

Heated rock material deep within the earth moves up and down in very slow moving patterns called convection currents. Convection current occurs when material is heated and becomes less dense than the material around it. The warm material moves up until it cools off and becomes more dense. It then begins to sink back down again until it is warmed up and the cycle begins again. You can make a simple model of convection currents in the activity below.

Materials:

- Food coloring
- Wax paper
- Eye dropper
- 2 clear plastic cups
 - One about 8-oz
 - One, a wider "punch" cup that the bottom of the 8-oz. cup can fit in
- Water
 - Some room temperature and some hot from tap

Procedures:

1. Place two or three drops of food coloring onto a piece of wax paper.
2. Fill the 8-oz. cup about 3/4 full of room temperature water.
3. Use a dropper to pick up two or three drops of food coloring from the wax paper.

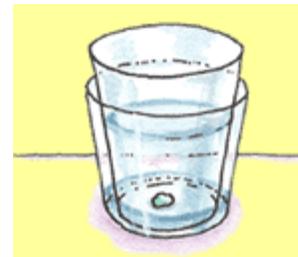


4. Push the dropper through the water in the 8-oz. cup, all the way to the bottom. Very gently, squeeze the dropper to put

the food coloring on the bottom of the cup. (This may take a couple of tries.)



5. Place two or three tablespoons of hot tap water in the wider punch cup. Carefully pick up the cup with the water and food coloring, and place it in the wider cup with the hot water.



6. Observe the food coloring. Describe how it moves.

Think about this ...

You have probably heard people say that warm air rises. Well, it may be hard to believe, but warm rock rises too. If warm air, which is made of gases, rises, and warm rock, which is solid, rises, do you think warm liquid rises? If you have ever gone swimming in deep water, think about how the temperature of the water at the surface compares with the water's temperature down below.

Where's the Chemistry?

Warming a substance can make it rise and cooling a substance can make it sink because temperature can change the density of a substance. When a substance is warmed, it becomes less dense than the material around it and will rise. A good example is a hot air balloon. The heated air in the balloon is less dense than the cooler air around it so the balloon rises.

It's hard to imagine that anything similar could happen with a huge layer of rock far beneath Earth's surface but it does. There is an area of rock about halfway to the center of the earth called the asthenosphere. As the material in the asthenosphere is heated, it becomes less dense than the material above it and rises very slowly. As it moves up, it begins to cool and become more dense. When it cools enough and becomes dense enough, it drops back down again.



The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at www.acs.org/kids.

Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

Never eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

Never experiment on your own!

For more detailed information on safety go to www.acs.org/education and click on "Safety Guidelines".

