National Oceanic and Atmospheric Administration
U.S. Department of Commerce

NOAA Education:
Hands-on activities

How marine mammals stay warm

Wear a “blubber glove” and plunge your hand into an ice water bath to investigate the insulative properties of blubber.

Background

- Blubber is important for most marine mammals, such as whales and seals. The thick layer of fat provides insulation from cold ocean temperatures.
- Blubber is also important because it stores energy that can be broken down to provide the animal energy when food is unavailable.
- Weddell seals live in Antarctica and can have more than 2 inches of blubber. Considering their massive weight of 400-600 kg (880-1320 lbs), that could be up to 240 kg (530 lbs) of pure blubber.
- Bowhead whales live in Arctic waters and can have 43-50 cm (17-20 inches) of blubber, thicker than any other whale's blubber layer.

Materials

- 3 gallon or quart size zippered plastic bags
- 1 large container of lard or shortening
- Heavy tape
- 2 large containers of ice or ice water
- *Optional*: Heavy rubber kitchen glove

Instructions

- Scoop fat into two of the zippered plastic bags. Spread the fat inside the bag so that it fills the bag and is about 1 inch thick. Seal the bags.
- Lay one bag on top of the other and tape three of the sides together making a “mitten."
- Slide the mitten into the third bag with the open side of the mitten facing out of the third bag.
- Put the mitten into one of the containers of ice, or ice water.
- Put one hand into the mitten and put your bare hand into the second container of ice.
- *Optional*: Use a heavy rubber kitchen glove can for the bare hand. If a lot of people are doing the activity this will help keep the demonstration area dry.

Extensions

- Use a thermometer to measure temperatures over time, with and without the mitten. Graph results.
- Predict results and test mittens with different thicknesses of fat.
- Predict results and test mittens with different materials for insulators.
- Investigate the thickness of different mammals’ blubber. Make models showing actual thicknesses.

Related resources

- NOAA Education marine mammal resources: https://www.noaa.gov/education/resource-collections/marine-life/marine-mammals
- NOAA Fisheries: Find a species: https://www.fisheries.noaa.gov/find-species
- Alaskan marine mammals field guide: https://seagrant.uaf.edu/marine-ed/mm/fieldguide/index.html
- Ocean Today: Whale anatomy (video): https://oceantoday.noaa.gov/whaleanatomy/