

Camouflage, Countershading & Adaptations



NIGHT AT THE AQUARIUM:

<http://gp.com/nature/video.html>

This one-minute video clip from Georgia-Pacific showcases the after-hours antics of the animals at the Georgia Aquarium. Learn fascinating facts about how a penguin's feathers serve as a form of camouflage called *countershading*.

Next Generation Science Standard

Structure and Function, 4-LS1-1

Animals have both internal and external structures that serve various functions in growth, survival, behavior and reproduction. A penguin's feathers serve as a form of camouflage called *countershading*. Countershading helps penguins blend in with their surroundings and hide from predators and prey. A penguin's white belly serves as camouflage from underwater predators looking up, and its black back serves as camouflage for predators looking down.

WORDS TO KNOW:

camouflage: a defense or tactic that organisms use to disguise their appearance, usually to blend in with their surroundings

countershading: a common color pattern in ocean-dwelling creatures in which the upper side of the animal is darker than the lower side; provides camouflage for the animal when viewed from above, below and even from the side

INTRODUCING THE LESSON:

1. Show students a photo of a penguin or, if possible, a plastic penguin or stuffed toy penguin. As students examine the penguin, share the definitions of *camouflage* and *countershading*. Then ask, "How do you think countershading assists the penguin in blending in with its environment?" (*Countershading helps penguins blend in with their surroundings in order to hide from both predators and prey. Their white bellies serve as camouflage for underwater predators looking up, and their black backs serve as camouflage for predators looking down.*)
2. Continue the discussion by asking students, "What other animals use camouflage for protection? What other animals use countershading for protection?" Invite them to do some quick Internet searches to confirm their ideas. (*Animals that use camouflage include chameleons, leopards, turtles, snakes and polar bears. Animals that use countershading include whales and dolphins, great white sharks and some fish and birds.*)
3. Extend the lesson: Challenge students to choose one type of these animals and make a model to show how their camouflage or countershading help the animals protect themselves.

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The Insulation Solution

Next Generation Science Standard Structure and Function, 4-LS1-1

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ESTIMATED LESSON TIME:

45–50 minutes

TEACHER PREPARATION:

1. Gather the experiment materials for each group of four.
2. Place sets of supplies at a distribution station.

MATERIALS FOR EACH GROUP:

- 4 quart-size resealable plastic bags
- 1½ cups solid vegetable shortening
- large dishpan of ice water
- 2 rubber bands
- spoon
- paper towels (for cleanup)
- science notebook for each child

WORDS TO KNOW:

adaptation: any characteristic of an organism that helps it survive and reproduce in its environment

blubber: the fat of whales and other large sea mammals

Background Information:

For animals, being able to adapt to their environment is important for survival. An adaptation is any characteristic of an organism that helps it survive and reproduce in its environment. The better an animal adapts to its environment, the greater its chances of survival.

Lesson:

1. Begin the discussion by defining the word *adaptation*. Ask students the following questions:
 - What are some adaptations that help animals survive? (*Answers will vary.*)
 - We've discussed how penguins use *countershading* to survive in their environments. What other adaptations do penguins have that help them survive? (*Students may mention penguins' streamlined shapes, powerful flippers that help them "fly" underwater and blubber to insulate their bodies.*)
2. Explain that the mother penguin feeds her young with milk that is very high in fat. The milk helps the baby produce a layer of blubber under its skin. The blubber helps keep the penguin warm. As the baby grows, the layer of blubber becomes thicker, providing warmth and protection from the cold ocean waters. (*Note: Be sure students understand that not all penguin species live in cold temperatures. Some penguins, like Galapagos penguins, live in warm climates. These penguins typically have bare patches around their eyes and can raise their wings to release heat.*)

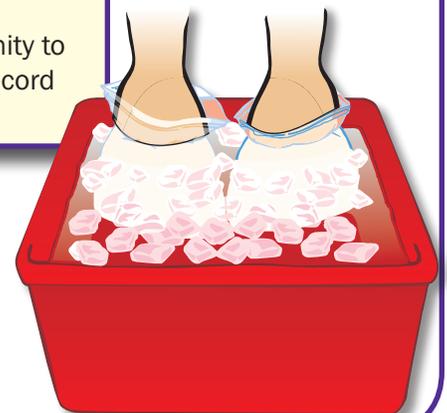
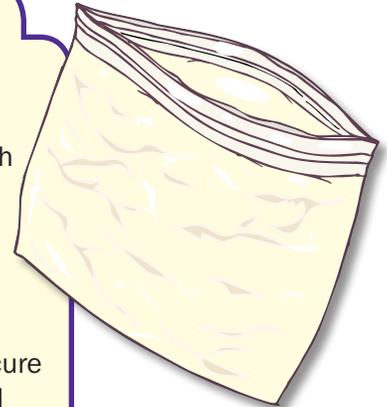
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Lesson (continued):

3. Ask one student from each small group to gather the experiment supplies. Guide the class through the experiment using the following steps.

EXPERIMENT STEPS

1. Spoon the shortening into one plastic bag.
2. Turn an additional plastic bag inside out and place it in the bag with the shortening.
3. Zip the two bags together, forming a pocket in the center.
4. Evenly spread the shortening between the bag layers by gently squeezing.
5. Repeat step 3 with the two remaining bags and *no shortening*.
6. Have a student in each group place one hand inside each bag. Secure each bag onto the student's hand by placing a rubber band around the opening.
7. Instruct the student to dip both hands into the ice water and determine which hand is kept warmer. (The hand in the "blubber mitt" will feel warmer.)
8. Repeat steps 6 and 7, allowing each group member an opportunity to test the blubber mitts and make observations. Have students record their observations in their science notebooks.



4. Conclude the lesson by discussing the students' questions and observations. Ask students, "How did the experiment help you to understand how blubber helps a penguin survive in cold environments?"
5. Challenge students to investigate other adaptations that help penguins survive.

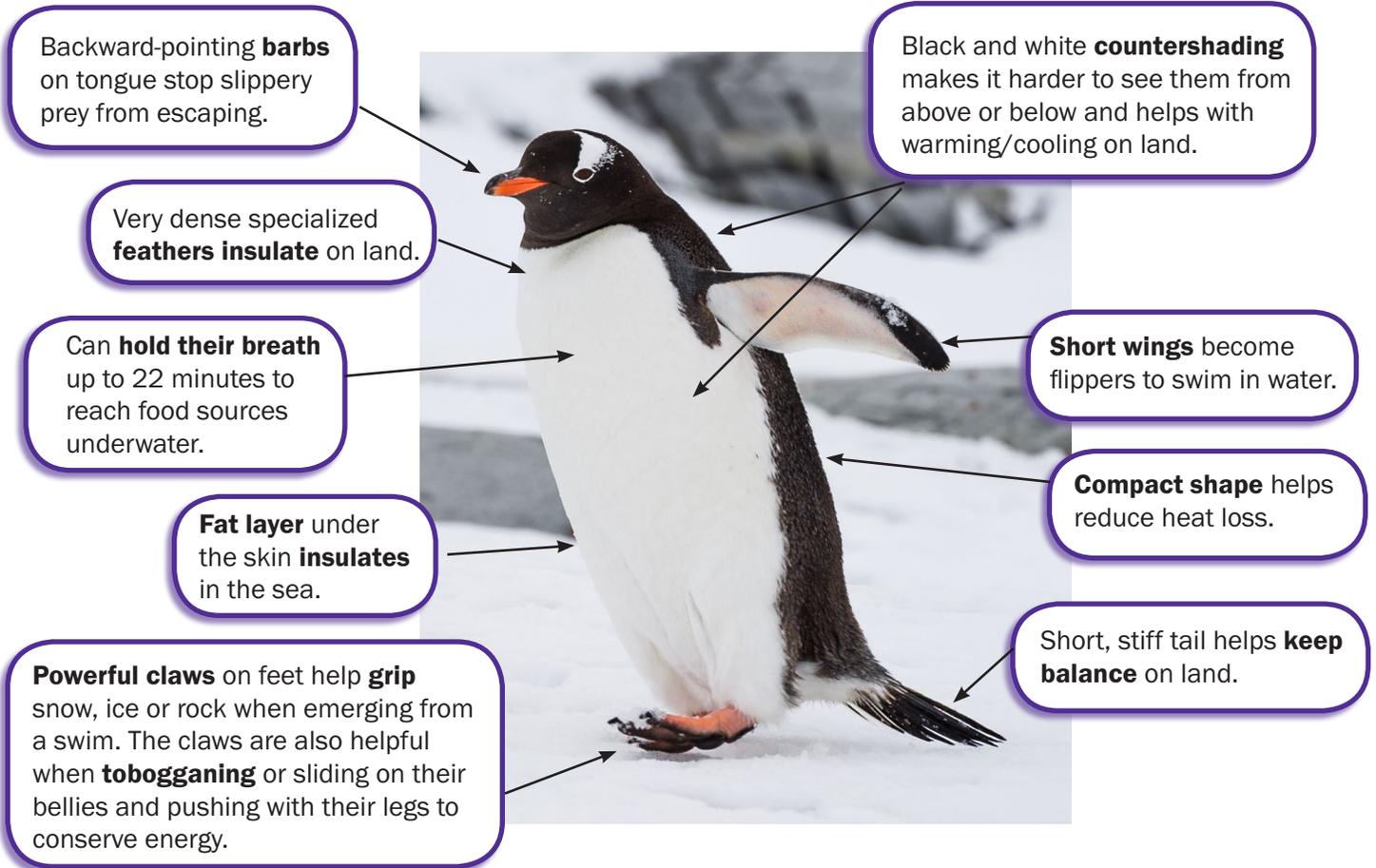
DID YOU KNOW?

Watch Jeff Corwin's *Ocean Mysteries* to learn about the rare *hoiho*, also called the New Zealand yellow-eyed penguin. *Ocean Mysteries* airs on Saturday mornings nationwide on ABC and is sponsored by Georgia Aquarium.



AMAZING ADAPTATIONS

Penguins are designed for life at sea. Read the diagram to learn about the adaptations that help penguins survive in their habitat. Then answer the questions below.



1. Which features help the penguin stay warm? _____

2. Which feature helps a penguin keep its balance on land? _____

3. Why would being able to hold their breath up to 22 minutes help them find food? _____

4. Based on the information above, what is *tobogganing*? _____

5. How does the tongue design help the penguin? _____

**CAMOUFLAGE, COUNTERSHADING & ADAPTATIONS
AMAZING ADAPTATIONS**

ANSWER KEY

1. Answers could include feathers, layer of fat, black and white countershading or compact shape
2. short, stiff tail
3. They can reach food deeper than other animals can reach.
4. sliding on their bellies to conserve energy while pushing with their legs
5. it has backward pointing barbs that stop slippery prey from escaping