



WHAT IS TEMPERATURE?

K-4

Activity #10

Related Subject: Climate and Weather

Group Size: 10-15

Length of Activity: 45 minutes

Overview

Help participants discover that as substances heat up, their molecules speed up and spread apart, causing the substance to expand. Compare this to their movement—standing still, walking, and jogging. This expansion makes the substance less dense, which is why hot air rises. (Note: In reality, the molecules bounce off of each other while moving around. It may be safer to abstain from that activity both to make the activity a little safer and to encourage the participants to spread out.)

Objective

To assist participants in understanding that as substances heat up, the molecules speed up and spread apart, causing the substance to expand.

Materials and Supplies

Drawing paper and pencil for each youth

Introduction

Ask, "What is temperature?" Share that:

1. Temperature is the measure of the average kinetic energy of the molecules in a substance. (Kinetic energy is the energy of motion.)
2. The more kinetic energy a molecule has, the faster it is moving.
3. Hot molecules move faster than cold ones.

Today, you will experience "temperature" by pretending to be molecules.

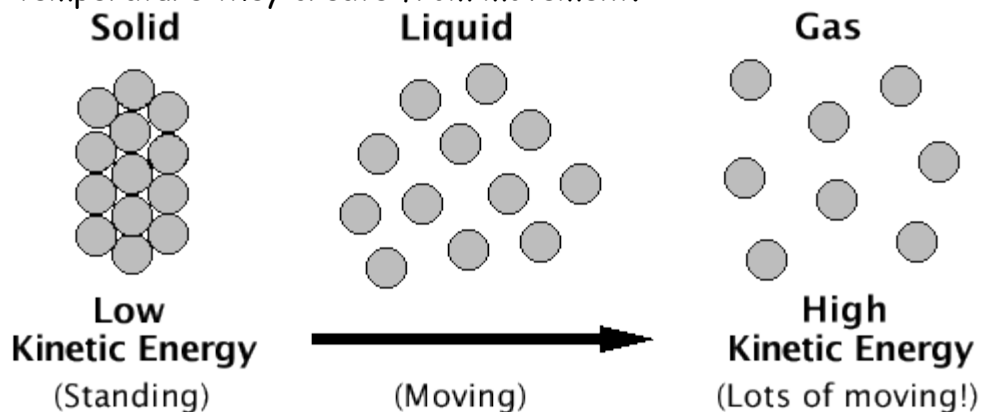
Activity

1. Have participants stand as close to each other as they can without touching each other.



What is Temperature?

2. Explain to participants that they are behaving like the low-energy molecules in a cold substance.
3. Have participants increase their level of kinetic energy by walking and moving around.
4. As participants increase their kinetic energy, you should notice them spreading out and taking up more space on the floor. Have them pick up pace by jogging around.
5. Have participants stop moving and observe their placement after walking and jogging.
6. Like moving molecules, they are now spread out.
7. Have participants "see, feel and draw pictures" showing the increased temperature they create from movement.



Discussion

1. What happened when the "molecules" of the group were "cold"?
2. What happened when the "molecules" of the group were given more kinetic energy?
3. After the group "heated up" were you standing in the same spot you started in?
4. Was the group as tightly packed together as when it was "cold"?
5. What is temperature?
6. Compare this to the notion of heating an ice cube → to water → to steam.

Evaluation

Listen for evidence that participants understand concepts of temperature, molecules, and kinetic energy.

National Science Education Standards:

NSES K-4:

Science as Inquiry (4ASI)

Abilities necessary to do scientific inquiry (4ASI 1)

Understandings about scientific inquiry (4ASI 2)

Physical Science (4BPS)

Properties of objects and materials (4BPSI 1)

Position and motion of objects (4BPSI 2)

Earth and Space Science (4DESS)

Properties of earth materials (4DESS 1)

Changes in earth and sky (4DESS 3)