Section 1  Continental Drift

A. The **continental drift** hypothesis—continents have moved slowly to their current locations

1. All continents were once connected as one large landmass now called **Pangaea**.

2. The land mass broke apart, and the **continents** drifted to their present positions.

3. Evidence for continental drift
   a. **Puzzle-like** fit of the continents
   b. Similar **fossils** have been found on different continents.
   c. Remains of warm-weather plants in **Arctic** areas and glacial deposits in **tropical** areas suggest that continents have moved.
   d. Similar **rock** structures are found on different continents.

B. At first, continental drift was not accepted because no one could explain **how** or **why** continents had moved.

**DISCUSSION QUESTION:**
Why is the fact that similar fossils have been found on different continents considered evidence for continental drift? *If fossils of similar plants and animals are found on widely separated continents, it is more likely that the continents had once been joined than that the plants and animals migrated.*

Section 2  Seafloor Spreading

A. Using **sound** waves, scientists discovered a system of underwater mountain ranges called the mid-ocean ridges in many oceans.

B. In the 1960s, Harry Hess suggested the theory of **seafloor spreading** to explain the ridges.

1. Hot, less dense material below Earth’s **crust** rises upward to the surface at the mid-ocean ridges.

2. Then, it flows sideways, carrying the **seafloor** away from the ridge.

3. As the seafloor spreads apart, **magma** moves up and flows from the cracks, cools, and forms new seafloor.

C. Evidence for seafloor spreading

1. **Youngest** rocks are located at mid-ocean ridges.

2. Reversals of Earth’s **magnetic** field are recorded by rocks in strips parallel to ridges.

**DISCUSSION QUESTION:**
How could seafloor spreading be related to continental drift? *If the seafloor is constantly spreading apart and moving, it will affect and move the continents as well.*
Content Outline for Teaching (continued)

Section 3  Theory of Plate Tectonics

A. Plate movements
   1. Earth's crust and upper mantle are broken into sections.
   2. The sections, called plates, move on a plasticlike layer of the mantle.
   3. The plates and upper mantle form the lithosphere.
   4. The plasticlike layer below the lithosphere is called the asthenosphere.

B. Plate boundaries
   1. Plates moving apart—divergent boundaries
   2. Plates moving together—convergent boundaries
      a. Denser plates sink under less dense plates.
      b. Newly formed hot magma forced upward forms volcanic mountains.
   3. Plates collide
      a. Plates crumple up to form mountain ranges.
      b. Earthquakes are common.
   4. Plates slide past—called transform boundaries; sudden movement can cause earthquakes.

C. Convection inside Earth—the cycle of heating, rising, cooling, and sinking of material inside Earth is thought to be the force behind plate tectonics.

D. Features caused by plate tectonics
   1. Faults and rift valleys
   2. Mountains and volcanoes
   3. Strike-slip faults—cause of earthquakes

E. Testing for plate tectonics—scientists can measure movements as little as 1 cm per year.

DISCUSSION QUESTION:
What will happen if a continental plate collides with an oceanic plate? A continental plate with a continental plate? Why? The denser plate will always subduct, or bend under, the less dense plate. Oceanic plates are denser than continental plates, so the oceanic plate will sink under it. When two continental plates collide, neither will subduct because they are both less dense than the asthenosphere beneath them. Instead, they will crumple up and form mountain ranges.
Chapter Review (page 37)

Part A. Vocabulary Review
1. asthenosphere (6/3)
2. convection current (6/3)
3. plate tectonics (5/3)
4. subduction zone (5/3)
5. transform boundary (5/3)
6. convergent boundary (5/3)
7. lithosphere (6/3)
8. magnetometer (4/2)
9. Pangaea (1/1)
10. continental drift (1/1)
11. divergent boundary (5/3)
12. plates (5/3)
13. mantle (6/3)
14. crust (6/3)
15. strike-slip fault (7/3)
16. seafloor spreading (3/2)

Part B. Concept Review
1. crust (6/3)
2. lithosphere (6/3)
3. asthenosphere (6/3)
4. oceanic crust (6/3)
5. upper mantle (6/3)
6. All are boundaries of tectonic plates, but they behave in different ways. At divergent boundaries, plates move away from each other. Convergent boundaries occur when two plates move together. Then one of three things will happen: one plate may sink under the other; one plate may bend and slide under the other; or both may crumple. A transform boundary occurs when two plates slide past one another. (5/3)
7. Scientists hypothesize that the cycle of heating, rising, cooling, and sinking of the hot, plastic-like rock in the asthenosphere provides the energy to move plates in the lithosphere. (6/3)
8. Some new ideas are so different from people's thinking that people cannot accept them. New ideas should be backed by some evidence before they are accepted. (1/1)