**Earth's Interior** (pp. 124–131)

This section explains how scientists learn about Earth's interior. The section also describes the layers that make up Earth and explains why Earth acts like a giant magnet.

**Use Target Reading Skills**

Before you read the passage for each heading, fill in the top box with what you know. After you have read the passage, fill in the bottom box with what you have learned.

<table>
<thead>
<tr>
<th>What You Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Earth's crust is made of rock.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What You Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
</tbody>
</table>

**Exploring Inside Earth** (pp. 125–126)

1. What prevents geologists from directly exploring Earth's interior?

2. Geologists use direct evidence from _________ to learn about Earth's interior.

3. Geologists learn about Earth's interior using indirect evidence from _________.

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Plate Tectonics  •  Guided Reading and Study

Earth's Interior (continued)

4. Is the following sentence true or false? Earth looks the same today as it did millions of years ago. ______________

5. Seismic waves reveal the structure of Earth through their ______________ and ______________.

6. Circle the letter of each sentence that is true about Earth.
   a. Indirect evidence of Earth's interior comes from studying rock samples.
   b. Geologists cannot observe Earth's interior directly.
   c. It is over 6,000 kilometers from the surface to the center of Earth.
   d. Geologists learn about Earth's interior by drilling holes.

7. ______________ waves are produced by earthquakes.

A Journey to the Center of Earth (p. 127)

8. How does the temperature change as you go from the surface toward the center of Earth? ________________________________
   ________________________________

9. How does pressure change as you go from the surface toward the center of Earth? ________________________________

10. The three main layers that make up Earth are the ______________, ______________, and ______________.

The Crust (p. 128)

11. The ______________ is a layer of rock that forms Earth's outer skin.

12. Is the following sentence true or false? The crust is thinnest under high mountains. ______________

13. The dark-colored rock that makes up most of the oceanic crust is ____________________.

14. The light-colored rock that makes up most of the continental crust is ____________________.
**The Mantle (p. 129)**

Match the name of each layer of the mantle with its description.

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. lower mantle</td>
<td>a. Rigid layer that includes the upper part of the mantle and the crust</td>
</tr>
<tr>
<td>16. lithosphere</td>
<td>b. Solid material beneath the asthenosphere</td>
</tr>
<tr>
<td>17. asthenosphere</td>
<td>c. Soft layer just below the lithosphere</td>
</tr>
</tbody>
</table>

18. Is the following sentence true or false? The asthenosphere is not considered solid because it can bend like plastic. ______

19. Is the following sentence true or false? The mantle is nearly 3,000 kilometers thick. ______

**The Core (pp. 130–131)**

20. Circle the letter of each sentence that is true about Earth’s outer core.

   a. It is under low pressure.
   b. It is made of solid metal.
   c. It contains iron and nickel.
   d. It is a solid.

21. Circle the letter of each sentence that is true about Earth’s inner core.

   a. It consists of molten metal.
   b. It is a thick liquid.
   c. It is not very dense.
   d. It is under extreme pressure.
Earth's Interior (continued)

22. In the drawing, label the three main layers of Earth.

23. Describe how a compass needle aligns itself.

24. What creates Earth's magnetic field?
Plate Tectonics  •  Guided Reading and Study

Convection and the Mantle (pp. 132–135)

This section describes how heat is transferred from Earth's hot core through the mantle.

Use Target Reading Skills

As you read about heat transfer, complete the outline to show the relationships among the headings.

<table>
<thead>
<tr>
<th>Convection and the Mantle</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
</tr>
<tr>
<td>A.</td>
</tr>
<tr>
<td>B. Conduction</td>
</tr>
<tr>
<td>C.</td>
</tr>
<tr>
<td>II. Convection Currents</td>
</tr>
<tr>
<td>III.</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Types of Heat Transfer (pp. 133–134)

1. The movement of energy from a warmer object to a cooler object is called

2. List the three types of heat transfer.
   a. ___________________  b. ___________________  c. ___________________

3. What is radiation? ____________________________

4. What are two forms of radiation? ____________________________

5. What is conduction? ____________________________

6. What is an example of conduction? ____________________________
Plate Tectonics  *  Guided Reading and Study

Convection and the Mantle (continued)

7. What is convection?

8. Heat transfer by convection is caused by differences of ____________ and density within a fluid.

9. A measure of how much mass there is in a volume of a substance is ____________.

10. Circle the letter of the sentence that describes what happens to a fluid when its temperature increases.
   a. Its particles occupy less space.
   b. Its density decreases.
   c. Its particles move more slowly.
   d. Its particles settle together more closely.

Convection Currents (p. 134)

11. What three factors set convection currents in motion?

12. What happens to convection currents when the liquid or gas is no longer heated?
Convection Currents in Earth (p. 135)

13. Complete the graphic organizer to show the relationships among heat, movement, and density in mantle rock.

Mantle rock a.

Particles move b. 

Particles occupy c. 
Density increases.

Mantle rock d.

Mantle rock rises

Particles move faster. 
Particles occupy more space.

Mantle rock e.

f. Why is this relationship shown as a cycle?

14. Is the following sentence true or false? The heat source for the convection currents in the mantle is the sun.
Drifting Continents (pp. 136–140)

This section describes a theory of how the continents came to be located where they are today. The section also gives evidence for the theory and explains why the theory was not accepted for many years.

Use Target Reading Skills

As you read about the evidence that supports the theory of continental drift, complete the graphic organizer.

Continental Drift (pp. 137–139)

1. State Alfred Wegener’s hypothesis about how Earth’s continents have moved.

2. Wegener named his supercontinent _____________.

3. What did Wegener think had happened to this supercontinent?

4. Wegener’s idea that the continents slowly moved over Earth’s surface became known as ____________________.
Plate Tectonics  •  Guided Reading and Study

5. Circle the letter of each sentence that supports Wegener's hypothesis.
   a. Some continents match up like jigsaw puzzle pieces.
   b. Different rock structures are found on different continents.
   c. Fossils of tropical plants are found near the equator.
   d. Continental glaciers once covered South Africa.

6. Give an example of evidence from land features that supported Wegener's idea of continental drift.

7. Any trace of an ancient organism preserved in rock is called a(n) ________

8. How did Wegener explain similar fossils on different continents?

9. Is the following sentence true or false? Wegener believed that continental drift explained fossils of tropical plants found in places that today have a polar climate.

Wegener's Hypothesis Rejected (p. 140)

10. How did Wegener think that mountains formed?

11. How do the locations of mountains support Wegener's idea about how mountains form?
Plate Tectonics  Guided Reading and Study

Sea-Floor Spreading (pp. 141–147)
This section explains sea-floor spreading and describes evidence that it happens. The section also explains subduction and describes how subduction affects Earth's oceans.

Use Target Reading Skills
As you read about sea-floor spreading, fill in the flowchart to show the sequence of events.

Magma erupts along mid-ocean ridge

\[ \text{Magma a. } \rightarrow \text{ to form new b. } \]

\[ \text{c. } \rightarrow \text{ spreads away from d. } \]

Mid-Ocean Ridges (p. 142)
1. Circle the letter of each sentence that is true about mid-ocean ridges.
   a. The mid-ocean ridges were mapped using sonar.
   b. The mid-ocean ridges are found only below the Pacific Ocean.
   c. The mid-ocean ridges are completely under water.
   d. The tops of some mid-ocean ridges are split by a steep-sided valley.
2. A device that bounces sound waves off underwater objects is called

3. What is sonar used for?

What Is Sea-Floor Spreading? (p. 143)
4. The process that continually adds new material to the ocean floor is called

5. In sea-floor spreading, where does new crust come from?
Evidence for Sea-Floor Spreading (pp. 144–145)

   a. 
   b. 
   c. 

7. Circle the letter of each sentence that is true about Earth's magnetism.
   a. At times in the past, a compass needle on Earth would have pointed south.
   b. Rock that makes up the ocean floor lies in a pattern of magnetized stripes.
   c. The pattern of stripes is different on both sides of mid-ocean ridges.
   d. The magnetic memory of rock on the ocean floor changes over time.

8. How did drilling samples show that sea-floor spreading really has taken place?

Subduction at Trenches (pp. 146–147)

9. A long, narrow and very deep canyon where the ocean floor bends down toward the mantle is called a

10. What is subduction?
11. Complete the cause, events, and effect graphic organizer to show the relationships among the processes of convection currents, subduction, and sea-floor spreading.

   a. ____________________________ in Earth's mantle
   
   \[\text{cause}\] 
   
   \[\text{Subduction}\] 
   
   \[\text{b. } \text{results in}\] 
   
   The ocean is changed in c. ____________________________

   d. What process in Earth's interior causes subduction and sea-floor spreading? ____________________________

   e. What effect do those two events have on Earth's surface? ____________________________

12. Is the following sentence true or false? At deep-ocean trenches, conduction allows oceanic crust to sink back into the mantle.

   ____________________________

13. Is the following statement true or false? The Pacific Ocean is shrinking.

   ____________________________

14. Why is the Atlantic Ocean expanding?

   ____________________________
The Theory of Plate Tectonics (pp. 150–154)

This section explains how the lithosphere is broken into separate sections that move.

Use Target Reading Skills

Before reading the section, write simple definitions for the words **diverge**, **converge**, and **transform**. You may use a dictionary. After reading the passages that contain the key terms **divergent boundary**, **convergent boundary**, and **transform boundary**, explain how your definitions relate to these terms.

Write a definition of each Key Term in your own words below:

plate: ____________________________

scientific theory: ________________________

plate tectonics: ________________________

fault: ____________________________

divergent boundary: ________________________

rift valley: ________________________

convergent boundary: ________________________

transform boundary: ________________________
Plate Tectonics  *  Guided Reading and Study

The Theory of Plate Tectonics (continued)

Introduction (p. 150)
1. The lithosphere is broken into separate sections called ________________.

2. Is the following sentence true or false? Plates can carry continents or parts of the ocean floor but not both. ________________

How Plates Move (p. 151)
3. What is a scientific theory? ________________________________

4. State the theory of plate tectonics. ________________________________

5. Is the following sentence true or false? The theory of plate tectonics explains the formation, movement, and subduction of Earth’s plates. ________________

Plate Boundaries (pp. 152–154)
Match the term with its definition.

Layer  

   6. plate boundary  
   7. fault  
   8. rift valley

Description  

   a. Deep valley that forms where two plates pull apart  
   b. Line where the edges of Earth’s plates meet  
   c. Break in Earth’s crust where rocks have slipped past each other

9. Complete the compare/contrast table to show how plates move at the different types of plate boundaries.

<table>
<thead>
<tr>
<th>Plate Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Plate Boundary</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>Divergent boundary</td>
</tr>
<tr>
<td>Convergent boundary</td>
</tr>
<tr>
<td>Transform boundary</td>
</tr>
</tbody>
</table>
Plate Tectonics • Guided Reading and Study

   d. How are the movement of plates at divergent boundaries and at transform boundaries similar?

10. Is the following sentence true or false? Crust is neither created nor destroyed along a transform boundary.

11. Most divergent boundaries occur along

12. When two plates converge, the result is called a(n)

13. When two plates collide, what determines which plate comes out on top?

14. Circle the letter of each sentence that is true about convergent boundaries.
   a. Where two plates carrying oceanic crust meet, subduction does not take place.
   b. An oceanic plate sinks beneath a continental plate when the two plates collide.
   c. Where two plates meet, the one that is more dense sinks under the other.
   d. Mountain ranges form where two plates carrying continental crust collide.

15. Was Pangaea the only supercontinent to have existed? Explain your answer.

16. Is the following sentence true or false? The pieces of the supercontinent Pangaea began to drift apart about 225 million years ago.
Key Terms

Use key terms from the chapter to complete the crossword puzzle.

Clues across
1. Section of lithosphere that carries crust
2. Layer that is part crust and part mantle
3. Rock that makes up oceanic crust
4. Study of planet Earth
5. Part of mantle below lithosphere
6. Kind of wave released during an earthquake
7. Kind of valley where plates move apart
10. The innermost layer of Earth
11. Used to map mid-ocean ridge

Clues down
8. Earth’s middle layer
9. Earth’s outer layer