

Warm Me Up!

Summary

Students will identify and discuss the misconception that many might have about heat sources, specifically that clothes do not produce heat.

Time Frame

1 class periods of 45 minutes each

Group Size

Small Groups

Life Skills

Thinking & Reasoning

Materials

For the teacher:

Mittens or gloves

Other winter clothing, such as hat and coat

For each group:

Thermometer

Mitten or glove

Science journals or pencil and paper

Background for Teachers

The temperature of an object is a measurement of much heat the object has. Thermometers can give us help in discussing and correcting the misconception many children have regarding the transfer of heat. Many think that gloves have the capability to transfer heat into the hands. Having students observe the temperature before and after they put gloves on their hands helps dispel this misconception and teaches them that heat from their hands is trapped by the gloves to cause temperature changes.

Intended Learning Outcomes

Observe simple objects and report their observations.

Conduct a simple investigation when given directions.

Use instruments to measure temperature.

Pose questions about objects, events, and processes.

Record data accurately.

Instructional Procedures

Step 1. Group students together as a class. Remark on how cold it is and how nice it might be to warm up a little. Discuss the clothing that might be used for cold weather. As different items are mentioned, either put them on a student, or dress yourself (hat, gloves, coat, etc.) Be sure that mittens or gloves are part of the items used. When completed, mention how warm you feel, stating something like "Wow, these hot clothes are making me really sweat." "Warm" and "hot" are the key words. Remove the clothing, with a comment such as "How do clothes do it?"

Step 2. Ask the class to raise their hands if they think that the gloves made the hands warm. Then

write the statement, "Mittens, (or gloves) keep my hands warm." Ask students, "Is there heat in the mitten?" Note how many believe this to be the case. Then tell students that today they will be using thermometers to find out if there is heat in the mitten.

Step 3. Divide the glass into groups with each group having a thermometer, glove or mitten and materials for recording their observations. Have the students lay their thermometers on the desk for a few minutes and then record the temperature in the classroom. Next have them put their thermometer inside the mitten and leave it for a couple of minutes to see if there is a difference from the room temperature. (The results should be no change in recorded temperature.) Have each group record their findings in their journals.

Step 4. Discuss these findings with the students. Was there a difference in the room temperature and the temperature inside the mitten? They should have just observed that there is no change in temperature. What is their conclusion now? If there were heat in the mitten, shouldn't the temperature inside have been higher? Because the temperature didn't change, there is no heat in the mitten. What might be another reason for the fact that our hands are warmer in mittens? Have each group record their answer to this question.

Step 4. Ask the students to put the thermometer inside the mitten, leave it for a few minutes, and record the temperature inside the mitten again. (It's important to note that there are not any changes.) Now, leaving the thermometer in the mitten, have a member of the group put the mitten on their hand. Leave the hand and thermometer inside the mitten for a few minutes. Record the temperature in their journals. What were the results? Did the temperature change? Can they draw a conclusion from their results? Where did the heat come from? (The heat is in the body, not in the mitten.) What part did the mitten play in this observation. (The mitten acted as a "heat trap" that kept the heat from the body from escaping into the cooler air.)

Step 5. Bring students back together. Is there a better way to state the original sentence? Help students change the original statement, "Mittens keep my hands warm" to a more accurate observation, such as "Mittens trap heat escaping from my hands to keep me warm." Have the group discuss why it seems confusing that putting more clothes on would create more heat. Would a person become warmer the more layers they had on? Why does this occur? (Clothing traps heat escaping from their bodies.) Be sure students understand that the heat comes from the body itself. If there are still those who seem confused, encourage them to take the thermometer and hold it in their hand to take their temperature.

Extensions

Students could continue investigations with temperature and clothing. Pose the question, "Will the results be the same if we use a hat? What about the coat?" Groups could use the same investigations on different articles of clothing.

Is more heat given off by different areas of the body? Does the head lose more heat than the hands? Compare temperatures and find out.

Assessment Plan

Have students fold a piece of paper in half. Label one side "Warm" and one side "Cold."

Have students draw a outlined picture of a body on each side. On the "warm" side, have them illustrate clothing that warm hands, head and feet. On the other side, have them illustrate clothing, if any that would be "cold" on hands, head and feet.

At the bottom of the page, Have them complete this sentence. "Clothes (do, do not) produce heat. They help _____ heat." (Trap, capture, hold, contain, etc.)

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