SECTION 17.2  Seafloor Spreading

In your textbook, read about seafloor spreading. In the space at the left, write true if the statement is true; if the statement is false, change the italicized word or phrase to make the statement true.

1. Sonar uses sound waves to measure water depth.

2. Maps made from sonar and magnetometer data led to the discovery of ocean ridges and deep-sea trenches.

3. Deep-sea trenches are vast, underwater mountain chains.

4. Rock samples taken near ocean ridges are older than rock samples taken near deep-sea trenches.

5. The thickness of ocean-floor sediments decreases with distance from an ocean ridge.

6. The oldest ocean floor rocks are about 3.8 billion years old.

7. The study of the magnetic record preserved in Earth’s rocks is called paleomagnetism.

8. An isochron is a change in Earth’s magnetic field.

9. Earthquake activity and volcanism are common along ocean ridges.

10. The magnetic patterns on either side of a deep-sea trench are mirror images of each other.

11. The theory of continental drift states that new ocean crust is formed at ocean ridges and destroyed at deep-sea trenches.

12. As new seafloor is carried away from an ocean ridge, it heats up, expands, and becomes less dense than the material beneath it.

13. The theory of seafloor spreading explains that Earth’s continents move because they ride atop ocean crust as it moves away from ocean ridges.

The statements below describe the steps involved in the process of seafloor spreading. Number these steps in the order in which they occur.

14. Magma fills the gap that is created.

15. Magma hardens to form new ocean crust.

16. Magma is forced upward toward the crust.
SECTION 17.2  Seafloor Spreading, continued

In your textbook, read about magnetism.
Use each of the terms below just once to complete the passage.

combine stronger isochron lower magnetic field
normal polarity older cancel reversed polarity younger

Earth’s (17) __________________ has changed over time. A field with the same orientation as today’s field is said to have (18) ___________________. A field that is opposite the present field has (19) ___________________. Magnetometers have been used to measure the ocean floor’s magnetic field. When the ocean floor’s magnetic readings match the present field, the two fields (20) ___________________. This produces a(n) (21) ___________________ than normal reading. When the magnetic readings of the ocean floor are reversed compared to today’s field, the two fields partially (22) ___________________ to produce a(n) (23) ___________________ than normal reading. Magnetic data of the ocean floor has been used to generate (24) ___________________ maps, which have shown that the ocean floor is (25) ___________________ near ocean ridges and (26) ___________________ near deep-sea trenches.

In your textbook, read about ocean rocks and sediments, magnetism, and seafloor spreading.
For each item in Column A, write the letter of the matching item in Column B.

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>27. Device that can detect small changes in magnetic fields</td>
<td>a. isochron</td>
</tr>
<tr>
<td>28. Minerals containing this act like small compass needles and record the orientation of Earth’s magnetic field at the time of their formation</td>
<td>b. iron</td>
</tr>
<tr>
<td>29. Was constructed from data gathered from continental basalt flows</td>
<td>c. geomagnetic time scale</td>
</tr>
<tr>
<td>30. This type of line connects points on a map that have the same age</td>
<td>d. new ocean crust</td>
</tr>
<tr>
<td>31. Each cycle of spreading and magma intrusion along an ocean ridge results in the formation of this</td>
<td>e. magnetometer</td>
</tr>
</tbody>
</table>
Section 17.2 Seafloor Spreading (continued)

Main Idea

Help From Technology

Use with page 448.

Details

Sequence the steps in the use of sonar to map the ocean floor.

- sound waves travel through the water
- regular pulses of sound sent out from a device aboard a ship
- the time it takes waves to travel from and to the receiver on the boat is used to calculate distance
- sound waves reflected off ocean floor

1.

2.

3.

4.

Organize information about ocean floor topography by completing the following flow chart.

- Topographic features on ocean floor
- earthquakes and volcanoes common
- Deepest spot in ocean—11 km deep

Predict where the oldest rocks in the Atlantic Ocean are. Predict where the youngest rocks are. Use maps in your text to help you answer this question.
SECTION 1-4 REVIEW AND REINFORCE

Sea-Floor Spreading

♦ Understanding Main Ideas

Use the figure below to answer the questions that follow. Answer the questions on a separate sheet of paper.

1. Name and describe the feature of the ocean floor shown at A.

2. Describe the process shown occurring at B, and explain what results from this.

3. What happens to old material as new material rises from the mantle?

4. The arrows on the figure show the ocean floor spreading from the ridge. What are three kinds of evidence scientists have found to support this idea?

5. What process is shown occurring at C, and why does it occur?

♦ Building Vocabulary

Fill in the blank to complete each statement.

6. A device that scientists use to map the ocean floor is

7. An underwater canyon where oceanic crust bends downward is called a(n)

8. The process that continually adds new material to the ocean floor is called

9. The process by which the ocean floor sinks into the mantle is called

10. The chain of mountains that extends into all of Earth's oceans is the