

# Heat Be Gone!

## A Qualitative Approach

Teacher



**This may be a great assignment to complete at home.**

### Introduction

The human body is an excellent indicator of temperature change. The nerve receptors on the surface of the skin act like tiny thermometer bulbs. Information is transmitting by impulses to our brain indicating even the tiniest temperature fluctuation. Your skin will feel cool if heat from within your body is being transferred to another surface. Your skin will feel warmer if heat is transferred into your body.

During the following lab you will put your temperature indicating system to the test. You will use your thermometer (skin) to make a qualitative analysis (analysis with no actual numbers) of the conductivity of five different materials. Sounds like fun, doesn't it?

**The face (cheek) is a great location for the test due to the large density of temperature receptors.**

**The items chosen should be very safe and clean.**

### Materials:

- All of the items should be room temperature.
- 1 Roll of paper towels
- 1 piece of wood
- 1 piece of cloth
- 1 bowl of water
- 1 piece of metal (example – bowl, large spoon, pan, pot)
- 1 room with “air”

### Data Table #1

Item	Describe your observations below
1. air	Should be comfortable – no temperature change
2. wood	Cool to the touch – heat transfer
3. water	Cold – heat transfer
4. metal	Cold – heat transfer
5. cloth	Warm or no change – insulator

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## Procedure

1. Describe how your skin feels in room temperature air. (Data table #1)

Normal – no change in temperature

2. Carefully place each of the following against your skin. The water will be a little tricky. You will need to alternate sides or wait between trials to allow the skin to return to its original temperature. Record your observations in data table #1. Please pay special attention to any temperature changes you notice and the duration (time length) of the change.

- A. air
- B. wood
- C. water
- D. metal
- E. cloth

3. Clean your testing area in accordance to your teacher's discretion.

## Data analysis (questions)

1. A. Why did the 5 items feel like they had a different temperature even though they were all the same temperature?

The air and cloth will act like an insulator so very little heat will be transferred. The wood should feel cool because some heat will transfer from the body into the wood. The water and metal will feel cold because they act like a conductor, transferring large amounts of heat from the body. The items will feel normal once temperature equilibrium is achieved.

B. Is the skin a reliable indicator of temperature? (Explain)

Not in every circumstance. The conductivity of the items in contact with the skin can trick the body because heat is transferred from the body at different rates even though the items are the same temp. The skin also produces sweat which cools the body when it evaporates. As a result air movement and humidity can affect the skin's ability to evaluate temperature.

2. Rank the following according to conductivity. A. air, B. wood, C. water, D. metal, and E. cloth (least to greatest)

Results may vary – cloth, air, wood, water, metal

3. Why does a pool that is 70 degrees Fahrenheit feel so cool? Why does a cool pool pose more of a risk for a smaller child in comparison to a larger child?

Water conducts heat from body so it feels cold. Smaller children have a larger surface area in comparison to their volume. A large amount of heat can transfer from a small child putting them at risk of hypothermia. The elderly are also at risk because they tend to lose body weight resulting in a larger surface area in comparison to their volume.

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