

Student Activity Sheet: Insulators and Conductors

Explore and understand the transfer of energy, the effect of different materials on the transfer of energy, and the meaning of the terms “conductor” and “insulator.”

MATERIALS:

- Three containers or cups, each of a different material (e.g., glass, metal, paper, plastic, etc.)
- Source of hot water (provided by teacher)
- Two spoons or tubes (one plastic, one metal)
- Heat resistant glove
- Two thermometers
- Watch with a second hand
- Other optional as required by teacher

Hey Kids:

Watch for signs and symbols in your science classroom!

PROCEDURE:

Part A - Predicting insulation and conduction of heat energy

1. If the materials needed to conduct your investigation are in a central location, gather those materials now before proceeding.
2. Place the cups in the center of your table or work area. Leave a few inches between each cup. Predict which cup is made of material that best conducts heat energy, and which is made of material that best insulates against transfer of heat. Write your prediction in the Part A of the Data and Questions section.
3. Signal your teacher when your group is ready. Your teacher will pour hot (not boiling) water into each cup. Touch the outside of each cup lightly with your hand, and then respond to the second question in part A of the Data and Questions section.



Note to the Safety Smart®



1. Never touch a surface that may be hot. Only touch what you are told to touch, and use a heat resistant glove.
2. Tie back long hair, and don't wear loose clothing. Ask if you aren't sure if your clothing and hair are safe.
3. Keep all hot things near the center of your table or work surface, and never reach or lean over any source of heat.

Look for signs and symbols when dealing with heat, fire, or hot surfaces!



Part B - Measuring insulation and conduction of heat energy

4. Place one of the cups in the center of your table or work area. Put the two spoons in the cup, on opposite sides of the cup. Tape one thermometer on each spoon so that the bulb is near the top of the spoon handle. See the arrangement in step 5.



- When you signal that your group is ready, your teacher will add boiling hot water to your cup, just covering the bowl of the spoon. Begin timing at that point (0 minutes), and take one temperature reading for each spoon each minute. Record the data as it is collected and respond to the questions in part B of the Data and Questions section. If your teacher allows, you may repeat the experiment and record data for another spoon made of a different material.

Note: It is important to always clean up your work area after you have completed an investigation. Did your group leave things the way they found them, or not? You don't need to answer, but if you didn't get things clean, then you should get **Safety Smart!**

DATA and QUESTIONS:

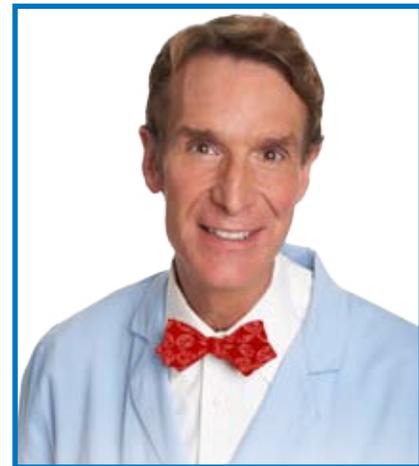
Part A:

Prediction of best conductor - _____

Prediction of best insulator - _____

What were the results of your test?

How close were your predictions to the actual results?



Part B:

Time (minutes)	0 minutes	1 minute	2 minutes	3 minutes
°F - Plastic				
°F - Metal				
°F - Other				

Which type of material was the best conductor of heat energy?
Which was the worst? How can you tell?

Of the materials used in this investigation, can you tell which would be the best insulator?
Why?

