

## ANATOMY AND PHYSIOLOGY

### 12. Bag of Blubber

**Objective:** students will learn the insulating properties of blubber.

**Level:** K-3

**Background:** Because whales are warm-blooded, they require a thick layer of insulation to maintain their body temperature in water. Water drains heat from a warm body 25 times faster than air does. Whales have a thick layer of fat, called blubber, that serves as an insulator and body temperature regulator, a reserve energy source, and a flotation device. Depending on the species, blubber can make up 21 to 45 per cent of a whale's body weight and can reach a thickness of 50 cm.

Although ocean water is cold, a whale that is exerting itself to swim fast produces a great deal of heat. Because whales cannot sweat or pant to cool off, their blubber may cause them to overheat. To maintain a constant body temperature, blood vessels leading to the flippers, tail flukes, and dorsal fin expand to dissipate excess heat into water.

**Materials:** a sink or bucket full of cold water, ice cubes, Ziploc bags, lard or vegetable shortening, elastic bands.

**Procedure:**

- 1) Fill the sink or bucket with water and add ice cubes.
- 2) Have students smear a 1-2 cm layer of lard evenly over the inside of a Ziploc bag.
- 3) Then turn another Ziploc bag inside out and place it inside the lard-filled bag. The tops of each side should close, forming a seal and trapping the lard between two layers of plastic, and leaving an opening for your hand.
- 4) Have students put the "bag of blubber" on one hand, and smooth out the layer of lard so it is spread evenly. An elastic band or some string may be helpful to keep the bags from sliding off their hands.
- 5) Instruct the students to immerse both hands into the cold water, being careful not to get water inside the bag.
- 6) See how long students can comfortably keep each hand in the water. Which hand gets colder more quickly? Why? If you were to spend your whole life in cold water, what would be a good way to keep warm?