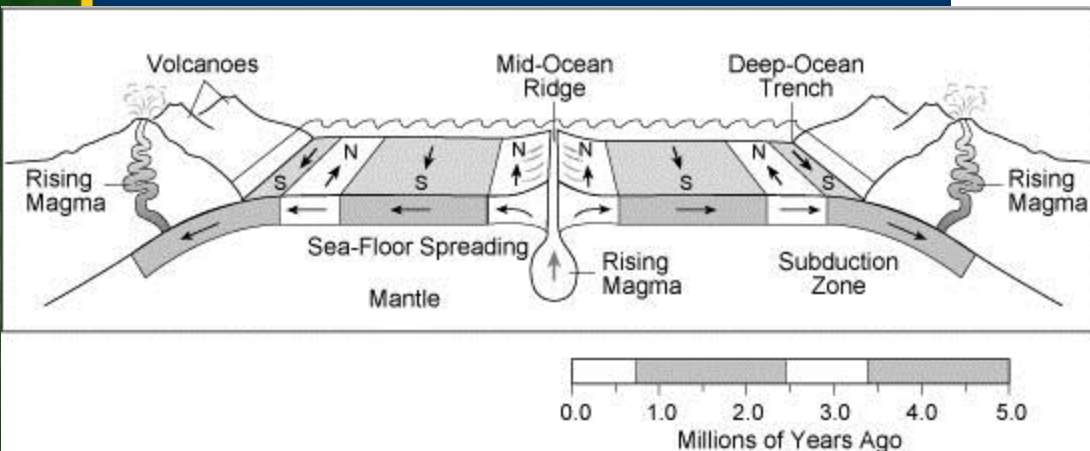
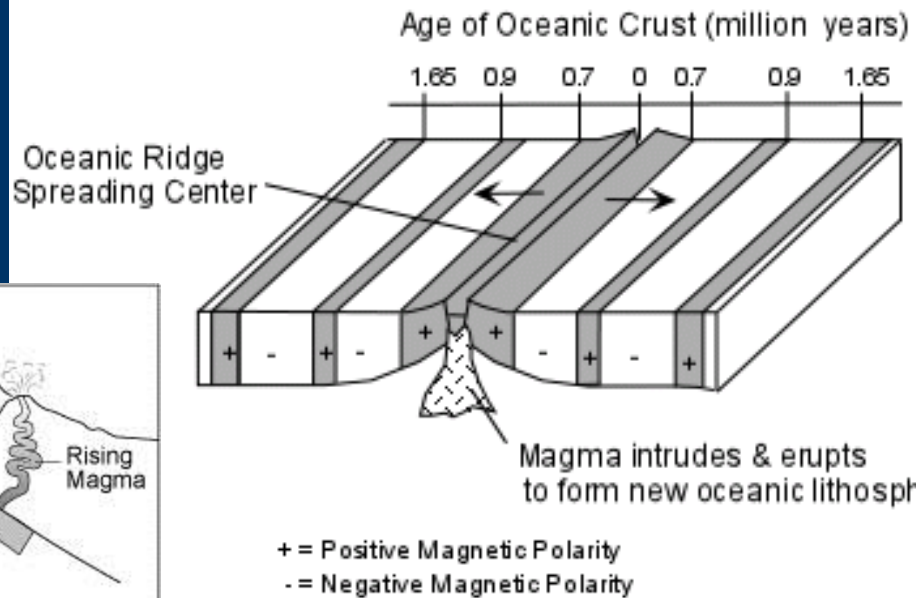
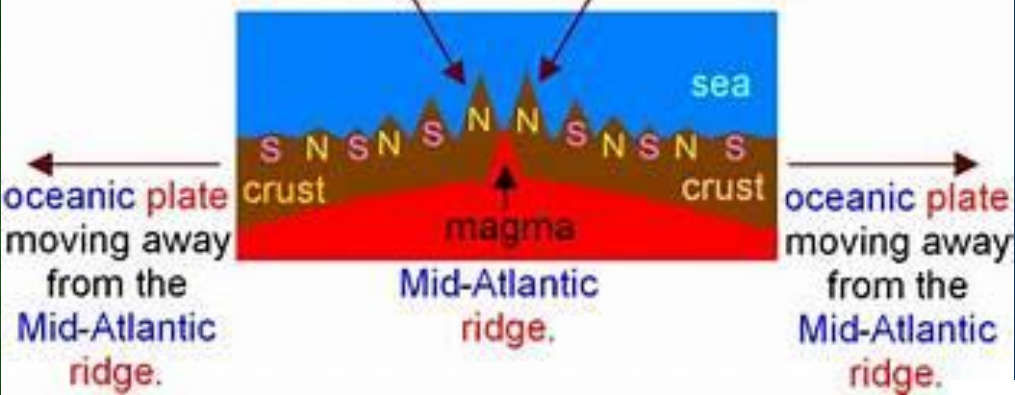


Plate Tectonics, *continued*

- 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.



magnetic field direction is symmetrical on each side of the Mid-Atlantic ridge.



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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





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

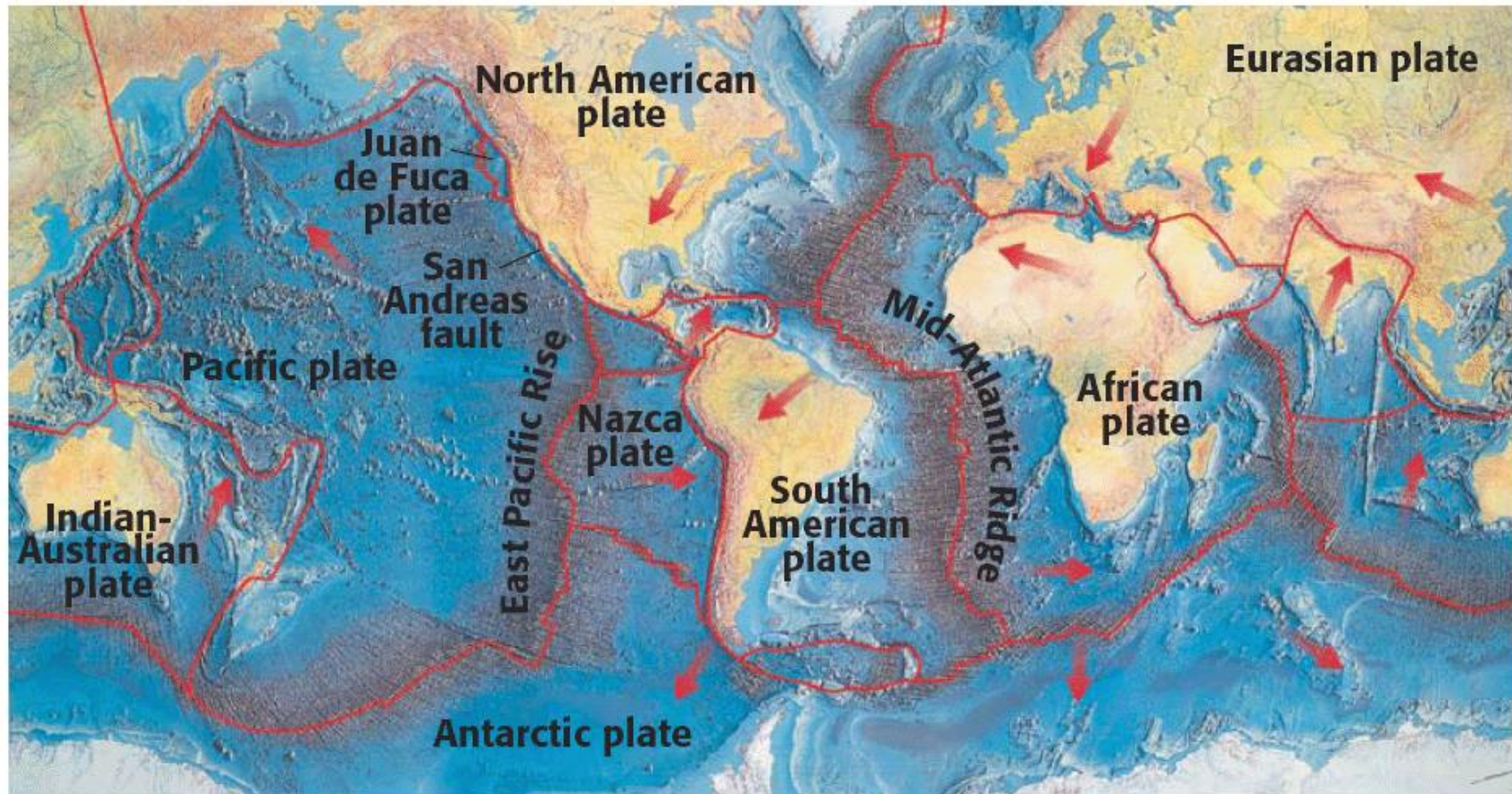


Chapter 21

Section 1 Earth's Interior and Plate Tectonics



Tectonic Plates



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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.**





Cool down

1. Alfred Wegner was from what country?

Germany

2. Name two evidences that help prove or support –
Plate Tectonics:

**Fossil evidence, magnetic alignment of rocks in
ocean crust**



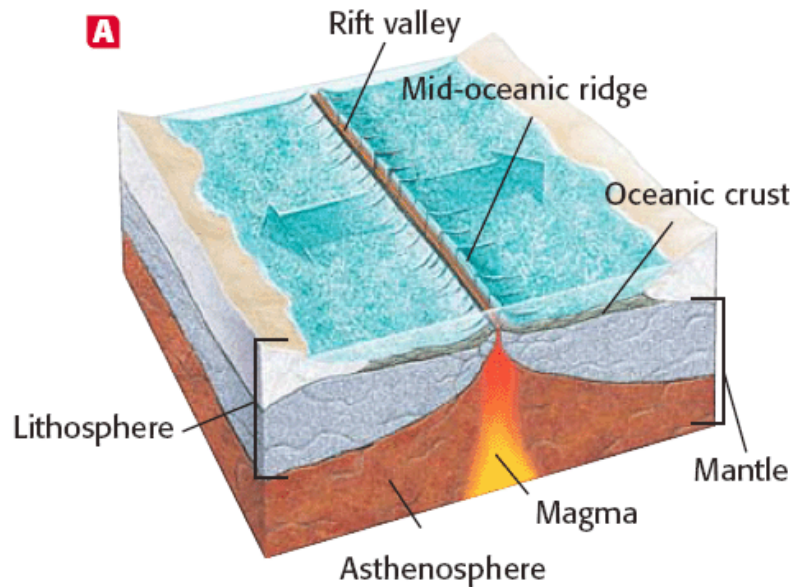
Plate Boundaries and Forces

- 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

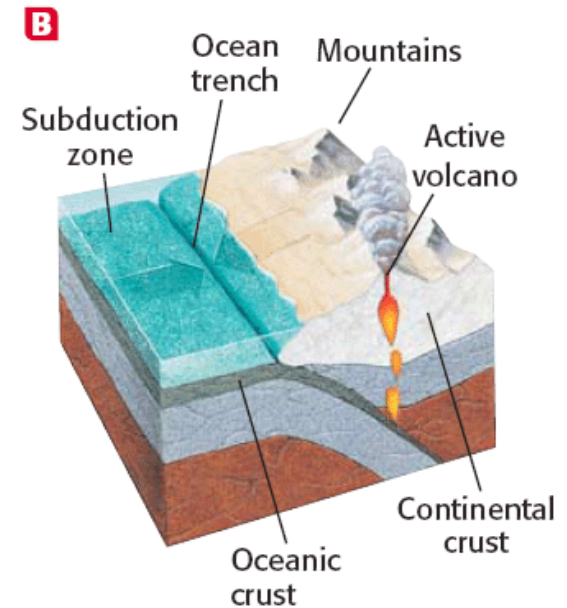




Divergent and Convergent Boundaries



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.





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.





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.





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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