

Losing Your Cool

Time: 1 hour

Introduction The ideal item of clothing to wear in Antarctica keeps you warm, dry and protected from the wind, but doesn't weigh too much. But what kind of material would this item of clothing be made of? This lesson focuses on which materials are the best insulators.

Learning Objective:

To investigate which materials are best for insulation.

Resources

1. Different materials such as cotton, foil, wool, fur fabric, newspaper
2. Ice cubes / hot water
3. Empty tin cans or measuring containers for ice cubes / hot water
4. Elastic bands
5. Measuring jug
6. Thermometers

1 Split the class into teams to test materials for insulation. Ask the class beforehand which materials they would like to test and they or you can bring these materials in. Once they have chosen five materials to test, ask them to write down which materials they think will be the best / worst insulators and why.

2 In their teams, ask the children to wrap the empty tin cans or measuring containers in each of the different materials. Do they think each material should be the same size? Once all the containers are wrapped in materials, pour 250ml of hot water into each one. Record the temperature inside each container with a thermometer. Are they all the same? These are the starting temperatures for the test.

3 After each 10 minutes passes ask the teams to re-record the temperature of the water in each container. While they are waiting in between the checks, ask the class to predict the temperatures. At the end of the experiment, they can record their estimate temperatures and the actual temperatures on a graph.

4 If there is time, you can repeat the experiment, but this time put a set number of ice cubes into the containers.

Will the best insulators for the hot water work as well in keeping the icy water cold? Record the temperatures every 10 minutes again and see what happens. Ask the children to create a new temperature graph or chart for this investigation.

Differentiation

There are graphs and charts on the website that the children can use, which will give them support when doing the drawing work. You may need to assist some children with the temperature readings.

The lesson could be extended by asking the children how well different materials might keep them protected from the icy polar winds. Could they use a hair dryer to try this out with a thermometer behind each piece of material? How long will they keep the hair dryer on for? Will they use the same materials as in the insulator experiment? Or could they try out a selection of jackets from children in the class?

Success Criteria

The children have a better understanding of which materials are good insulators and which materials make for good polar clothing.

Temperature / Material	Temp /	Temp /	Temp /	Temp /	Temp /
Starting Time					
+10 Minutes					
+20 Minutes					
+30 Minutes					
+40 Minutes					
+50 Minutes					
+60 Minutes					