

**SECTION 5-1****SECTION SUMMARY****Exploring the Ocean****Guide for Reading**

- ◆ What factors make ocean-floor research difficult?
- ◆ What processes have shaped the ocean floor?

Studying the ocean floor is difficult for three reasons: First, the deep ocean is totally dark because sunlight does not penetrate far below the surface. Second, the water is very cold. And third, the water pressure is very high. **Because of the darkness, cold, and extreme pressure, scientists have had to develop technology to enable them to study the deep ocean floor.** That technology includes sonar, scuba, submersibles, satellites, remote underwater manipulators, and gravity mapping. **Sonar** is a system that uses sound waves to calculate the distance to an object.

Scientists have discovered many features on the ocean floor. Extending out from a continent's edge is a gently sloping, shallow area called the **continental shelf**. At the edge of the shelf, the ocean floor drops off in a steep incline called the **continental slope**. Beyond this slope is the **abyssal plain**, a smooth and nearly flat area of the ocean floor. In some places, deep, steep-sided canyons called **trenches** cut into the abyssal plain. A continuous range of mountains called the **mid-ocean ridge** winds around Earth. There are mountains on the abyssal plain, too. Some reach above the ocean surface to form volcanic islands. Others, called **seamounts**, are completely underwater.

Earth consists of layers around its center, or core. The outer layer, or crust, is thin and rocky. The thick layer between the crust and the core is the mantle. It contains hot, liquid rock called **magma**. Magma flows out of the mantle and onto the surface through cracks in the crust. Magma on the surface is called lava, which hardens to form new crust.

Earth's crust is broken into large **plates** that float on the mantle. As these plates slowly move, they create different landforms. **The mountain ranges of the mid-ocean ridge, trenches, and underwater volcanoes are all formed by the interactions of Earth's plates.** At the mid-ocean ridge, plates are diverging, or moving apart. Magma squeezes up through cracks between the plates and hardens to form new rock. Newer eruptions push the older rock away from the ridge in a process called **sea-floor spreading**. Over millions of years, sea-floor spreading created the ocean floor.

Even though new ocean floor is created at the mid-ocean ridge, Earth stays the same size. Where two plates converge, or come together, one plate sinks under the other plate. The old rock sinks into a trench and back into Earth's mantle.

**SECTION 5-1 REVIEW AND REINFORCE**

**Exploring the Ocean**

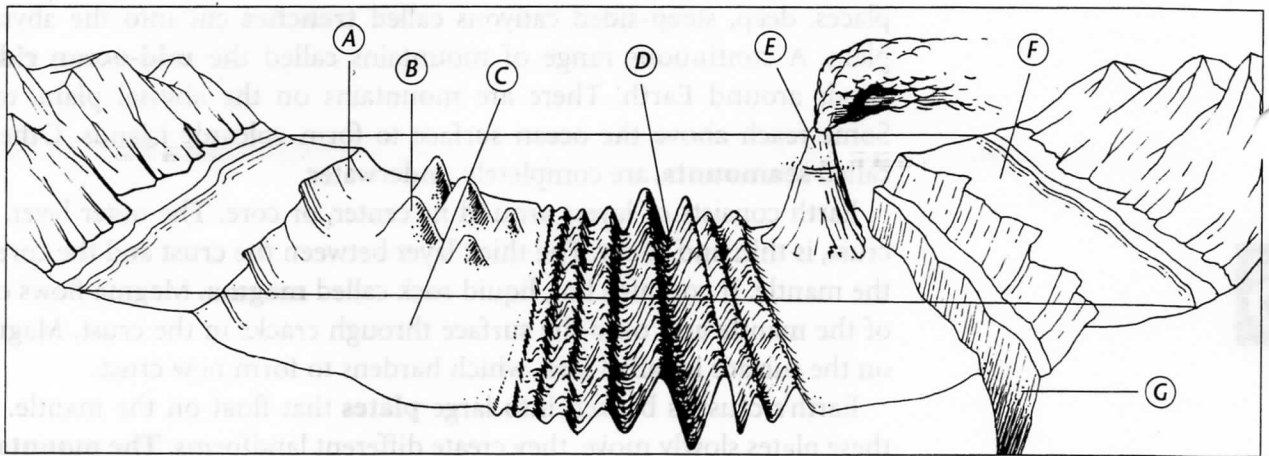
**◆ Understanding Main Ideas**

Answer the following questions on a separate sheet of paper.

1. What factors make it difficult to explore the ocean floor?
2. Describe the process of sea-floor spreading.
3. Why doesn't Earth get larger when new rock is added to the ocean floor at the mid-ocean ridge?

**◆ Building Vocabulary**

Match each letter on this diagram with one of the terms listed below. Write the letter on the line before each term. Then define each term in your own words in the spaces provided.



- \_\_\_\_\_ 4. mid-ocean ridge \_\_\_\_\_
- \_\_\_\_\_ 5. trench \_\_\_\_\_
- \_\_\_\_\_ 6. continental slope \_\_\_\_\_
- \_\_\_\_\_ 7. abyssal plain \_\_\_\_\_
- \_\_\_\_\_ 8. seamount \_\_\_\_\_
- \_\_\_\_\_ 9. continental shelf \_\_\_\_\_
- \_\_\_\_\_ 10. volcanic island \_\_\_\_\_

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