

RAFT IDEAS

Topics: Marine mammals, Environments, Ecology, Adaptations

Materials List

- ✓ One pair of 2 liter (half-gallon) plastic bags for each type of insulating material
- ✓ Duct tape
- ✓ Ice chest (or equivalent) filled with ice water
- ✓ Shortening, lard, feathers, and other desired materials for testing
- ✓ Thermometer for Ice water bath (Optional)

This activity can be used to teach (CA Science Standards):

- Life forms in ocean environments (Grade 3, 3.b)
- Animal survival in specific environments (Grade 4, 3.b)
- Heat flow (Grade 6, 3.0)

Blubber Gloves: It's All About Insulation



Whales, seals, walrus, and other marine mammals survive and thrive in very harsh, freezing cold environments. In this activity, students discover the insulation properties of several materials by testing them in a bucket of ice water; simulating how marine mammals can survive in arctic conditions, yet not freeze to death.

Assembly

1. Fill 1 of the plastic bags with approximately 100 ml (~½ cup) of material (For example: lard or feathers).
2. Insert another plastic bag into the first, making sure the material is evenly distributed in between the two bags.
3. Fold the opening of the inner bag over the opening of the outer bag and secure this seam with duct tape so that the material is sealed between the two layers of plastic.

To Do and Notice

Students take turns inserting their hands in the “blubber gloves” and dipping the gloves in the ice water bath to see how well each material insulates.

The Science Behind the Activity

Because marine mammals are warm-blooded, they need to have some method of insulating themselves from the freezing cold water or they could not survive. A thick layer of fat (blubber) between their muscles and skin serves this purpose. Fat is an excellent insulator, keeping in their body heat, as students will discover in this activity. Blubber also serves as energy storage for the winter months when food sources are limited; some marine mammals do not eat at all during winter. Land mammals use a combination of fat and fur to help them survive cold winters.

One common misconception that students might have about insulation is that it “keeps the cold out”. Since energy flows in the direction from the warmer object to the cooler object (in other words, heat flows, not cold), it is more accurate to say that the insulating material keeps the heat in. Insulating materials greatly slow down the rate at which heat is conducted through the material, much in the same way that insulators prevents electricity from flowing through them. Different materials provide different insulating effects.

Resources - Visit www.raft.net/more for how-to videos and more ideas!

- For an excellent activity that explores insulation on a quantitative level, see “**The Arctic in a Cup**” in *Human Body Explorations*, by Karen E. Kalumuck and the Exploratorium Teacher Institute
- Printable marine mammal booklets are downloadable from Seaworld’s website: http://www.seaworld.com.au/education/project_info_index.cfm?project_id=15
- Printable ocean life coloring pages are available at Enchanted Learning: <http://www.enchantedlearning.com/subjects/ocean/Oceanlife.shtml>