

Blubber Mitt

OBJECTIVE

Students will investigate how blubber helps marine mammals stay warm in cold water by experiencing first hand the discomfort of cold water and the insulating properties of a blubber mitt.

TIME REQUIRED

10 minutes

BACKGROUND

Like humans, marine mammals are warm-blooded animals. Although they live in some of the coldest environments on earth they still maintain a constant body temperature. Most marine mammals have blubber. Blubber is a thick layer of fat under the skin that acts as insulation against the cold ocean water. Almost all marine mammals need the insulating properties of blubber to stay warm. Blubber is firmer and far thicker than the fatty tissue of land mammals and is laced with connective tissue. Unlike fur, blubber does not compress when the animals dive deep to feed. Whales, dolphins, and walrus depend primarily on blubber to keep warm; sea lions and seals depend on both blubber and fur.

Blubber is such an effective insulator that marine mammals must guard against overheating.

MATERIALS

For each team of 3 students:

- 2 one-gallon or one-quart resealable freezer bags (no zipper bags)
- 36 oz. of vegetable shortening
- spatula
- duct tape
- towels
- ice
- 2 digital thermometers
- bucket or tub
- water
- graph paper
- bubble wrap

Optional

- feathers
- wool
- sweatshirt
- fleece
- Styrofoam packing peanuts

Introductory Discussion

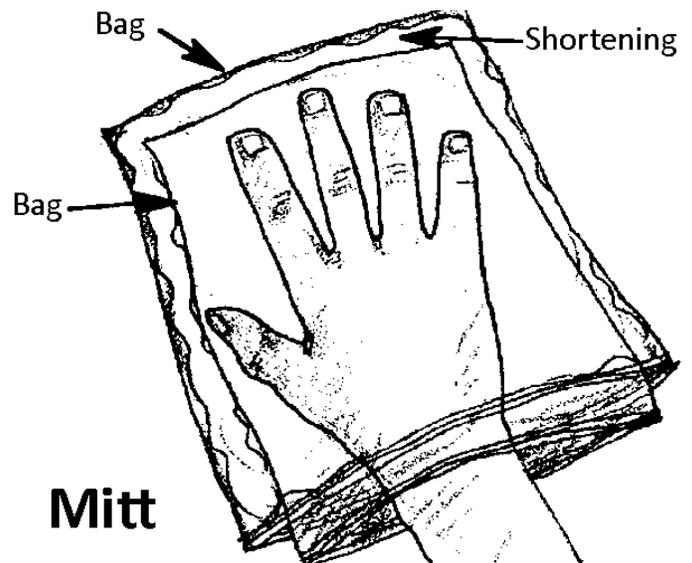
- Ask students how marine mammals stay warm in the water.
- Talk about how humans stay warm in cold water.
 - ◆ Divers wear wet suits or dry suits.
- Introduce the concept of blubber and fur that marine mammals use to keep warm.

PROCEDURES

Either you or your students will need to make blubber mitts. If you can stand the mess, consider having your students make the mitts. Once a class set of mitts is constructed, you can use them year after year. Students can work in groups of 3 or more.

Make the blubber mitts

1. Fill one plastic bag with enough shortening to coat all of the surfaces.
2. Turn the second bag inside-out and insert it into the first bag. Try to keep the seals free of shortening to allow for a better grip. Zip the tops together.
3. Use duct tape on the seals to prevent water from entering the blubber mitt.



Make the control mitts

- Follow the procedure above but leave out the shortening.

Prepare the cold water.

- Fill a bucket or cooler with ice water. The container should be large enough to hold two mitts at the same time.

PROCEDURES continued

K-1

Test how well each mitt insulates against the cold water.

1. Put one hand in each mitt.
2. Place both mitts in the cold water for 60 seconds.

Record which hand feels colder.

Grades 2-6

Measure the temperature in the blubber mitt and in the control

Worksheet 5.1.1 (see below) in groups of three.

1. Have students predict which mitt will be warmer.
2. Put the blubber mitt and control mitt in the ice water. Make sure the ice water does not get inside the mitts.
3. Assign tasks or allow students to volunteer for a task.

Tester — holds the blubber mitt and control mitt so that the temperature can be measured in each.

Temperature measurer — uses the digital thermometer to record the temperature.

Data recorder — records the temperature on the data sheet.

4. Rotate roles among students so that the group gets three measurements and each student has a turn in each role.
5. Have students calculate the average temperatures from their three trials, compare the results from the blubber and control mitt, and write a conclusion about which mitt provides the most insulation.

DISCUSSION

- Discuss the results. Which material provided the best insulation and why?
- Were there any surprises? Did the students predict that a material would not provide insulation when it actually did?
- What are other materials that could be used? How do other animals stay warm?
- Was there anything that affected the outcome? (For example, if cold water got into the blubber mitt, it would affect the temperature recorded in the mitt). Think about how this could happen in an animal with blubber (e.g. the animal gets an injury and coldwater gets past the blubber).

EXTENSION

1. Have students create their own 'survival mitt' by substituting other materials for the shortening in the mitt, such as Styrofoam packing peanuts, feathers, or wool, etc. retry the experiment, and compare results.
2. Create a mitt that has air or bubble wrap between the two layers of plastic bag. Compare results to the blubber. Northern fur seals and sea otters trap bubbles of air in their fur to insulate them against the cold water.
3. Grades 5-6: Research how northern fur seals stay cool on land. See also Lesson 5 PowerPoint slide #8.

The Blubber Mitt activity is a lesson adapted with permission, from the award-winning FOR SEA family of curriculum guides for grades 1–2, available from FOR SEA Institute of Marine Science, Indianola, Washington 98342 (<http://www.forsea.org>)

ACTIVITY 5.1

WORKSHEET 5.1.1

Blubber Mitt

Student 1 name: _____

Student 2 name: _____

Student 3 name: _____

Prediction: Which mitt will provide the most insulation? (Which mitt will be warmer?)

Data Table: Temperature inside mitt

	Blubber Mitt Temperature	Control Mitt Temperature
Trial 1		
Trial 2		
Trial 3		
Average		

Conclusion:

Additional observations (What affected the outcome?)
