

HOW DO PENGUINS, WHALES, AND SEALS LIVE IN SUCH A COLD OCEAN?

Adapted from lessons found at:

<http://octopus.gma.org/surfing/antarctica/blubber.html>,

<http://whale.wheelock.edu/whalenet-stuff/Blubberglove.html>, and

<http://www.biol.sc.edu/~coral/antarctica/page101-Ant.html>

OVERVIEW: Students discover that a layer of fat just under the skin is highly adaptive for living in cold water.

Ohio Science Content Benchmarks Addressed:

K-2: Life Science B. Explain how organisms function and interact with their physical environment.

Inquiry B. Design and conduct a simple investigation to explore a question.

3-5: Life Science B. Analyze plant and animal structures and functions needed for survival.

Inquiry C. Develop, design and safely conduct scientific investigations and communicate the results.

Materials needed: - Vegetable shortening

- Plastic or latex gloves, or plastic bags

- Ice water

Procedures:

1. **Show students pictures (or models) of whales, penguins and seals.**

Discuss how they are similar and different. Explain that all are animals that can live in the Antarctic, and ask how they keep warm? Some will know that whales have blubber, a thick layer of fat.

Explain that seals and penguins also have layers of fat, and that fat is very good for insulating animals in cold water.

2. Show students the vegetable shortening, explaining that it is vegetable fat. Then, ask them to think of a simple experiment the class can do to test how the vegetable fat insulates warm-blooded animals—they should **form a hypothesis and an experiment to test that hypothesis**.
3. As much as possible, allow them to carry out their own experiments. If needed, here is one way to test the shortening:
 - a. Students will (with gloves or without), **place a hand in ice water**, and describe how their hand feels.
 - b. Students will then **coat one hand with vegetable shortening**. They should then dip the hand in the same ice water. They should describe how it feels, and compare that to the previous step.
 - c. Students should be able to **explain that the layer of vegetable fat insulated their hand against the cold**, much like a layer of fat insulates whales, penguins and seals.