Chapter 4 study guide

Lesson 1

Wegener is the German scientist who first proposed continental drift and the super continent Pangea. The continental drift hypothesis said that continents have moved slowly to their current locations. Wegener had very strong evidence to support the continental drift hypothesis:

Evidence from fossils, *Glossopteris*

Evidence from rocks

Evidence from past climate

However, Wegener did not have a good answer for what forces cause the continents to move, and his hypothesis was rejected until years after his death.

Lesson 2

Describe seafloor spreading. Know that the youngest rocks on the ocean floor are near the mid-oceanic ridge, while the older rocks are far away (closer to the continents).

The main evidence for seafloor spreading comes from magnetic reversals recorded in the iron minerals of seafloor rock. When new rock forms along an oceanic ridge, its iron minerals align with the current direction of Earth’s magnetic field. However, some older rocks on the ocean floor have their minerals aligned in the opposite direction. Some rocks older than those have their iron minerals aligned in the normal way, and so on.

Lesson 3

Describe the modern theory of plate tectonics. Know that a scientific theory is NOT a guess or something unknown.

Tectonic plates only move a few centimeters per year. We can see where plate boundaries exist because of the results of plate interactions.

Convergent plate boundaries are where plates smash together. Continental convergent boundaries form mountains. Convergent boundaries between continental and oceanic crust form oceanic trenches and volcanoes. Oceanic crust is denser and moves underneath less dense continental crust in a process called subduction. Subduction is how rock is recycled in the rock cycle to make new igneous rock. When two oceanic plates converge a line of volcanoes may form.

Divergent plate boundaries are where plates move apart. Oceanic divergent boundaries form mid-oceanic ridges. Continental divergent boundaries form rift valleys.

Transform plate boundaries are when plates slide past each other. Earthquakes are associate with transform boundaries, e.g. the San Andreas fault in California.

Three forces drive plate motion:

1. Ridge push—gravity pushes down on ocean ridges.
2. Basal drag—convection currents in the asthenosphere drag on the lithosphere above it. Convection currents form when a hot liquid rises (hot things are less dense), and then sinks after cooling (cold things are more dense).
3. Slab pull—gravity pulls down on subducting oceanic crust.