



Adaptations: Traits to Thrive in an Environment

Physical Adaptations: A closer look

Key Question

How do **physical adaptations** allow animals to thrive in their environments and get their resources?

Objectives

- Students will **understand** that physical adaptations are structural or physiological characteristics that allow animals to thrive in their environments.
- Students will **observe** bird beaks and **infer** their functions.

Grade: 5

Time: 45 minutes

Location: Classroom

Materials

- For build-a-beaver:
 - Paper (teeth)
 - Warm coat with raincoat on top (fur)
 - Bottle of WD-40 or a can that says “oil” (oil glands)
 - Scuba flippers (hind webbed feet)
 - Oar or kayak paddle (tail)
 - Goggles (indicating membrane in eyes)
 - Perfume (castor gland)
- For Bird Beaks Activity:
 - Bowls filled with rice, cheerios, water, etc. for food;
 - Tools for beaks (tweezers, tongs, nutcracker, straw, spoon, etc.)
- Bird Beaks worksheet and key (attached)
- Darwin’s Finches Collection (<http://eol.org/collections/782>)

Culminating Activity

Students will make observations and inferences about the function of diverse bird beaks.

Directions

Engage:

Review: Why do animals have adaptations?

- Modified body parts: claws, teeth, eyes, ears, stomachs
- Defense: poison, spray, hard shells
- Mimicry: viceroy butterflies mimic monarch butterflies, caterpillars with eyespots
- Camouflage: chameleons, green anoles change colors, stick insects resemble sticks

Build-a-beaver (5 minutes)

Pick a student and have that student go into the hallway and put on/carry all of the props:

- Teeth: cut long rectangular front teeth out of paper - represents the strong teeth that grow continuously, allowing beavers to chew through dense wood
- Fur: warm coat with raincoat on top: warm coat represents the downy hairs that trap air and insulate beaver; raincoat represents guard hairs that repel water
- Bottle of WD-40 or a can that says “oil” - represents oil gland that beavers secrete to waterproof coat
- Hind feet: flippers - represents webbed feet for swimming
- Tail: an oar - represent flat tail that beavers use to steer and turn underwater
- Eyes: goggles - represent nictating membrane, an additional translucent membrane/eyelid that protects eyes and allows beavers to see underwater
- Castor gland: perfume - represents gland that beavers use to mark territory, attract males

Explain to the rest of the class that they will have a very special visitor today who is perfectly adapted for living in the swamps/watersheds of the Florida panhandle. Have the class clap and bring in the student from the hallway.

Think-pair-share: Have students study the beaver for 30 seconds, then discuss with a neighbor what the physical adaptations the props may represent, then ask students to share.

Explore/Explain (25 minutes): As we have learned already, adaptations are something an organism has that allow it to thrive in its environment. We are going to explore a physical adaptation that is critical to birds’ diversity and ability to survive almost everywhere on earth.

Bird Beaks Activity

Split students into groups and give them a set of tools. Then, pass out a bowl of one “food” and an empty bowl, and have students experiment which of the tools best transfers the food from one bowl to another. Or, have each group choose the tool they think will work best and time how long it takes to transfer food.

Ask students to guess which types of bird beaks these tools may represent.

Ask students for some real world examples of birds they know that have specialized beaks.

Elaborate/Evaluate: Bird Beaks (10 minutes)

Option A: Bird beaks worksheet (attached). Have students carefully observe bird beaks on worksheet from Biodiversity Heritage Library drawings and draw inferences about what a bird may eat. Students can also try to name the species from the word bank. Review the worksheet with students (key also attached).

Option B: Explore the most iconic specialized bird beaks, Darwin’s Finches in the [EOL Darwin’s Finches collection](#)

Modifications

- Modify game to meet the needs of the class or teaching objectives.
- The bird beaks activity can be modified into a relay race where teams race to collect as much of a food source with different bills to see which is most efficient.

Extensions

- The BBC Nature website has a large selection of video clips arranged by adaptation <http://www.bbc.co.uk/nature/adaptations>

Next Generation Science Standards

- 2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats.
- 3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
- 3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.
- 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
- 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.



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This activity was developed by the Encyclopedia of Life Learning + Education Group as part of the Okaloosa SCIENCE grant, supported by the Department of Defense Education Activity (DoDEA) under Award No. H#1254-14-1-0004. Opinions, interpretations, conclusions, and recommendations are those of the author and are not necessarily endorsed by the Department of Defense. Learn more about this grant at: www.okaloosaschools.com/okaloosascience/

Bird Beaks: What do they eat?

How can bird beaks give us clues to what birds eat? Look carefully at the bird beaks. Guess what each of these birds eat and write it below the picture. Then, guess the species name from the word bank.



Food: _____

Species: _____



Food: _____

Species: _____



Food: _____

Species: _____



Food: _____

Species: _____



Food: _____

Species: _____



Food: _____

Species: _____



Food: _____

Species: _____



Food: _____

Species: _____



Food: _____

Species: _____



Food: _____

Species: _____



Food: _____

Species: _____

Species Bank

Brown Pelican

Black Skimmer

Northern Flicker

Roseate Spoonbill

Cooper's hawk

Crossbills

White Ibis

Black-necked Stilt

Nuthatches

Carolina Parakeet

Nighthawk

Bird Beaks: What do they eat?

How can bird beaks give us clues to what birds eat? Look carefully at the bird beaks. Guess what each of these birds eat and write it below the picture. Then, guess the species name from the word bank.



Food: Crack nuts, fruits

Species: Carolina Parakeet (extinct)



Food: Stir up fish, aquatic insects

Species: Roseate spoonbill



Food: Screen flying insects

Species: Nighthawk



Food: Fish, invertebrates in mud and water

Species: Black-necked Stilt



Food: Pry conifer seeds from cones

Species: Crossbills



Food: Insects in bark

Species: Northern Flicker



Food: Probe in mud for crabs and crayfish

Species: White Ibis



Food: Scoop up fish

Species: Brown Pelican



Food: Small mammals, reptiles

Species: Cooper's Hawk



Food: Skim fish and crustaceans from surface

Species: Black Skimmer



Food: Insects and other arthropods

Species: Nuthatches

Species Bank

Brown Pelican

Black Skimmer

Northern Flicker

Roseate Spoonbill

Cooper's hawk

Crossbills

White Ibis

Black-necked Stilt

Nuthatches

Carolina Parakeet

Nighthawk