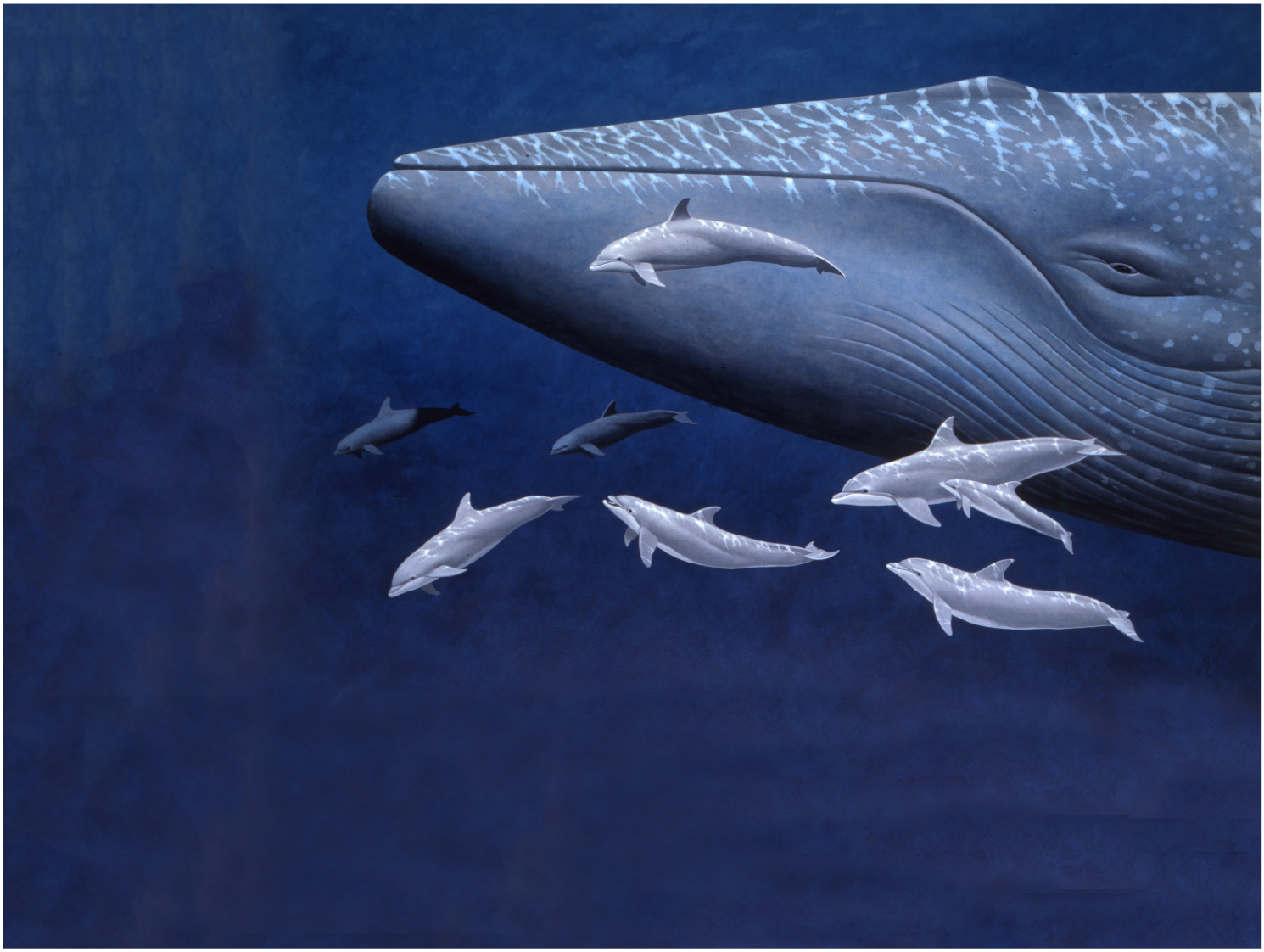
NEW BEDFORD WHALING MUSEUM

WHALES GIANTS OF THE OCEAN

Facilitator's Guide - Lesson 6
Whale Adaptation - Blubber

Lesson time: 45-60 minutes



All cetaceans have a layer of blubber under their skin. The thickness of the blubber has a direct impact on where the species can live. Tropical species might only have an inch of blubber; Arctic species might have 12 or more inches of blubber.

www.whalingmuseum.org

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NEW BEDFORD WHALING MUSEUM

WELCOME!

This facilitator's guide will assist you as you lead *Whales: Giants of the Ocean* **Whale Adaptation - Blubber**. It includes content and links to resources that can be used to present the material to students All resources listed can be found on the New Bedford Whaling Museum education website at www.educators.whalingmuseum.org/

GUIDING QUESTION

What special structure or adaptation do cetaceans and other marine mammals have that makes it possible for them stay warm when they are always in the water, including water that is close to freezing temperature?

BY THE END OF THIS LESSON, STUDENTS WILL BE ABLE TO:

- Explain how whales and other marine mammals are able to keep warm in the ocean.

KEY TERMS

Blubber warmth heat loss

BACKGROUND INFORMATION

Blubber is a layer of adipose (fat) tissue that can be found under the skin of all whales, dolphins, porpoises, and other marine mammals. It is important for maintaining a constant body temperature, minimizing heat loss, and helping with buoyancy.

MATERIALS NEEDED

- 2 quart-sized Ziploc bags
- Vegetable shortening (e.g. Crisco)
- Duct tape
- Long-handled spoon or scoop
- Large container or bucket
- Water and ice
- Thermometer
- Stopwatch
- Worksheet

ACADEMIC STANDARDS

NGSS| LS1.A Cross-Cutting Concepts: Cause and Effect: Mechanism and explanation, Structure and function; Science and Engineering Practices: Asking Question and Defining Problems, Developing and Using Models, Planning and Carrying Out Investigations, Analyzing and Interpreting Data, Using Mathematics and Computational Thinking

COMMON CORE| **ELA** RI.4.4, RI.4.7, RL.4.7, SL.4.1, SL.4.2, W.4.1, W.4.2, W.4.3, W.4.4 | **MATH** 4.OA.A.3, 4.NBT.A.2, 4.NBT.A.3, 4.NBT.B.4, 4.MD.A.1, 4.MD.A.2, 4.MD.B.4

Mathematical Practices | Make sense of problems and persevere in solving them; Reason abstractly and quantitatively; Construct viable arguments and critique the reasoning of others; Use appropriate tools strategically; Attend to precision

LESSON DIRECTIONS

MAKING A BLUBBER GLOVE

(video directions)

- Fill one baggy 1/2 - 3/4 full with vegetable shortening
- Turn a second baggy inside out
- Put your hand inside this second baggy and push it into the middle of the shortening inside the first baggy.
- Do your best to have an equal amount of shortening around the perimeter of the baggies.
- Press the zips of the two bags together until they are completely sealed.
- Cut strips of duct tape and use them to seal around the top edge of the two baggies.

CONTROL BLUBBER GLOVE

- Follow directions for Blubber Glove but don't use vegetable shortening.

INTRODUCTION

Set the scene by describing the challenging environment for marine mammals:

- They live in the water all of the time.
- Water is really good and cooling off warm or hot things (this is why we like to swim).
- Their body temperature needs to stay close to 100° F (38° C), slightly warmer than ours!
- Some migrate long distances. For example, humpback whales swim every year from Puerto Rico where the ocean is warm (77° F or 25° C), north to Iceland where the ocean stays cold (50° F or 10° C in summer). Others make similar migrations from warm to cold water every year. (Hawaii to Alaska, etc.)
- Some, especially toothed whales, dive down deep to feed where the water is as cold as 40° F (5° C), about the same temperature as Buzzards Bay in the winter.

What special adaptation could help them stay warm in the cold ocean?

LESSON DIRECTIONS

ACTIVITY

Ask students to predict: Which hand will be able to stay in the water longer? Bare hand or **Hand in blubber glove**

- Set up a large container of ice water.
- Using a thermometer have students measure the temperature of the water.
- Have them record the temperature (ºF or ºC) on the data sheet.
- Have a student place a blubber glove on one hand and then place that hand and the bare hand in the water at the same time.
- See which hand gets cold the fastest (students keep hands in the water only until it starts to become uncomfortable).

WRAPPING UP

- Have students complete the **"Think About It"** questions when finished with the activity.
- We encourage you to try a variation of this activity for a more objective investigation of the insulating properties of blubber.

Have more time?

Try this additional activity to help students think about a benefit other than warmth that is provided by blubber.

- Pennies Floating on Blubber

Need Additional Resouces?

- NBWM Blubber Adaptation
- NatGeo Blubber

Ready for the next lesson?
Lesson 7
Whale Adaptations - Feeding