



KIDS ENVIRONMENTAL LESSON PLANS

This lesson plan developed by:



Whale Blubber

Overview:

Students will make a “blubber glove” to mimic the importance of blubber to whales for keeping them insulated from the frigid water temperatures.

Ocean Literacy Principles:

5. The ocean supports a great diversity of life and ecosystems
6. The ocean and humans are inextricably interconnected
7. The ocean is largely unexplored

Key Concepts:

- Learn about the whale’s layer of insulating fat, known as blubber
- Conduct a simple experiment to test the effectiveness of fat as an insulator
- Discuss how humans use insulating materials to protect themselves from cold exposure

Materials:

- 1 large Ziploc freezer storage bag per group
- 1 smaller Ziploc sandwich bag per student
- 1 can of shortening (Crisco) per student
- 1 plastic bucket or container of ice water per group
- 1 large spoon per group
- 1 stopwatch (or some way of measuring time in seconds) per group

Duration:

30 minutes

Physical Activity:

Moderate

Background:

Whales are warm-blooded mammals that can survive in water temperatures as frigid as the low-40s F. How do they manage to stay warm, even in the ice-cold waters of the Atlantic? By wearing a thick layer of fat, called blubber just beneath the skin.

How does the whale acquire this fat layer? Being mammals, whales suckle their young. A baby right whale, for example, may drink up to 58 gallons of its mother's milk, which has the consistency of soft margarine every day! An adult right whale, on the other hand, may eat 2,000 lbs of food each day. All of this intake is necessary to not only provide the whale with the energy it needs to swim great distances and dive to incredible depths, but to help maintain an essential layer of fatty insulation.

Activity:

1. Divide students into small groups and give each student a small Ziploc bag. Give each group a bucket of ice water, a large Ziploc bag and a can of shortening.
2. Have each group fill their large Ziploc bag with about six inches of shortening.



3. Instruct students to take turns placing their small Ziploc bags on one of their hands, and then placing their hand in the ice water. Have students time one another to see how long they can withstand the cold. Instruct students to keep precise records of the results.
4. Next, have students switch hands, placing their warm hand in the small bag and placing that hand inside the larger bag containing the shortening. Instruct the students to perform the ice-water dip test again, this time with the "insulated" hand. Again, keep exact time records of the results.

**Discussion:**

1. Collect results of the two tests (uninsulated versus insulated) and compare. Students should draw conclusions regarding the effectiveness of blubber fat (shortening) as an insulator.
2. Have them consider how effective a thick layer of blubber must be in order to keep a whale warm while submerged in cold water throughout its life.
3. Discuss the applications of insulation for cold protection in humans.
 - Point out that long-distance swimmers, such as those who cross the English Channel, typically coat their bodies in shortening or other fatty compounds.
 - Consider the fact that native peoples inhabiting arctic regions rely upon blubber and other fatty foods they harvest from marine mammals to help build and maintain a fat layer of their own.
 - Discuss the effectiveness of a diver's wetsuit in providing the same sort of thermal protection for a submerged human. Remember that a wetsuit is a snugly fitting suit of spongy rubber called neoprene that traps a layer of water between itself and the diver's skin. As the diver's body temperature raises the temperature level of the water, the water retains this heat and maintains the diver's body temperature at a comfortable level. If available, try neoprene gloves in the above experiment.

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