

Thermal Expansion

Concepts:

1. Most materials will contract when they become cooler.
2. The decrease in volume occurs when the molecules move more slowly and closer together.
3. Water is an exception; it will increase in volume as it changes from a liquid to solid ice at 0°C or 32°F.

Materials:

1. Plastic disposable container such as a yogurt container

Directions:

1. Fill the container all the way to the top with water.
2. Carefully place the container in a freezer and leave it overnight.
3. Remove the container the next day and observe any changes.

Explanation:

1. A water molecule is composed of two hydrogen atoms and one oxygen atom.
2. As water freezes into ice, the molecules re-arrange in position relative to each other.
3. The molecules orient into a ring-like pattern that occupies more space.
4. This causes water to be one of the only materials to expand when it freezes instead of contracting like most other materials.

Evaporation

Concepts:

1. Temperature is a measure of how much and how fast molecules are moving.
2. Warmer temperatures indicate more molecular motion; cooler temperatures have less motion.

Materials:

1. Rubbing alcohol
2. Cotton ball

Directions:

1. Put a little rubbing alcohol on the cotton ball.
2. Lightly rub the cotton ball on inside of your forearm.
3. Notice how it feels.
4. Observe what happens to the liquid.

Explanation:

1. Heat moves from something that is warm to something that is cooler.
2. Heat moved from your warm arm into the cooler rubbing alcohol.
3. The transfer of heat caused the alcohol to evaporate.
4. Evaporation is when a liquid changes into a gas.
5. The gas molecules move faster than the liquid molecules.