Thursday, Sept 21, 2017

Pick up: vocab pg 28 and notes pg 29

Today you will:

- Finish the last 5 mins of "How the Earth was Made: The Ring of Fire"
- Notes on Divergent, Convergent & Transform boundaries pg 29

HOMEWORK:

Work on Ch. 10-Complete by 9/29

Wegener's Hypothesis

- **Continental drift** the hypothesis that states that the continents once formed a single landmass, broke up, and drifted to their present location
- The hypothesis of continental drift was first proposed by German scientist **Alfred Wegener** in 1912.
- Wegener used several different types of evidence to support his hypothesis

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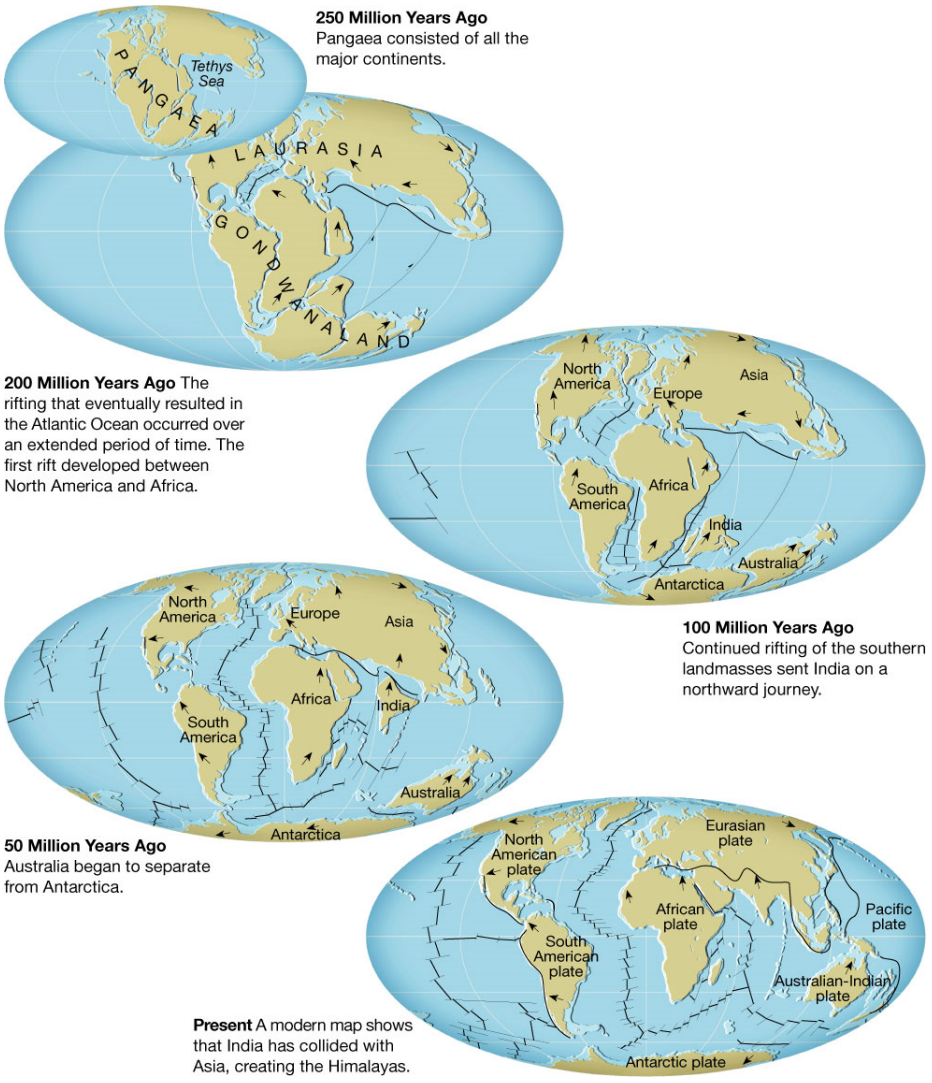
9.1 Continental Drift

An Idea Before Its Time

- Wegener's **continental drift** hypothesis stated that the continents had once been joined to form a single supercontinent.

  - Wegener proposed that the supercontinent, **Pangaea,** began to break apart 200 million years ago and form the present landmasses.

Breakup of Pangaea



250 Million Years Ago Pangaea consisted of all the major continents.

200 Million Years Ago The rifting that eventually resulted in the Atlantic Ocean occurred over an extended period of time. The first rift developed between North America and Africa.

100 Million Years Ago Continued rifting of the southern landmasses sent India on a northward journey.

50 Million Years Ago Australia began to separate from Antarctica.

Present A modern map shows that India has collided with Asia, creating the Himalayas.

Wegener's Hypothesis, *continued*

Wegener's Evidence

- Fossil Evidence: fossils of the same plants and animals could be found in areas of continents that had once been connected.

- Evidence from Rock Formations: ages and types of rocks in the coastal regions of widely separated areas matched closely.

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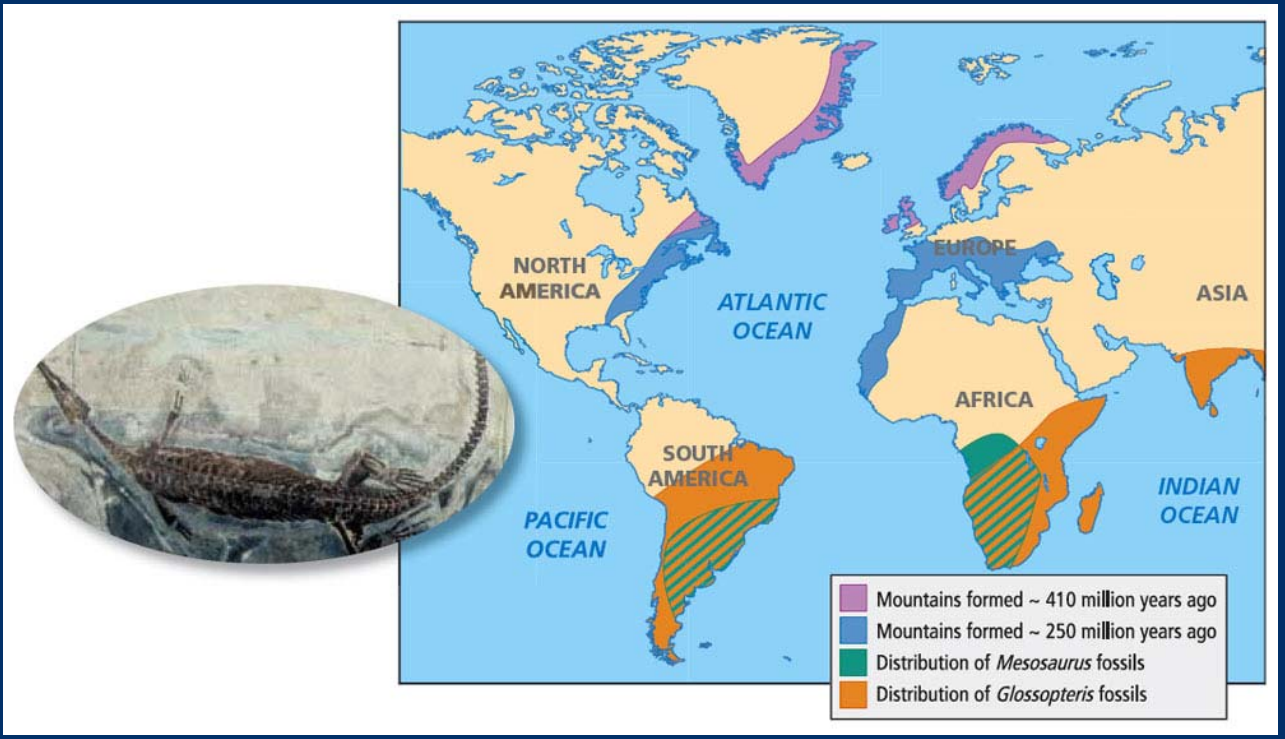
Climatic Evidence: changes in climatic patterns suggested the continents had not always been located where they are now.

Wegener's Hypothesis, *continued*

Similar rock formations and fossil evidence supported Wegener's hypothesis.



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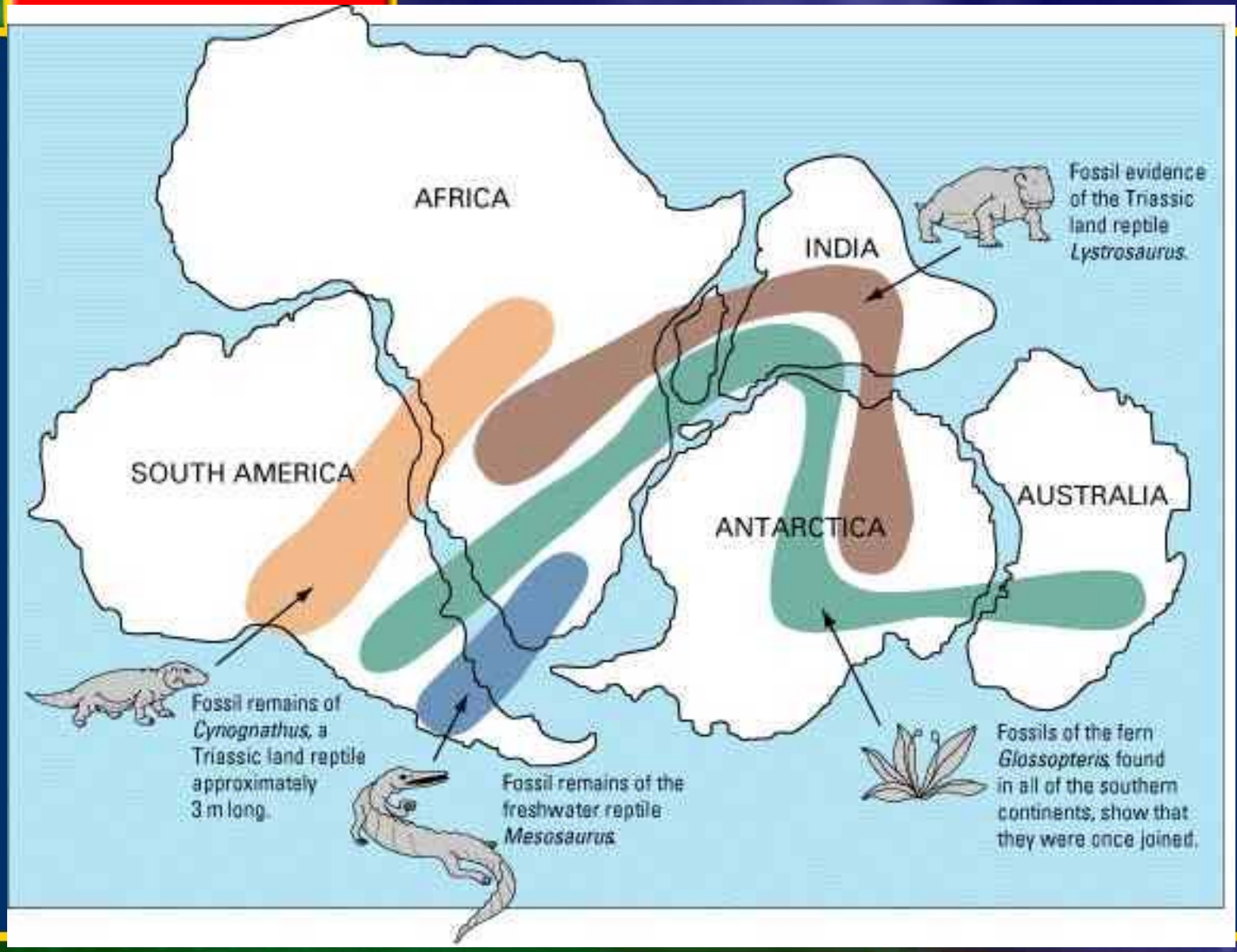

Wegener's Hypothesis, *continued*

Missing Mechanisms

- Wegener proposed that the continents moved by plowing through the rock of the ocean floor.
- Wegener's ideas were strongly opposed.
- Wegener's mechanism was disproved by geologic evidence.
- Wegener spent the rest of his life searching for a mechanism for the movement of continents.

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9.1 Continental Drift

Rejecting the Hypothesis

- A New Theory Emerges
  - Wegener could not provide an explanation of exactly what made the continents move. News technology lead to findings which then lead to a new theory called plate tectonics.

Mid-Ocean Ridges

- **Mid-ocean ridge** a long, undersea mountain chain that has a steep, narrow valley at its center, that forms as magma rises from the asthenosphere, and that creates new oceanic lithosphere (sea floor) as tectonic plates move apart

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Mid-Ocean Ridges, *continued*

In 1947, a group of scientists set out to map the Mid-Atlantic Ridge. While studying the Mid-Atlantic Ridge, scientists noticed two surprising trends.

1. The sediment that covers the sea floor is thinner closer to a ridge than it is farther from the ridge

2. The ocean floor is very young. Rocks on land are as old as 3.8 billion years. None of the oceanic rocks are more than 175 million years old.

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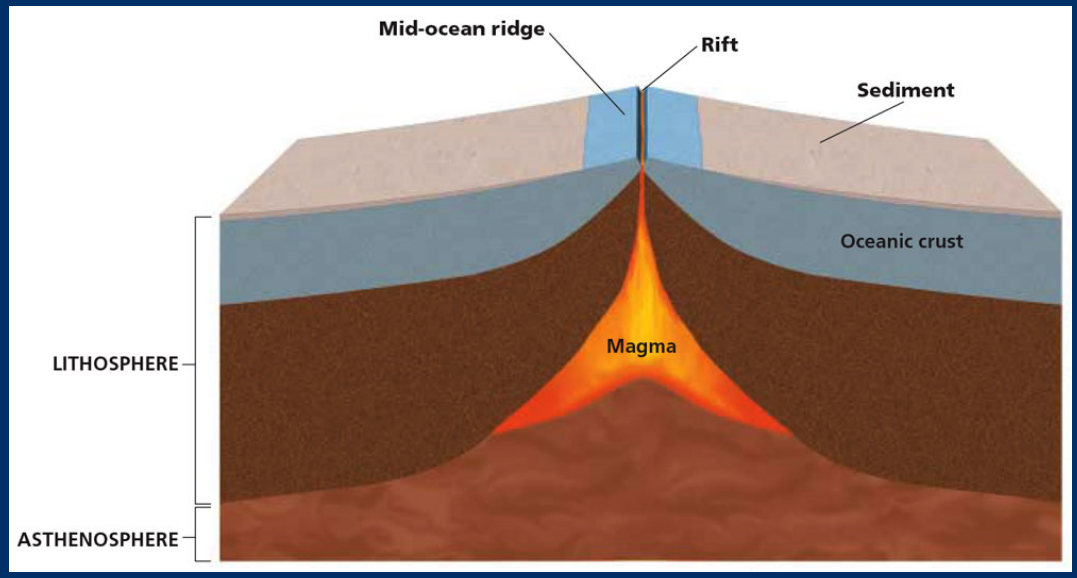
Mid-Ocean Ridges, *continued*

Rocks closer to a mid-ocean ridge are younger than rocks farther from the ridge. Rocks closer to the ridge are covered with less sediment than rocks farther from the ridge.



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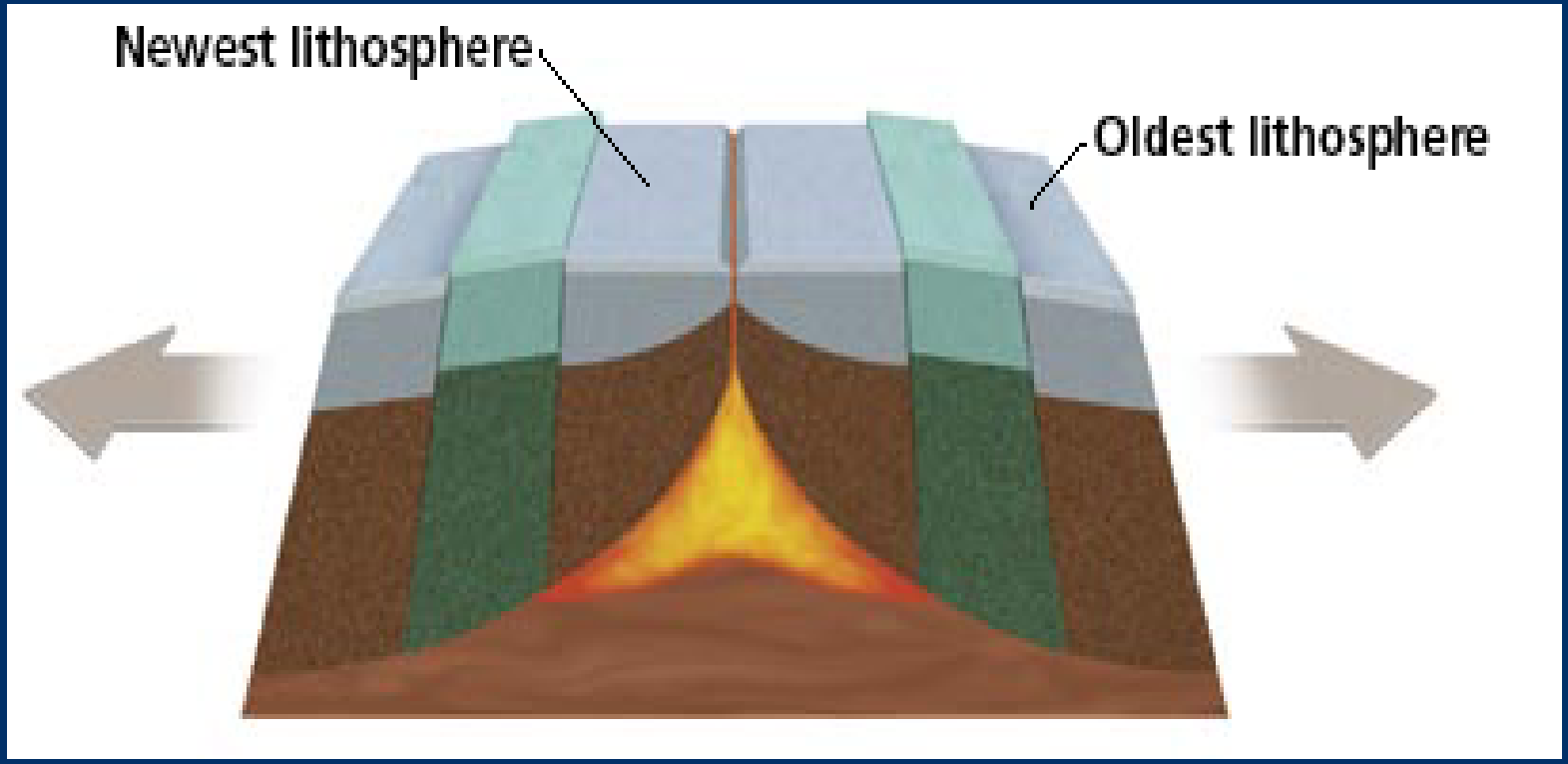
Sea-Floor Spreading, *continued*



Sea-Floor Spreading

- **Sea-floor spreading** the process by which new oceanic lithosphere (sea floor) forms as magma rises to Earth's surface and solidifies at a mid-ocean ridge

- **Paleomagnetism** the study of the alignment of magnetic minerals in rock, specifically as it relates to the reversal of Earth's magnetic poles; also the magnetic properties that rock acquires during formation

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Sea-Floor Spreading, *continued*

- In the late 1950's geologist Harry Hess proposed that the valley at the center of the mid-ocean ridge was a crack, or *rift*, in Earth's crust.
- As the ocean floor moves away from the ridge, molten rock, or magma, rises to fill the crack.
- Hess suggested that if the sea floor is moving, the continents might be moving also.
- He suggested this might be the mechanism that Wegener was searching for.

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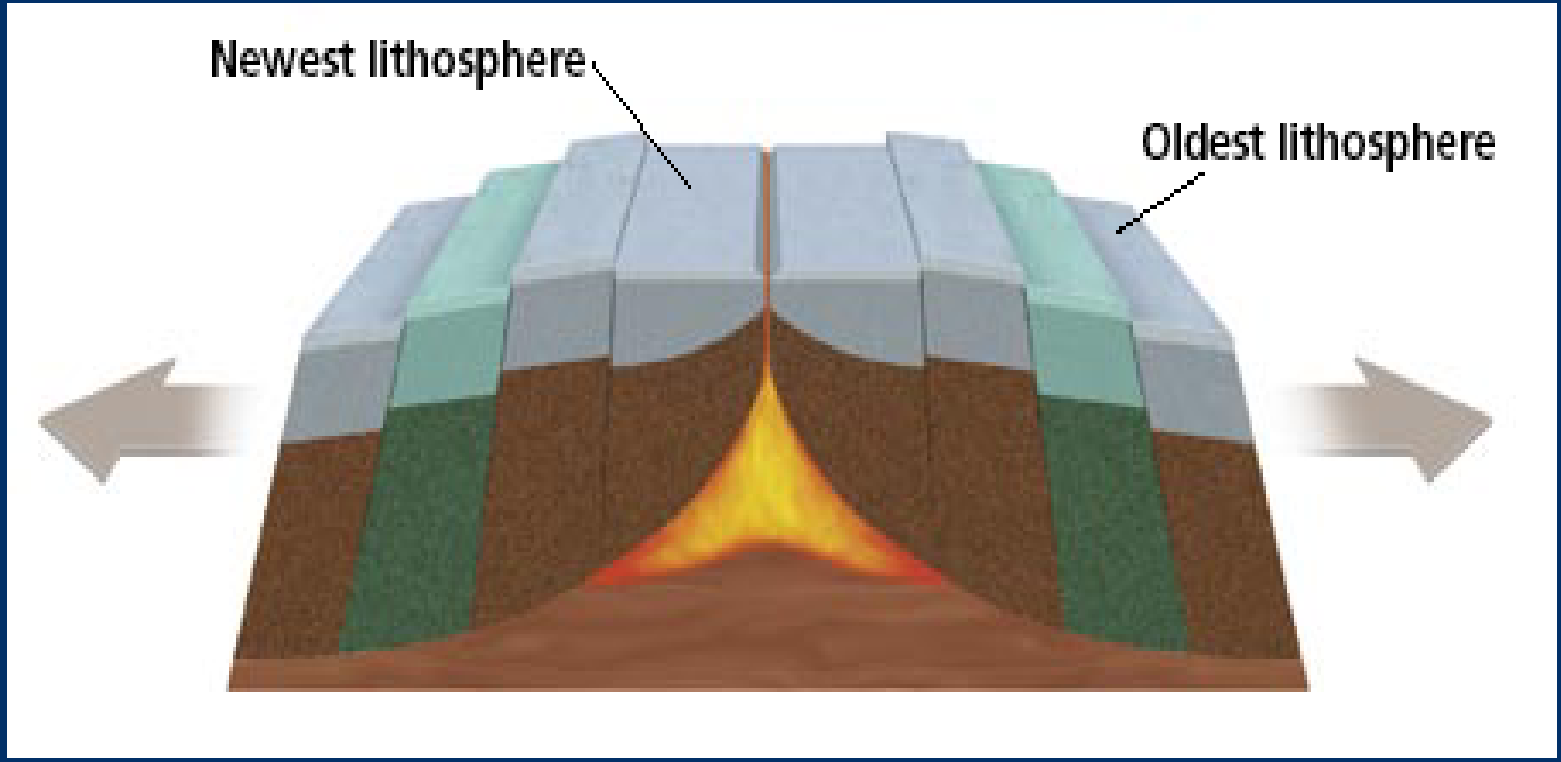
Sea-Floor Spreading, *continued*



9.4 Testing Plate Tectonics

Evidence for Plate Tectonics

- **Paleomagnetism** is the natural remnant magnetism in rock bodies; this permanent magnetization acquired by rock can be used to determine the location of the magnetic poles at the time the rock became magnetized.

  - **Normal polarity**—when rocks show the same magnetism as the present magnetism field
  - **Reverse polarity**—when rocks show the opposite magnetism as the present magnetism field

Polarity of the Ocean Crust