



Staying Warm with Blubber

Introduction

Orcas are warm-blooded mammals that spend their lives in cold seas. Like humans, they need to stay warm. Under their skin, orcas have a thick layer of fat called blubber. Blubber provides insulation that keeps heat in and cold out. Blubber fat can also be burned as energy when orcas can't find food. In this activity, students discover how blubber provides orcas with effective insulation in cold water.

Objectives

1. Students will identify examples of different physical (hibernation and insulation) and behavioral (migration) adaptations used by animals (birds, insects, reptiles and mammals) to stay warm in cold climates.
2. Students will demonstrate how blubber functions as insulation to keep orcas warm in cold seas.
3. Students will make predictions, conduct experiments and collect data to assess effectiveness of different kinds of insulators.

Key Concepts

- ◆ Animals use different physical & behavioral adaptations to survive in cold environments.
- ◆ Blubber is an adaptation that provides insulation to help orcas stay warm in cold water.

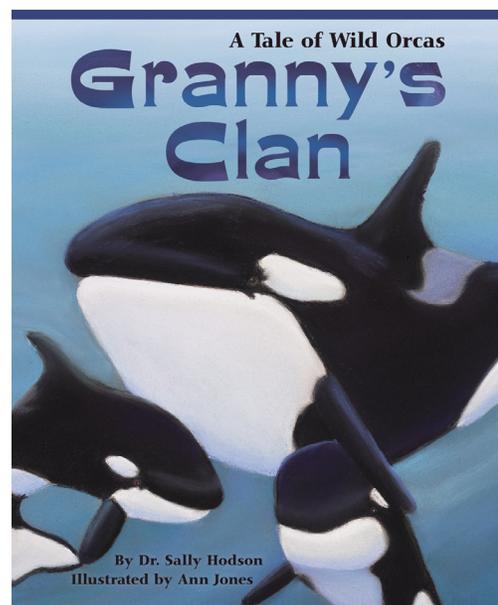
For standards correlation please see our website.

Vocabulary

- ◆ Blubber
- ◆ Adaptation
- ◆ Insulation

Critical Thinking Questions

- ◆ What adaptations do animals use to keep warm in cold environments? (remembering)
- ◆ How do humans keep warm in cold climates? (understanding)
- ◆ How does blubber help orcas survive in a cold ocean? (solving)
- ◆ Compare the different ways humans and orcas stay warm in cold water? (analyzing)
- ◆ What would happen if a hungry orca burns up too much blubber for energy? (creating)
- ◆ Why does blubber provide the best insulation in cold water? (evaluating)





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(Continued)

Materials Needed

- ◆ Styrofoam packing balls
- ◆ Crisco
- ◆ rubber gloves
- ◆ Ice cubes
- ◆ Bucket
- ◆ Paper Towels
- ◆ 2 half-gallon Ziploc freezer bags for each type of insulation
- ◆ Stopwatch
- ◆ bubble-wrap
- ◆ cotton balls
- ◆ Jug of water
- ◆ Duct tape

Procedure

1. Ask students what they wear to keep warm in winter.
2. Ask students how they would stay warm in a cold sea? How do orcas stay warm?
3. Be a Scientist Blubber Investigation - Students make predictions, conduct experiments and collect data to determine the best insulation to keep warm in cold water.
 - a. Students make predictions about different kinds of insulation on **Blubber Investigation** worksheet
 - b. Students pair up into teams and take turns conducting each experiment. One student tests gloves while the other records time and test results.
 - c. Each student team tests Blubber glove. Directions: Insert one hand in blubber glove. Place blubber-gloved hand in bucket of ice water. Remove hand when it gets too cold and record time on worksheet.
 - d. Place bare hand in cold water and remove when it gets too cold. Record time on worksheet.
 - e. Each student team tests the other insulation gloves (cotton balls, Styrofoam, bubble wrap, rubber) the same way. Record times on worksheets.
 - f. Repeat until all student teams have a chance to test the gloves.
 - g. Students complete **Blubber Investigation** worksheets.

Preparation

1. Fill one Ziploc bag with about a cup of Crisco.
2. Turn another empty Ziploc bag inside-out and attach to bag w/Crisco.
3. Zip inner bag to outer bag so Crisco is sealed between. Distribute Crisco evenly.
4. Seal edges with duct tape.
5. To make other insulation gloves, fill each with different materials and seal bags. Use rubber glove by itself.
6. Fill bucket with water and ice.

Nature Connections

- ◆ Students design an Orcan - a human body with blubber that can survive in cold water. Show how your Orcan will swim, dive and breathe.
- ◆ How will you get all the blubber needed to insulate your body?
- ◆ How much food and what kinds of food will you have to eat every day to keep your blubber thick?
- ◆ What will happen if you couldn't find enough food?
- ◆ How is your Orcan like and different from a normal human? Like and different from an orca?

Assessment Worksheet

Be a Scientist: **Blubber Investigation** worksheet

Design an ORCAN worksheet

1. Students explain how adaptations help people and orcas stay warm in cold environments.
2. Students make predictions and record their test results on Blubber Investigation worksheet.
3. Students compare the results of their experiments and discuss why blubber is the best insulation in cold water.