

Cloverbud Investigators: Taking the Adventure Outside

Beaks to Tweet About

June

Background: The exact number of bird species is unknown, but scientist estimate there are over 10,000 different species. Birds come in all shapes, colors, and sizes but there are a few things that all birds have in common.

- 1.) All birds are vertebrates - they have a backbone.
- 2.) All birds are warm blooded - they can regulate their body temperature.
- 3.) Only birds have feathers.
- 4.) All birds have two wings.
- 5.) All birds lay hard shelled eggs.
- 6.) All birds have two legs.
- 7.) All birds have beaks.

Objectives: This lesson focuses on the function, types, and shapes of bird beaks. Birds use their beaks to preform different functions. Most bird beaks have evolved because of the specialized feeding habits of the species.

Science Behind: Examples of Beak Adaptions

1. Carnivorous – Carnivorous birds are meat eaters. Birds like eagles, owls, hawks, and falcons are carnivores. They hunt live prey and use their strong beaks to grab prey and pull it apart. These birds have beaks in which the upper bill protrudes over the lower bill. They are hook shape and have the strength to clamp down on prey and hold it tight. (*Hooked Beaks*)



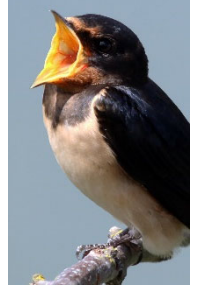
2. Granivorous – Granivorous birds are seed eaters. Species like goldfinch, sparrows, and cardinals. They feed off the grains and seeds of flowers. They have strong short solid beaks, that taper in shape, making them look triangular. They use their beaks to pick up small seeds and crack them open. (*Cracker Beaks*)

3. Frugivorous – Frugivorous birds are primarily fruit eaters, like orioles and hornbills. They often have very specific beaks designed for the fruit they eat. Some, like the waxwing, have narrow beaks for picking berries from plants. Others, like parrots, have adapted bills specific for their food. Parrots are the only birds that have upper beaks that move and allow them to peel the fruits they love to eat. (*Pliers*) (*Tongs*)





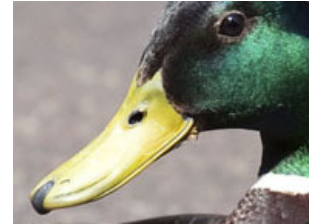
4. Insectivorous – Insectivorous birds are insect eaters. Many have developed bills to help them hunt and catch insects. Birds like woodpeckers have developed long, hard bills to help them drill holes into dead trees to find insects. Others, like barn swallows have short, wide, flat beaks to catch insects as they fly. (*Tweezer Beaks*) (*Net Beaks*)



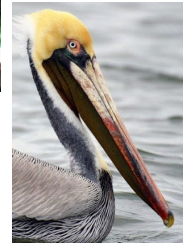
5. Piscivorous – Piscivorous birds are fish eaters, they have specially developed beaks to help them catch fish. Birds like great blue herons have developed large, strong, sharp beaks which help them stab their prey. Others like Penguins have developed sharp, curved tip beaks, while some like the Canada goose have developed serrated ridges that act almost like teeth to help them pull up vegetation. (*Spear Beaks*)



6. Filter – Filter feeders have specialized bills that allow them to take in large amounts of water or even mud and filter out food. They have flat wide bills with a special filtering



system that acts like a food strainer, keeping food in and straining out the rest. Most species of ducks and many other waterfowl have this type of beak. Flamingos are famous filter feeders with their unique upside-down beaks. (*Strainer Beaks*)



7. Nectarivorous – Nectarivorous birds are nectar feeders, they have long thin bills that can vary in shape and size. Hummingbirds are nectarivorous feeders. There are many kinds of hummingbirds; some have shorter bills, some have long bills, and some even have curved bills to reach into specific flowers. (*Probing Beaks*)

8. Other – There are so many different species of birds that some have developed specialized beaks that are like no other. The Rhinoceros Hornbill is one of these. Scientists are not sure about the function of the bill, there is a theory that it may amplify the bird's call during courtship. Toucans have the largest bill of all birds at 7.5 inches long. It uses this big bill to reach fruit on small branches and to toss fruit to its mate.



Why do birds have so many different beaks?

Start by looking at different kinds of bird beaks using pictures from field guides or birding websites. Discuss traits that all birds have in common. (See the *background section* of this lesson and additional activity “What Makes Birds Unique”). Next, have the Investigators focus on just the bird’s beaks. Using the “Bird Beak Lesson Cards,” group birds together by similar looking beaks. Once the birds are grouped together ask, “What do you think this group of birds might eat?” Allow guesses for each bird group, recording answers on a slip of paper next to the group. Using information from the *background section* of this lesson, lay out the following items on a table, food on one side and tools on the other.

Optional Supplies for Sample Beaks

1. Tweezers
2. Eye droppers
3. Pliers
4. Slotted spoon
5. Vice grips
6. Toothpick
7. Skewers
8. Small net
9. Strainer
10. Meat Fork
11. Tongs
12. Fence Pliers
13. Straw



Optional Sample Foods

1. Gummy Worms
2. Plastic Insects
3. Seeds like Sunflower seeds
4. Gummy Fish
5. Fruit (berries, grapes etc.)
6. Juice in different shape containers
7. Toy Mouse, Lizard, or Snake
8. Bowl of Cereal with Milk
9. Nuts (*Caution- make sure there is no nut allergies.*)



Activity - Which beak is best?

Do ahead: Print picture cards, gather sample beak tools, and sample food items at least 5 of each.



What to do: (procedures) Challenge the Investigators to pick the perfect “beak tool” for each of the food sources. First, have them make a *hypothesis* (scientific guess) like: “I think the pliers will work the best to crack open the nuts,” record their hypothesis, then test their theories. They can test each tool, trying to pick up, crack, or eat each food sample to determine which is the best beak for the job. Use the “Bird Beak Tally Sheet” included with this lesson to record results.

Go Over Findings: Have the Investigators report how many of each food item they were able to pick up with each tool in a set amount of time. This will help determine the best tool for the job.

Talk it over: Which beak was best for eating each food item? Look at their hypothesis for what each bird group eats and ask, “Do you think our guesses were correct? Should we change any of our answers based on what we now know from our experiment?”

Additional activities: *Discussion – ask the following questions.*

What makes a bird unique?

Are beaks unique to birds? Can you think of another animal that is not a bird that has a beak? (Did you know turtles and the duck-billed platypus also have beaks?)

Are wings unique to birds? Can you think of another animal that is not a bird that has wings? (Bats have wings, but they are not birds, also insects have wings and they are not birds.)

Are two legs unique to birds? Can you think of some other animal that only had two legs? (Humans have two legs, what about monkeys? Can you think of others?)

Is laying eggs unique to birds? Can you think of some other animal that lays eggs but is not a bird? (What about snakes and turtles? Fish, frogs, salamanders also lay eggs, can you think of more?)

Are feathers unique to birds? (Yes! Birds are the only living animal with feathers!) Bird feathers are light, flexible, and strong.

Feather Facts: Birds have different types of feathers to do different things. For example, “Down Feathers” are fluffy and short to help the bird by holding body heat in and allowing the bird to stay warm. “Wing Feathers” have interlocking barbs like Velcro that create a windproof surface that allows for lift in flight. “Tail Feathers” also interlock to create a uniform surface and help with steering or direction. “Contour Feathers” cover the bird’s body and help keep it dry. Feathers can also help a bird hide or attract a mate.

If you have access to a computer, participants can also explore The Cornell Bird Academy at www.academy.allaboutbirds.org which has interactive lessons on birds.



Making Scientific Connections to nature: The diversity in the Aves class is amazing, with 29 orders and over 10,000 species, you can find every shape, size, and color imaginable. Birds are found on all seven continents, they are known to fly, swim, and run. They can be carnivores, herbivores, or omnivores. Some birds are prey while others are superior predators. Many are active during the day, but some prefer the night. Some are boldly colorful, while others are shy and have mastered the art of camouflage. The diversity of birds is fascinating to the scientists and the backyard birder alike. The goal of this lesson is to open the eyes of the young explores to the wonderful world of birds that exists right outside their window.

Optional activities:

- ***Watch Bird Feeding Adaptions: How Beaks are Adapted to What Birds Eat -***
<https://youtu.be/IFZ8NMBDCJw>
- Create your own bird feeding station
 1. Locate an area in your yard with places that birds can land, perch, and hide. The edge of a wooded area or fence row is great but remember you need to be able to fill and clean feeders. Make sure you can see the feeders from a window or a favorite patio spot.
 2. Offering a selection of different kinds of feeders will allow more species to use your feed station. Example: tray feeders, tube feeders, suet feeders, nectar feeders and traditional seed feeders.
 3. Be picky about bird feed. Avoid feeds with high percent milo, wheat, canary seed, rice, buckwheat, rapeseed, golden millet, red millet, and oats. Instead provide sunflower seeds, safflower seed, Nyjer seed, unsalted peanuts, unshelled peanuts, mealworms, cracked corn, suet, sugar water (nectar), and fresh or dried fruit.
 4. Provide a water source such as a birdbath or fountain. A heated water source is needed in the winter.

Taking the Adventure Outside: Take a bird hike. Birds are easy to find, just look out your window. Take along a camera and snap some pictures of your favorites. Turn your hike into a game with “Bird Bingo,” or a “Bird Scavenger Hunt!” Make up your own cards and see who can find various colors of birds, or birds in various locations like on a nest or in a tree.

Career Connections: *Ornithologist, Wildlife Biologist, Veterinarian, Wildlife Photographer, Zoologist, Pet Show Management, Environmental Education, Parks and Recreation*

Investigate, Create, & Take: Investigators can take with them:

- Create your own set of bird bingo cards
- Create your own bird scavenger hunt list
- Make a homemade bird feeder
- Create your own bird and tell its story. What adaptations does it have and why?



Sources: <https://birdeden.com/different-types-of-bird-beaks>
<https://www.audubon.org/news/10-wonderfully-weird-bird-beaks#>
<http://www.birdwatching-bliss.com/bird-beaks.html>
<https://academy.allaboutbirds.org/features/all-about-feathers/#how-feathers-are-built.php>
<https://www.publicdomainpictures.net/en/stock-photos.php?hleda=robin+bird+spring>

Developed by Tracy Winters, OSU Extension, Gallia County Extension Educator, 4-H Youth Development, winters.5@osu.edu. Tiffany Sanders Riehm, Gallia County 4-H Program Assistant, 4-H Youth Development, riehm.11@osu.edu. Edited by: Michelle Stumbo, Meigs County Extension Educator, ANR.



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