

Student Handout #1: Testing Insulating Materials



Materials:

- ✓ Down materials (jacket, vest, hat)
- ✓ Gloves/mittens
- ✓ Cotton sock
- ✓ Wool sock
- ✓ Other types of cloth or clothing
- ✓ Styrofoam (a cooler or packing peanuts)
- ✓ Plastic wrap
- ✓ Plastic fleece materials (vest or hat)
- ✓ Dirt
- ✓ Large piece of paper
- ✓ Aluminum foil
- ✓ Leaves
- ✓ Fiberglass insulation material (**WARNING!** Fiberglass material can irritate your skin. Wear gloves when you use it.)
- ✓ Baby food jars with lids -- one for each of the different materials you'll be checking
- ✓ Gallon jug of water or hot sink water (don't scald yourself)
- ✓ Good thermometer
- ✓ Notebook and pencil

NOTE: Two of the materials you are testing are dirt and leaves. In order to test the insulating effects of these two materials, you will need to cover the jars with each substance. Work with your teacher to decide the best thickness of the layers of dirt and/or leaves.



Procedure:

1. Divide the items to be tested among small groups.
2. List in your notebook all the items you'll be testing.
3. Fill all the baby jars with hot water.
4. Measure the temperature of the water in each jar. Record the temperature of the water and note this in your notebook. Tightly cap each jar.
5. Wrap or cover each jar in one of the material(s) you are testing. Be sure one jar is uncovered; it's the control for your experiment.
6. Carry the jars where it is relatively cold. Outside, near an air conditioner vent or in a refrigerator or ice chest full of ice will work.
7. Leave the jars alone for 20 minutes. Then remove the wraps and, using your thermometers, measure the temperature of the water. Write down the temperature in your notebook next to each item you are testing.
8. Compare your results and list each of the materials in the order from worst insulator to best.

Questions:

- Which insulating material was best? Why do you think this was a good insulator? Explain.
- Which insulating material was worst? Why was this not a good insulator?
- What happened to the jar that had no insulating wrap? Where did it occur in your ranking? How can you explain this?