Convection Experiments

The process of convection can be difficult to see because it is difficult to see how a fluid moves all by itself. Things can be added to the fluid, however, that will be carried along by the motion of the fluid and make it possible to see the fluid flow.

Always have an adult help with your experiment. **Be safe and have fun!**

Colored Ice Cubes #1

Experiment from:  

Materials (for each group)

- 2 ice cubes (strongly dyed with food coloring - dark blue works well)
- fresh warm water
- tongs
- a ruler
- thermometer
- 250 ml beaker (may substitute a similar clear glass container)
- salt (about 70 grams)
- stirring rod

Procedure

1. Obtain an ice cube that has been strongly dyed with food coloring.
2. Fill the beaker ¾ full of warm, fresh water.
3. Using tongs, gently place the ice cube in the beaker. Keep the beaker and water as still as possible.
4. Observe the ice-water mixture for several minutes. Write a detailed description of your observations.
5. Measure the temperature at the surface, at the bottom of the mixture, and 3 measured levels in between. Record the temperatures in the data table.
6. Empty the beaker and fill it to the same level with warm water.
7. Add salt to the water, stirring vigorously as you pour until no more salt will dissolve.
8. Repeat steps 3 and 4 using salt water in place of fresh water.

Data Sheet

Answer the following questions:

1. As the ice melts, what happens to the colored melt water in the sample of fresh water?
2. In the salt water?

3. Do you observe convection currents in this activity?

4. Of the 2 liquids used, which do you think is denser?

**Always have an adult help with your experiment. Be safe and have fun!**

**Pie Pan Convection #2**

**Materials:**
Water  
Food Coloring  
Pearlized shampoo, liquid soap, etc.  
Aluminum pie pan  
Stirrer  
Hotplate

1. Fill the pie pan halfway with water and add a few drops of food coloring (any color).
2. Add 3-5 squirts of shampoo or liquid soap and stir until the shampoo or soap breaks up into small clumps.
3. Place the pie pan onto the hotplate and heat the mixture at a low temperature. (Convection cells will not form at high temperatures.)
4. Watch the clumps of shampoo or soap move with the fluid and try to identify the boundaries of the convection cells.

Experiment from:  
[http://www.exploratorium.edu/snacks/pie_pan_convection/index.html](http://www.exploratorium.edu/snacks/pie_pan_convection/index.html)