



Discipline: All  
Age Level: All  
Time: 45 minutes

Next Generation Science Standard : Analyzing and Interpreting Data

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*Acres of Adventure*,  
National 4-H Curriculum  
BU-08330

## Testing Insulation

**Objective/Success Indicators:** Youth discover which types of insulation maintain cold temperatures best.

**Assessment Question:** What materials do the best job maintaining temperature?

**Supplies:**

- 20-24 quart sized Ziploc bags filled with a large variety of materials such as wool, cotton, polar fleece, cotton balls, quilt batting, aluminum foil, grass clippings, newspaper, etc.
- Previously frozen ice cubes measuring 1/4 cup in volume that fit into a snack sized Ziploc bag.
- Observation chart with pens and pencils
- Timer
- Graduated cylinder or liquid measure for teaspoons
- 4 snack size Ziploc bags for each team

**Lesson Outline:**

1. Divide the group into teams of 4-8 youth. Have them student the different types of insulation available and as a group, choose four to test.
2. Each team will rank their choices from best to worst and record them in that order on their observation chart.
3. Place a snack bag in the center of the insulation bag, trying to keep it in the center.
4. When all teams are ready, have each team retrieve four ice bags and put them inside the snack bags surrounded by the insulation. Seal all the bags, and work quickly.
5. Start the timer. Check the bags at 5, 10, 15, 20 and 30 minutes, writing down any observations. To observe: Pull the ice bag out and observe for 10 seconds, then put it back in and reseal. Teams will need to work together to be able to pull and observe their bags at once. As soon as the bags are sealed, start the timer, and then write down the observations. After the final observation, measure the amount of water that has melted in each bag, and record it.
6. Rank your insulations 1-4, with #1 as the insulation with the least amount of water, and #4 with the most.

7. Reflection: How do the actual results compare with your predictions? Are you surprised? Why or why not?

Gather as a group to do the final analysis. Compare results across groups. In cases where teams had the same materials, was their data similar? If not, why do thou think this happened?

After pooling all your data, what conclusions do you have about insulations? Which is best? What properties might make a material a better insulation than others?

This experiment measured how cold something stayed when insulated. Would you expect a similar results for keeping something warm? Why or why not?

How can you apply this knowledge about insulation to shooting sports? On the range? Out hunting? Other situations?

**Additional activities:**

Make judging classes that use the knowledge gained to make good consumer choices. For example, boots, clothing, hot or cold drink containers, or coolers.

Observation chart ideas:

Material	5 minutes	10 minutes	15 minutes	20 minutes	30 minutes	Amount melted
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