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1.1.d Sensing Heat: A Student and Instructor Guide

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KEEPING AN EVEN TEMPERATURE

Tactile sensation of temperature

Concepts: Hot and cold are human perceptions.

Procedures: Using fingers to feel and describe water temp

The idea is to keep the water temperatures unknown, so that the students can't anticipate their particular situation. This makes it more intriguing to do, otherwise, it's kind of ho-hum.

The idea is to acclimate their fingers to either hot or cold (cups A and C), and then the immersion into room temperature water (cup B). The procedure sets up having opposite observations (warm or cool) about the water in cup B. And that should start a conversation leading to questions for the Question Bank.

At each table place 3 green mtn mugs, lids on loosely.

One mug containing water at room temp

One mug containing ice water (no ice in it)

One mug containing hot water

The cooling/heating must be done out of sight.

The water must all look the same at first glance.

Fill up to near rim -- allow room for 2 finger displacements

Heat the hot water in a beaker on hot plate to about 50-60 degrees, or in microwave, then balance with cooler water. Will large storage container.

Make ice water slurry in large storage container. Make sure mugs do not have ice in them.

Room temperature water right from the tap – let sit out.

For debriefing, have sheet on wall for Question Bank.

Recorder: Record observations and comments on the Recorder Report Form.
Write each group member's name and role on the sheet.
All comments must be complete sentences.

Manager: Read the brief procedure below to your group.
Check for readiness to proceed, then go ahead.
There are copies of this handout for everyone to have afterwards.

Spokesperson: You will report to the class regarding your group's observations.

PROCEDURE: There are 3 plastic mugs. All contain water.

WITHOUT ANY DISCUSSION OR COMMENT THROUGH THE PROCEDURE

Carefully remove the lids of all three cups.

Two people in your group will use cup A. Two will use cup C.
Immerse your pinky finger CAUTIOUSLY in your cup (A or C)

Keep it there for count of 10, or until you can't stand it any more.

Everyone at about the same time, remove your finger from that cup.
Immerse that same finger in the cup in the center of table (B)

Be prepared to describe (not yet) how your finger feels now.

DISCUSSION

1. One at a time, each group member should describe how his/her finger felt in the MIDDLE cup.
If there is disagreement on that observation, you will need to find a way to resolve the disagreement.
This may take additional experimentation on your part.
Go ahead. Make a record of that.
2. Assume you just entered this room, having been outside without gloves on today.
How would your pinky feel if inserted into each of the three cups?
3. Identify at least two other instances from your personal experience that are consistent with the observations you just made. Discuss them sufficiently to be sure that they are about the same phenomenon.
4. What is the central concept being explored by this experiment?
5. Develop at least three good questions for the Question Bank that would extend our inquiry regarding your observations. These questions could go in ANY direction. Recorders should write those questions in the Bank.