

Measuring Heat

Heat is energy on the move. It is the motion of atoms and molecules — tiny particles that make up everything around us. The more heat atoms have, the more they move around and the more space they take up. The cooler atoms are, the more slowly they move, and the less room they take up. As a result, almost everything expands when heated and contracts when cooled.

Objective

Build a device to measure heat.

Materials

- a glass bottle filled with cool water
- a handful of clay
- a clear, plastic straw
- food coloring
- a bowl of hot water
- a bowl of cold water
- a marking pen

Safety Notice: All applicable laboratory safety rules must be followed. Students should not perform any experimental activity without the teacher's supervision and express permission. Students must follow safety guidelines and wear appropriate protective gear.

Procedure

1. Put a few drops of food coloring in the bottle of water. Roll out some clay and wrap it around the middle of the straw. Place the straw halfway into the bottle and press the clay around the straw and bottle opening to seal it. Make sure there are no air holes.
2. If you don't know which bowl holds the hot water and which bowl holds the cold water, the device you made in step 1 will help you find out. Place the bottle in one bowl of water and wait five minutes. Check out how high the water level climbs up the straw. Note your results in the space below. If you are able to, use a pen to mark the water level on the straw.

3. Place the bottle in the other bowl of water and wait five minutes. Note how high the water in the straw has risen and any observations in the space below. If you are able to, use a pen to mark the water level on the straw.

Conclusions

- Which bowl contained the warmer water? How did you know?

- How is the liquid in the straw an example of expansion and contraction?

- How is your device like a thermometer? How are they different?
