



Section 1 Continental Drift

Underlined words and phrases are to be filled in by students on the Note-taking Worksheet.

- 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.*

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:

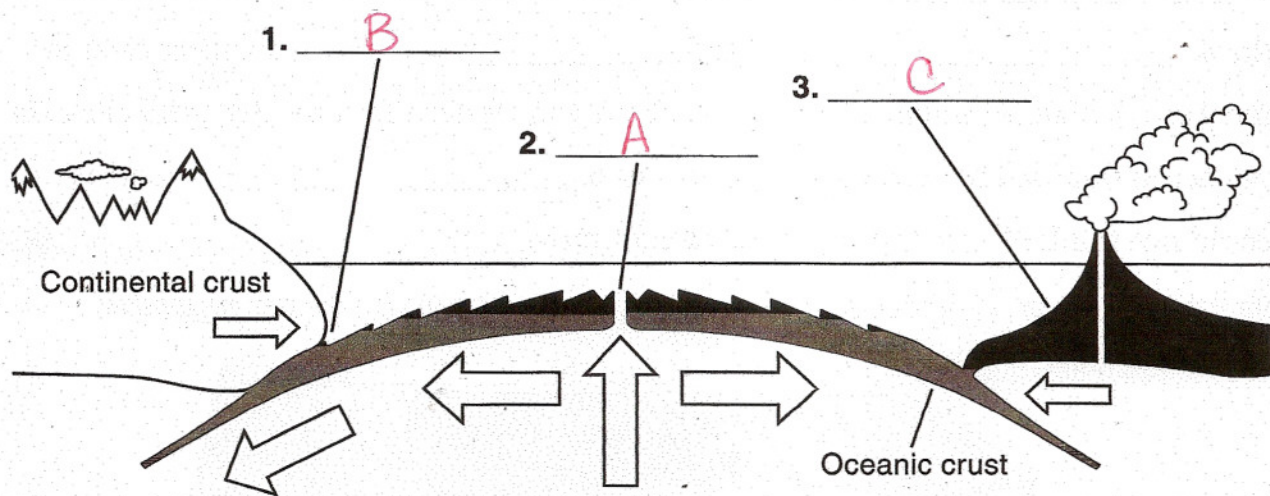
What will happen if a continental plate collides with an oceanic plate? A continental plate with a continental plate? Why? *The denser plate will always subduct, or bend under, the less dense plate. Oceanic plates are denser than continental plates, so the oceanic plate will sink under it. When two continental 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.*

Directed Reading for
Content Mastery

Overview Plate Tectonics

Directions: Study the following diagram. Then label each part with the letter of the correct description below.

- A. A mid-ocean ridge forms whenever diverging plates continue to separate, creating a new ocean basin. As the rising magma cools, it forms new ocean crust.
- B. When an oceanic plate converges with a less dense continental plate, the denser oceanic plate sinks under the continental plate.
- C. When two oceanic plates converge, the denser plate is forced beneath the other plate and volcanic islands form above the sinking plate.



Directions: Circle the words in parentheses that best complete the sentences below.

4. (Fossils, Human bones), rocks, and climate provided Wegener with support for his continental drift theory.
5. The fact that the (youngest, oldest) rocks are located at the mid-ocean ridges is evidence for seafloor spreading.
6. The transfer of (solar, heat) energy inside Earth moves plates.

Directed Reading for
Content Mastery

Section 1 ■ Continental Drift

Section 2 ■ Seafloor Spreading

Directions: Complete the paragraph by filling in the blanks using the words below.

Pangaea
continents

Arctic
Africa

rock
seafloor spreading

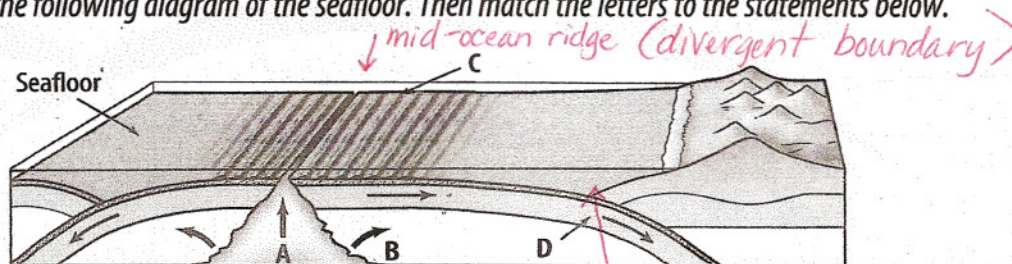
Alfred Wegener was one of the first people to suggest that all of the

1. Continents were joined together in the past. He called the one large continent 2. Pangaea. Evidence exists to support his hypothesis.

For example, similar fossils have been found in South America and

3. Africa. Also, fossils of warm weather plants have been found in the 4. Arctic. Similar 5. rock structures exist in the Appalachian Mountains and in Greenland and western Europe. But until clues on the ocean floor led to Harry Hess's theory of 6. seafloor spreading, scientists could not think of how the continents might move.

Directions: Study the following diagram of the seafloor. Then match the letters to the statements below.



- C 7. Molten rock flows onto the seafloor and hardens as it cools.
- A 8. Hot, molten rock is forced upward toward the seafloor at a mid-ocean ridge.
- D 9. New seafloor moves away from the ridge, cools, becomes denser, and sinks.
- B 10. Molten rock pushes sideways in both directions as it rises, moving the mantle with it.



Plate Tectonics

Part A. Vocabulary Review

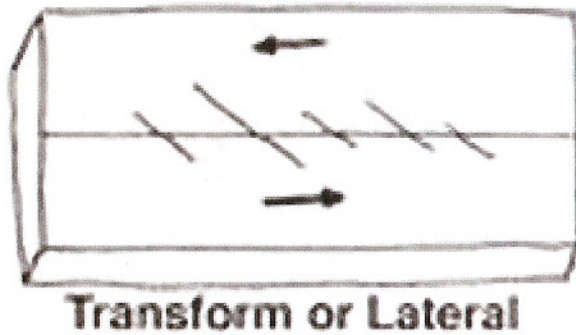
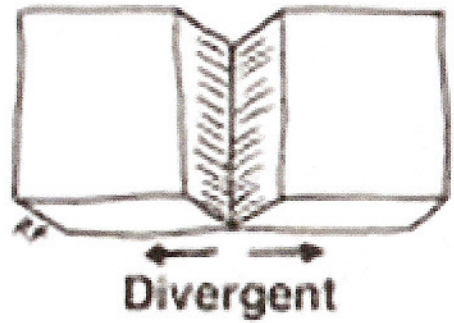
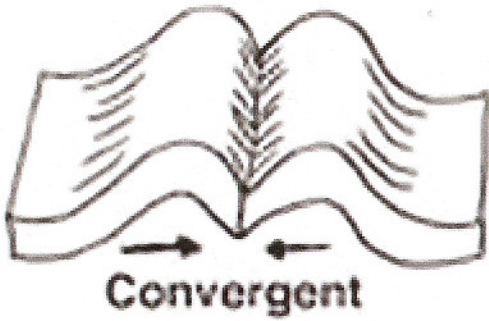
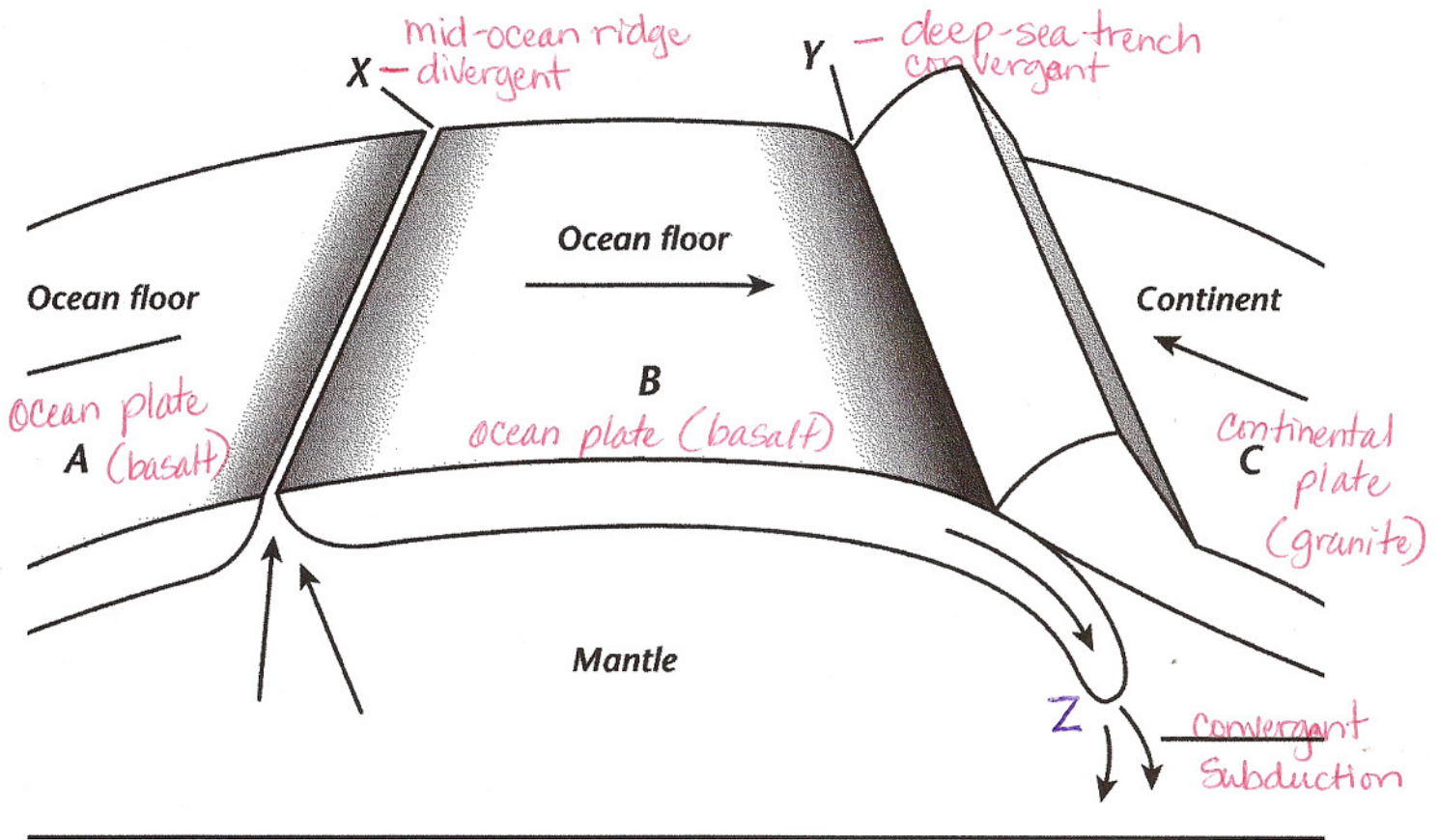
Directions: Write the term that matches each description below in the spaces provided. Then unscramble the letters in the boxes to reveal the mystery phrase.

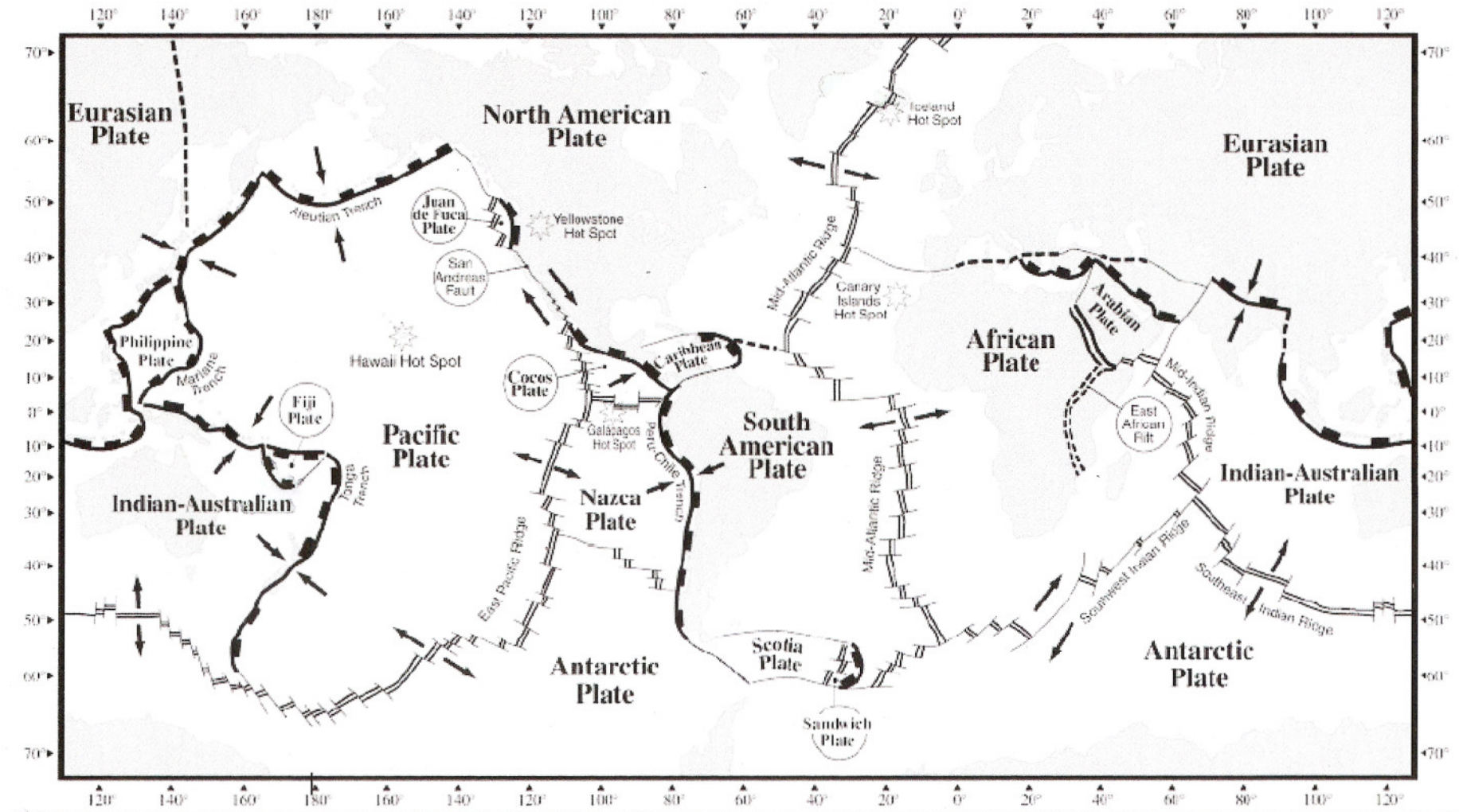
1. ASthenosphere
2. convection current
3. Plate tectonics
4. subduction zone
5. transform boundary
6. convergent boundary
7. Lithosphere
8. magnetometer
9. Pangaea
10. continental drift
11. divergent boundary
12. plates
13. mantle
14. crust
15. Strike - slip fault

1. plasticlike layer of Earth's surface below the lithosphere
2. cycle of heating, rising, cooling, and sinking
3. theory that states that Earth's crust and upper mantle are broken into sections, which move around on a special layer of the mantle
4. area where an oceanic plate goes down into the mantle
5. plate boundary that occurs when two plates slide past one another
6. place where two plates move together
7. rigid layer of Earth's surface made up of the crust and a part of the upper mantle
8. sensing device that detects magnetic fields, helping to confirm seafloor spreading
9. one large landmass hypothesized to have broken apart about 200 million years ago into continents
10. hypothesis that the continents have moved slowly to their current locations
11. boundary between two plates that are moving apart
12. sections of Earth's crust and upper mantle
13. largest layer of Earth's surface, composed mostly of silicon, oxygen, magnesium, and iron
14. outermost layer of Earth's surface
15. where rocks on opposite sides of a fault move in opposite directions or in the same direction at different rates
16. Mystery phrase:
seafloor spreading

rorpsfgnloadeeasi

Plate Boundaries





KEY:



NOTE: Not all plates and boundaries are shown.