

## **Stay Warm: Insulation Experiment**

Even during the coldest of winters, animals have different adaptations that help them stay warm such as feathers and fur. Conduct an experiment to compare different insulating materials and discover which are better for staying warm.

**Location:** Outdoors (or refrigerator)

**Age Range:** 5 and up

### **Materials:**

- 4 jars with lids
- Warm water (warm tap water or boiled with the help of adults)
- Thermometer
- Different insulating materials (scarf, leaves, twigs, fur, feathers or winter coat)
- Worksheet or paper for recording results
- Pencil

### **Activity:**

If possible, perform this experiment outdoors or use your fridge.

1. Warm up water by either running your hot water tap or boiling with the help of an adult.
2. Fill each jar with warm water and take the temperature. Record the temperature of each jar on your worksheet. Put the lids securely on the jars.
3. Cover 3 of the jars with different insulating materials. Leave one jar exposed without any materials as a control.
4. Wait approximately 15 minutes.
5. Open one jar at a time and measure the temperature. Record the new temperature and note the difference in temperature for each jar.
6. Based on the temperature difference, which insulation material was better at retaining heat? Which jar had the largest drop in temperature?

### **Discussion:**

The purpose of insulation is to minimize the loss of heat. Insulation occurs when there is air trapped in pockets of empty space. The spaces are a barrier that help stop the flow of heat. This can keep heat in or out (or both). Materials that are good insulators prevent conduction (heat transfer through touch) and convection (heat transfer through air or water).

Humans use clothing to stay warm when it is cold outside. Clothes prevent heat from escaping by creating a thermal barrier between our bodies and the cold. Animals have natural barriers that help trap heat and insulate them from the cold.

Mammals that live in cold water such as polar bears, whales, and walruses use a thick layer of fat known as blubber. Blubber has low thermal conductivity, therefore preventing heat from escaping. Fur and feathers also act as a great heat insulator by trapping pockets of air against

the body. To help keep out moisture, animals such as beavers have water-repellent guard hairs covered in oil which prevents the animal from becoming wet and cold. Similar to animals, your winter coat is filled with different insulating materials that trap heat and a water-resistant outer layer to help keep out moisture.

This activity is adapted from the activity Stay Warm in The Big Book of Nature Activities by Drew Monkman and Jacob Rodenburg. British Columbia: New Society Publishers, 2016. pg.173-174.

**For Teachers:** See below for links to the Ontario curriculum

<b>Grade</b>	<b>Topic</b>
Grade 1	Characteristics and Needs of Living Things
Grade 2	Growth and Changes in Animals
Grade 2	Air and Water in the Environment
Grade 4	Habitats and Communities

### **Share with us!**

We want to hear how your insulation experiment went. Share with us using the hashtag #RBGathome or tagging us @RBGCanada.