

Prepare Your Own Summary

In this chapter, you learned how heat transfer in Earth moves large pieces of rock at the surface. Create your own summary of the key ideas from this chapter. You may include graphic organizers or illustrations with your notes. (See Science Skill 11 for help with using graphic organizers.) Use the following headings to organize your notes:

1. Continental Drift Theory
2. Plate Tectonics
3. Plate Boundaries
4. Volcanoes
5. Earthquakes

Checking Concepts

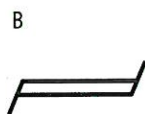
1. Why did Wegener call his hypothetical supercontinent Pangaea?
2. Create a series of Venn diagrams to compare and contrast the following terms.
 - (a) asthenosphere and lithosphere
 - (b) shield volcanoes and rift eruptions
 - (c) P-waves and S-waves
 - (d) seismometers and seismograms
 - (e) focus of an earthquake and epicentre
3. Explain how the following pieces of evidence supported the continental drift theory.
 - (a) matching continental margins
 - (b) similar animal fossils in South America and Africa
 - (c) similar rock types and structures in North America and northern Europe
 - (d) magnetic striping in rocks
4. Why do earthquakes and volcanoes occur at tectonic plate boundaries?
5. Describe the age of rocks relative to their distance from an ocean ridge at a divergent plate boundary.
6. What plate boundaries experience the deepest earthquakes? Explain your answer.
7. Explain how sea floor spreading occurs.
8. Where do shield volcanoes occur?
9. Why do composite volcanoes usually produce violent eruptions?
10. Describe two similarities and two differences between P-waves and S-waves.
11. What causes earthquakes?

Understanding Key Ideas

12. In the early 1600s, the English philosopher and statesman Sir Francis Bacon suggested that South America and Africa looked like broken parts of the same piece of continent. What later theory explained his observation?
13. Match the mapping symbols given below with the correct tectonic plate boundaries.



Transform plate boundary



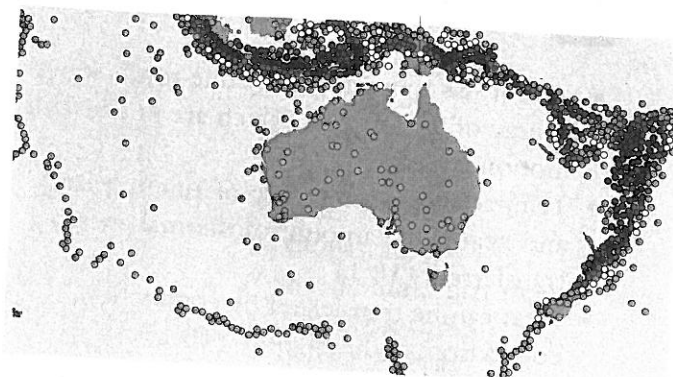
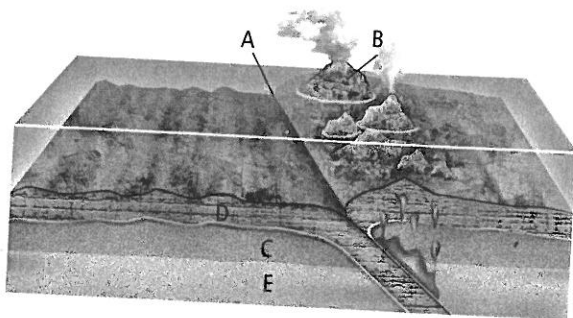
Convergent plate boundary



Divergent plate boundary

14. Volcanoes do not usually form at continental-continental plate boundaries or transform plate boundaries. Why not?
15. How does the pattern of mountain ranges on different continents provide evidence for continental drift?
16. Describe what might happen if mantle convection suddenly stopped.
17. How does studying volcanoes give geologists clues about Earth's interior?

18. Explain why most volcanic activity on Earth occurs at or near tectonic plate boundaries.
19. Although rift eruptions are not violently explosive, what effects would be caused by such an eruption in southwestern British Columbia?
20. Earthquakes occur frequently, all over the world. Why is it difficult to study earthquakes as they occur?
21. Label the features on the tectonic plate boundary shown below.



Depth in metres

- | | | |
|--------------|----------------|----------------|
| • 0 to -35 | • -70 to -150 | • -300 to -500 |
| • -35 to -70 | • -150 to -300 | • -500 to -800 |

- (a) What types of plate boundaries are shown in the diagram?
- (b) Which way are the plates moving relative to each other?
- (c) Which circle colour indicate the location of what were likely the most destructive earthquakes mapped in the diagram?
- (d) Why do earthquakes occur in Australia?

22. A geologist studying ancient lava flows in central British Columbia discovers three different layers of flows, one on top of the other. She analyzes samples of each flow and determines that the middle flow has a magnetic orientation exactly opposite to that of the flows above and below it. What can she conclude from her observation?

Applying Your Understanding

23. Australia is part of the Indo-Australian Plate. As the tectonic plate is pushed north, it collides with the Eurasian Plate, the Philippine Plate, and the Pacific Plate. The plate interactions cause a great deal of stress to build up in the interior of the Indo-Australian Plate. The diagram below is a map of the Indo-Australian Plate. The shapes on the map indicate different depths of earthquake foci on the plate and at the plate boundary. Use the information above and the diagram below to answer the questions that follow.

Pause and Reflect

Ancient Hawaiians noticed that the northwest islands of Hawaii had different types of soil and plants than the southeast islands. These differences supported their belief that the northwest islands were much older than the southeast islands. How does the knowledge of the ancient Hawaiians relate to the plate tectonic theory and the concept of geologic hot spots?