

# ***FOR THE BIRDS***

## Bird Beak Adaptations

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# For the Birds

## *Bird beak adaptations*

### Skill Level

Beginner (4<sup>th</sup> & 5<sup>th</sup> graders)

Intermediate (6<sup>th</sup>-8<sup>th</sup> graders)

### State Standards Addressed

4.LS1.1, 8.LS4.4, 8.LS4.5

### Learner Outcomes

The learner will be able to:

- Describe several different beak shapes
- Explain how beak shape is an adaptation to type of food the bird eats

### Tag(s)

4-H Science

### Time Needed

30 minutes

### Materials Needed

Several different bowls of “foods”:

“Seeds”: Lentils, beads, rice or other small objects

“Fish”: marbles, pennies

“Insects”: rubber bands or toothpicks

“Nectar”: colored water in a narrow-necked bottle

“Floating vegetation”: mini marshmallows in water

Several types of “beaks”:

Tweezers

Clothespins or binder clips

Tongs

Pipettes or straw

Strainer spoons or sieves

Cups for collecting foods

### Author

Jennifer DeBruyn, Professor, Biosystems Engineering and Soil Science

Adapted from:

“What’s that Beak For?” Audubon Society

[audubon.org/news/whats-beak](http://audubon.org/news/whats-beak)

“Bird Beak Buffet” USGS

[pubs.usgs.gov/of/1998/of98-805/lessons/chpt2/act5.htm](http://pubs.usgs.gov/of/1998/of98-805/lessons/chpt2/act5.htm)

### Introduction to Content

Bird beaks are a great example of an organism’s adaptation to its environment. In this lesson, students will connect beak shape to food type.

### Introduction to Methodology

Students will select tools representing different “beaks” and visit four stations to collect different “foods.” After counting the collected food with their beaks, they will determine which beak type was most effective for the different foods.

### Terms/Concepts

**Beak** – a specialized structure found mostly in birds, but also turtles, non-avian dinosaurs and even some mammals

**Mandible** – jawbone

**Keratin** – proteins that make up hard structures in animals, including horns, hoofs, claws, feathers, reptile skin, hair, etc.

## Setting the Stage/Opening Question

*Ask: What is a beak?*

**Beaks** are a structure found in some animals: mostly birds, but also turtles, dinosaurs and even some mammals. They are a special structure of the jaw bones (**mandibles**), covered in a **keratin** layer. Keratin is a protein that also is found in our hair and fingernails as well as animal horns, hoofs, claws, feathers and reptilian skin.

*Ask: What does a bird use its beak for?*

Explain that beaks are how birds find, catch and/or pick up food. This is especially important because birds don't have hands or paws to hold food like mammals do. They also use them for preening, fighting and courtship.

*Ask: Have you noticed that bird beaks come in all sizes and shapes? Why do you think that is?*

Show pictures of different bird beak types (see sidebar) and ask students to predict what types of food the birds might eat based on their beaks.

Explain that large beaks may be stronger and good for large foods like fish or meat, but they are less precise when it comes to small food items, like seeds or small insects.

Here are some common beak shapes:

| Beak shape            | Primary food        | Examples    |
|-----------------------|---------------------|-------------|
| Conical or triangular | Seeds               | Cardinal    |
| Long and slender      | Nectar              | Hummingbird |
| Short and pointed     | Insects             | Warbler     |
| Long and strong       | Insects inside tree | Woodpecker  |
| Wide and flat         | Floating vegetation | Duck        |
| Long and dagger-like  | Fish                | Heron       |

Explain that today we're going to be birds and explore how our "beak" shape affects our ability to get food.

### Strategies to Increase Student Engagement

**SHOW:** Slide show of bird beaks with teacher notes  
[tnlearn.pbslearningmedia.org/resource/tdc02.sci.life.colt.birdfood/bird-food/](http://tnlearn.pbslearningmedia.org/resource/tdc02.sci.life.colt.birdfood/bird-food/)

**WATCH:** Bird Feeding Adaptations  
[youtu.be/IFZ8NMBDCJw?feature=shared](https://youtu.be/IFZ8NMBDCJw?feature=shared)

**MAKE:** Homemade birdseed ornaments by mixing birdseed and gelatin and mold into cookie cutters  
[fountainavenuekitchen.com/birdseed-ornaments/](http://fountainavenuekitchen.com/birdseed-ornaments/)

**GET OUTSIDE:** Use the Merlin App to identify birds in your school yard  
[merlin.allaboutbirds.org/](http://merlin.allaboutbirds.org/)

## Experience

1. In advance, set up the following for each group of 5 students:
  - a. Four bowls of different “food” items, labelled with the food items the objects represent (e.g., seeds, fish etc.)
  - b. Four “beaks”
  - c. Four cups for collecting food
2. Have students work in groups of five. One student will be the timer. Four students will be “birds” and select four different “beaks” and a cup for collecting food.
3. The four birds will select a food station. Set a timer for 15 seconds. Birds use their beak tool to pick up pieces of food and put them in their cups.
  - a. Note: They may only collect one piece of food at a time. For example, they may not use a spoon to collect a spoonful of seeds.
4. When time is up, have each bird count the number of food items in the cup and record on the datasheet.
5. Have students rotate to another food station and repeat steps 3 and 4. Have students repeat until they’ve visited all four food stations.

## Share

Ask, “Which beak was most/least effective for seeds? Insects? Fish? Floating vegetation? Nectar?”

## Process

Ask, “How does the shape and size of the beak make a difference in getting the food?”

## Generalize

Ask, “How do the tools we used correspond to actual birds?”

Tweezers = insectivores e.g., warblers

Clothespins/binder clips = seed eaters e.g., cardinals

Straw/pipette = nectar feeders e.g., hummingbird

Tongs = fish eaters e.g., herons

Strainer spoons/sieves = strainers e.g., ducks”

## Apply

Ask, “What are some other ways birds adapt to their environment?”

Notes

## Supplemental Information

### *Educational Standards Met*

4.LS1.1: From Molecules to Organisms: Structures and Processes. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain and skin.]

8.LS4.4: Biological Change: Unity and Diversity  
Develop a scientific explanation of how natural selection plays a role in determining the survival and reproduction of a species in a changing environment.

8.LS4.5: Biological Change: Unity and Diversity  
Obtain, evaluate and communicate information about the technologies that have changed the way humans use artificial selection to influence the inheritance of desired traits in other organisms.

#### **TIPPS** ***Life Skills***

- Head - Thinking
- Heart - Communicating
- Heart - Relating
- Health - Living

## Student Worksheet

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. Record how many food items you can pick up in the time limit. (For nectar, estimate volume):

|       |                        | BEAKS    |                                   |                     |       |                                 |
|-------|------------------------|----------|-----------------------------------|---------------------|-------|---------------------------------|
|       |                        | Tweezers | Clothespins<br>or binder<br>clips | Straw or<br>pipette | Tongs | Strainer<br>spoons or<br>sieves |
| FOODS | Seeds                  |          |                                   |                     |       |                                 |
|       | Fish                   |          |                                   |                     |       |                                 |
|       | Insects                |          |                                   |                     |       |                                 |
|       | Nectar                 |          |                                   |                     |       |                                 |
|       | Floating<br>vegetation |          |                                   |                     |       |                                 |

2. In the table above, circle the beak that was most effective for each type of food.
3. How does the size of a bird's beak make a difference in getting food?
4. How did the shape of a bird's beak make a difference in getting food?



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