

HOUSEHOLD CHEMISTRY

HEAT ENERGY

INTRODUCTION:

Heat is an energy. How does heat affect molecules? In this experiment, you will be observing hot and cold water with added food dyes. Temperature is a good indicator of how much heat energy each water sample has.

EXPERIMENT 1 QUESTION:

What is Heat Energy?
How does heat affect molecules?

PERSONAL PROTECTIVE EQUIPMENT:

- Goggles/eye protection

MATERIALS:

- Hot tap water
- Cold tap water
- Ice
- 3 Large plastic cups
- Food coloring

EXPERIMENT 1 PROCEDURE:

1. Place some ice in a large cup and add water to make ice water. After the water is cold, pour the ice water (without the ice) into a cup so that it is about $\frac{3}{4}$ full.
2. Have your adult partner help you add hot water to another cup until it is $\frac{3}{4}$ full.
3. At the same time, you and your adult partner should put one drop of yellow and one drop of blue food coloring on the surface of the hot and cold water.

Observe: What do you notice about the way the food coloring moves in the two cups?

INTRODUCTION:

Do hot and cold-water act differently? In this experiment we are going to add hot and cold water to room temperature water and see what happens.

EXPERIMENT 2 QUESTION:

Heat Transfer – How is water density affected?

PERSONAL PROTECTIVE EQUIPMENT:

- Goggles/eye protection

MATERIALS:

- Hot tap water
- Cold tap water
- Ice
- 3 Large plastic cups
- Food coloring

EXPERIMENT 2 PROCEDURE:

1. Place a few ice cubes into a cup and add two tablespoons of water to make very cold water. Add 1 drop of blue food coloring to the cold water and gently mix.
2. Carefully add two tablespoons of hot tap water to a separate cup. Add 1 drop of red food coloring to the hot water and gently mix.
3. Pour room temperature water into a taller clear plastic cup until it is about $\frac{3}{4}$ -full.
4. Use a dropper to pick up a dropper-full of cold blue water. Look at the room temperature cup from the side as your adult partner pokes the dropper about halfway into the water and slowly squeezes the cold blue water into the room temperature water.
5. **Observe:** Does the cold blue water flow down to the bottom of the cup, stay near the middle, or float to the top?
6. Next, use a dropper to pick up a dropper-full of hot red water. Look at the room temperature cup from the side as your adult partner pushes the dropper about halfway into the water and slowly squeezes the hot red water into the room temperature water.

Observe: Does the hot red water sink down to the bottom of the cup, stay near the middle, or float to the top?

REFERENCES:

<https://www.acs.org/content/acs/en/education/whatischemistry/adventures-in-chemistry/experiments/heat-energy-on-move.html>
<https://www.acs.org/content/acs/en/education/whatischemistry/adventures-in-chemistry/experiments/heat-up-cool-down.html>