Convection Currents in Earth

In Earth's mantle, large amounts of heat are transferred by convection currents, as shown in Figure 10. **Heat from the core and the mantle itself causes convection currents in the mantle.**

How is it possible for mantle rock to flow? Over millions of years, the great heat and pressure in the mantle cause solid mantle rock to flow very slowly. Many geologists think that plumes of mantle rock rise slowly from the bottom of the mantle toward the top. The hot rock eventually cools and sinks back through the mantle. Over and over, the cycle of rising and sinking takes place. Convection currents like these have been moving inside Earth for more than four billion years!

There are also convection currents in the outer core. These convection currents cause Earth's magnetic field.

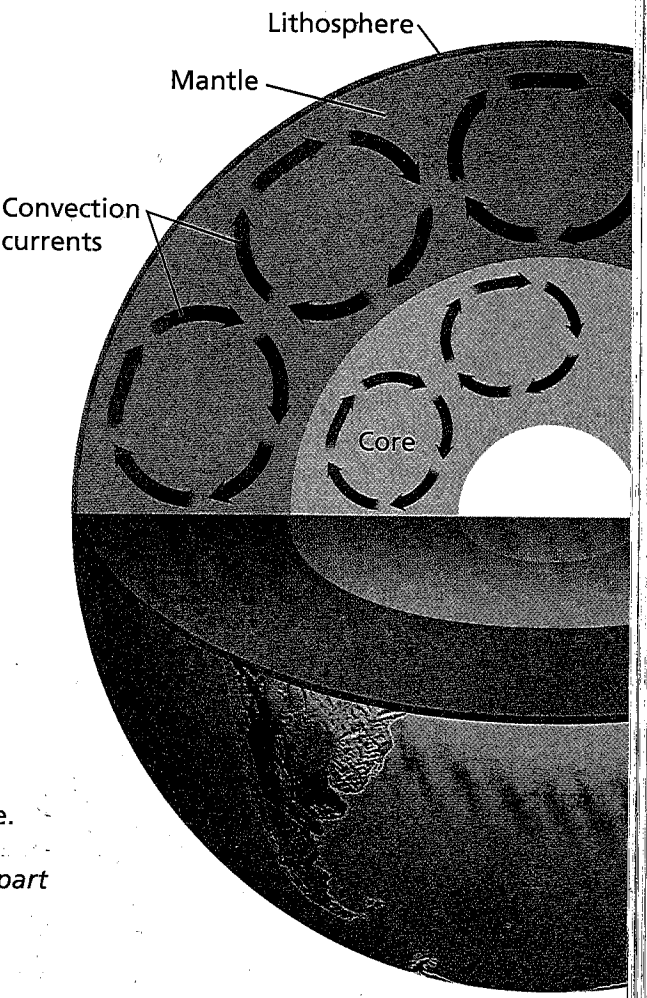

FIGURE 10
Mantle Convection
Most geologists think that convection currents rise and sink through the mantle.
Applying Concepts *What part of Earth's interior is like the soup in the pot? What part is like the burner on the stove?*

Section 2 Assessment

Target Reading Skill Outlining Use the information in your outline about heat transfer to help you answer the questions below.

Reviewing Key Concepts

1. a. **Listing** What are the three types of heat transfer?
   b. **Explaining** How is heat transferred through space?
2. a. **Defining** What is a convection current?
   b. **Relating Cause and Effect** In general, what happens to the density of a fluid as it becomes hotter?
   c. **Summarizing** Describe how convection currents form.
3. a. **Identifying** Name two layers of Earth in which convection currents take place.
   b. **Relating Cause and Effect** What causes convection currents in the mantle?
   c. **Predicting** What will happen to the convection currents in the mantle if Earth's interior eventually cools down? Explain.

Lab zone At-Home Activity

Tracing Heat Flow Convection currents may keep the air inside your home at a comfortable temperature. Air is made up of gases, so it is a fluid. Regardless of the type of home heating system, heated air circulates through a room by convection. You may have tried to adjust the flow of air in a stuffy room by opening a window. When you did so, you were making use of convection currents. With an adult family member, study how your home is heated. Look for evidence of convection currents.