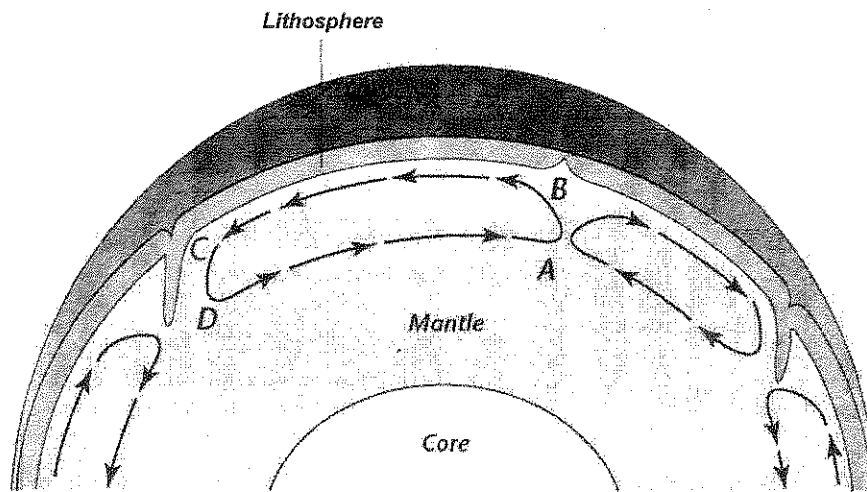


What's Happening During Convection?

The figure below shows a convection cell in Earth's mantle. A **convection cell** is one complete loop of a convection current. Use the figure to answer the questions that follow.



Answer the following questions on a separate sheet of paper.

1. Where does the heat come from that drives this convection current in the mantle?
2. Where is the temperature of the mantle material greater, at point A or point B? Explain why.
3. Where is the density of the material greater, at point B or point C? Explain why.
4. What causes the convection cell to turn to the left at point B?
5. What happens to the temperature and density of the material between points B and C?
6. What force causes the convection cell to turn down at point C?
7. What happens to the temperature and density of the material between points D and A?
8. What causes the convection cell to turn up at point A?
9. How do you think this convection cell might affect the crust material above it?

6-7

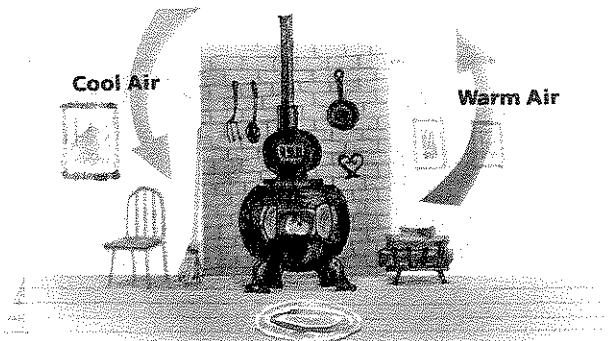
What is convection?

Objective ▶ Describe how heat travels through gases and liquids.

TechTerms

- ▶ **convection** (kuhn-VEK-shun): heat transfer in gases and liquids
- ▶ **convection currents:** up and down movements of gases or liquids caused by heat transfer

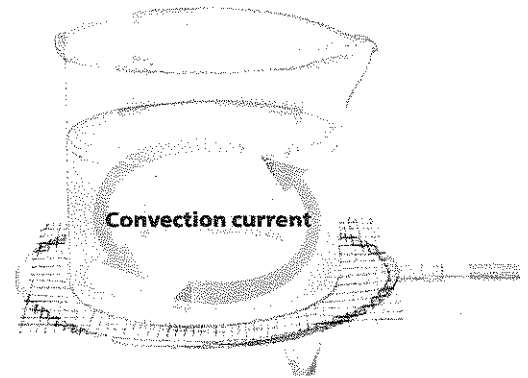
Heat Transfer in Gases and Liquids Heat travels through gases by **convection** (kuhn-VEK-shun). Air is a gas. When air is heated, the air particles move farther apart. As a result, the warm air becomes less dense. Warm air is less dense than cold air. The cold, dense air sinks. The warm air rises. As it rises, the warm air carries heat with it. This is how heat travels through a gas by convection.



Convection takes place in liquids as well as in gases. Cold water is denser than warm water. Cold water sinks. Warm water rises, carrying heat along with it.

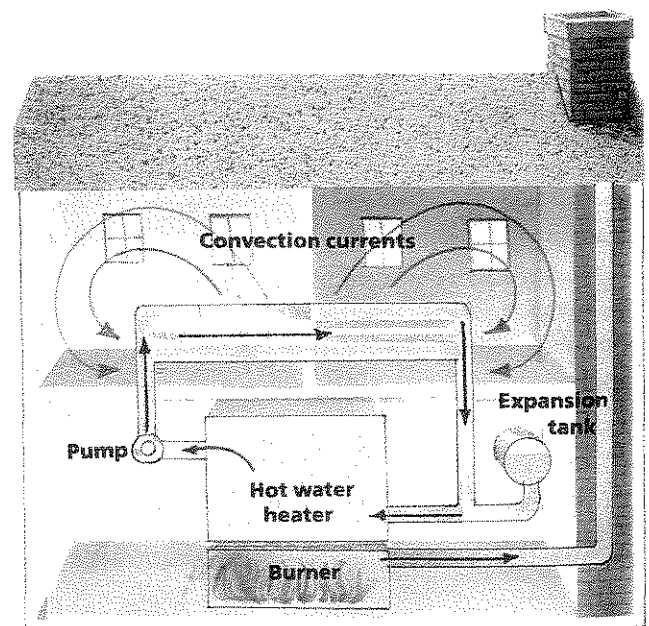
▶ **Identify:** How does heat travel through gases and liquids?

Convection Currents Heat is carried through the air by means of **convection currents**. Convection currents are up and down movements of the air. Sinking cool air and rising warm air move heat through the air. This is what causes convection currents. Convection currents are found in water as well as in air.



▶ **Define:** What are convection currents?

Uses of Convection Heat transfer by convection is used in some home heating systems. In a hot water heating system, water is heated in a hot water heater. The hot water is then pumped through pipes to each room in the house. The hot water flows through heaters near the floor of the room. The hot water warms the air near the floor. The warm air rises, carrying heat through the room by means of convection currents. The water then returns to the heater to repeat the process.



▶ **Identify:** What method of heat transfer is used in hot water heating systems?