

WHAT IS INSULATION?

Insulation is the key to staying warm, whether through a warm coat, layers of blankets, or the fur and fat animals. This experiment will test different materials to see which retains heat the longest.

INSTRUCTIONS:

STEP 1: Wrap each cup with a different material.

STEP 2: Heat water in a kettle or microwave.

STEP 3: Add the same amount to each cup.

STEP 4: Immediately take the temperature of the water in each container using a thermometer and record the starting temperature.

STEP 5: Check the temperature of the water in each container at regular intervals (e.g., every 5 minutes) for 20-30 minutes. Record the results.

Materials

Hot water

Four glasses or mugs
Materials for insulation:
Wool, aluminum foil,
cotton, plastic wrap
Thermometer
Stopwatch or timer



THE SCIENCE BEHIND INSULATION

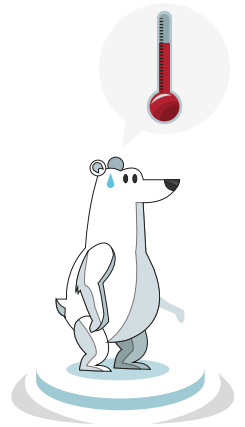
Insulation is all about preventing the transfer of heat. Materials that trap air, like wool and cotton, are usually great insulators because air is a poor conductor of heat. On the other hand, materials like aluminum foil reflect heat but may not trap it as effectively. By testing these materials, you can see how different insulators perform under the same conditions.



Animals living in cold environments use natural insulation. For example: Polar bears have thick fur and a layer of fat (blubber) to help retain body heat. Penguins huddle together and use their feathers to trap warm air close to their bodies. Understanding how insulation works in this experiment can give insight into the adaptations animals use for survival.

Insulation Observations

Use this worksheet to process and evaluate your work.



<u>MATERIAL</u>	<u>STARTING TEMP</u>	<u>5 MINUTES</u>	<u>20 MINUTES</u>

Which material seemed to slow down the temperature drop the most?

What surprised you most about how each material affected the water temperature?

Which material would you choose for insulation and why?

