

The Best Beak Ever

Of course, everyone knows that birds have beaks, but did you know that they are very different from one another?

To explore the structure and function of bird beaks while discovering their specialized features that contribute to the birds' survival, there is an assortment of ready-made resources to investigate, as well as ways to prepare your learners for this fascinating topic.

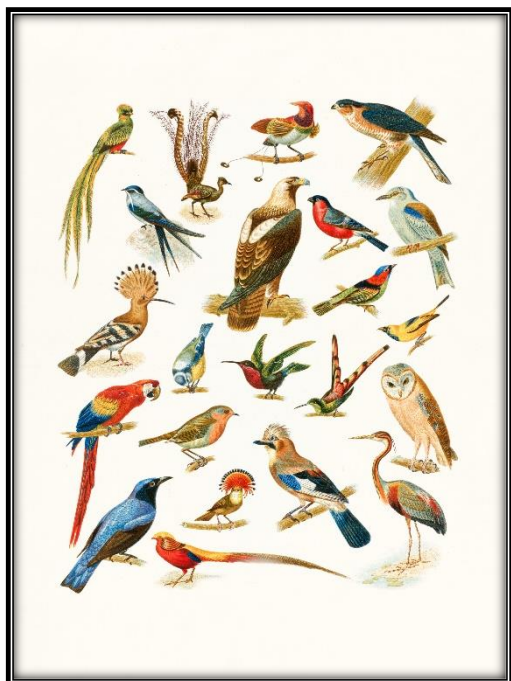
Getting ready... anticipatory sets

Brainstorming General Functions

First, consider all the different jobs that beaks (and bills) serve.

Birds use their beaks during feeding, but how else are beaks useful?

(If teaching a class, this question can be posed as a “Think. Pair. Share” or responses on individual whiteboards, post-its, or cards. Answers may include: preening, manipulating objects, killing prey, probing for food, courtship behaviors, feeding young, gathering nesting materials, eating. Can you think of others?)



One size does not fit all...

Birds populate the world and thrive in thousands of different types of environmental conditions. Some are mostly aquatic, while others mostly live in desert conditions. Some fly for the span of continents and from one side of an ocean to the other, while others spend most of their time in one general location.

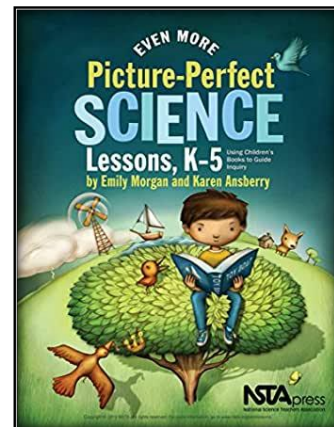
(You can ask you students for places and habitats where birds may live. Make a long list on the front board or on easel paper, collecting your students' ideas.)

If birds live in all these environments, it would stand to reason that their structures, including beaks/bills would be able to help them survive and serve the functions listed previously.

To investigate beaks as “tools used for the bird to eat” ...

Picture-Perfect Science Lessons

The unit, “Unbeatable Beaks”, from the Even More Picture-Perfect Science Lessons, K-5, by Emily Morgan and Karen Ansberry and NSTA Press includes an activity where students are provided a fork with the tines taped together, a medicine dropper and a spring clothes pin. They are also given three pie plates.



- One a pie plate has small marshmallows which represent insects.
- One pie plate just has water to represent nectar.
- One pie plate has about a cup of water and a 0.5 cup of dried beans to represent small insects or animals that are in a pond or lake.

In this lesson, students are timed to see how much “food” they can gather by using each of the tools. Students must determine which of the tools works best to move the food from the pie plate to a cup.

Results from each group are shared and discussed. For example:

- How much water was gathered when using the clothespin, the medicine dropper and then the taped fork?
- How many beans were collected when using the medicine dropper, the clothespin or the taped fork?
- How many marshmallows were collected when using the medicine dropper, the clothespin or the taped fork?
- Is there one beak that works for each of the “foods”? Or does one beak work for one food type better than the others? (The “best beak” depends on which food you are trying to get.)

Students then consider which birds might have beaks like an eye dropper, the taped fork, or the clothes pin.

In this activity, the medicine dropper was to provide an example of how a hummingbird gets nectar; the taped fork was an example of a flamingo and how it gets small invertebrates and tiny plants out of the water; a toucan’s beak was demonstrated by the clothespin. What are some of the answers generated from the class? (Students having the opportunity to look through an assortment of bird photos will allow for more varied responses.)



The Cornell Lab – It’s more than what’s been billed...

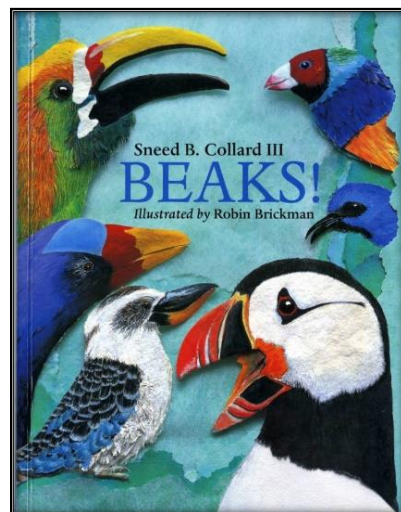
The Cornell Lab is always a fabulous *free* resource to investigate birds and their beaks. You can find an assortment of activities at this link and information about this book:

Beaks! by Sneed B. Collard III

According to the review appearing on the Cornell Lab website, “Beaks! is an excellent introduction for children to the wide variety of bird beaks and their many uses. This picture book looks at the amazing adaptations of various beaks, their different qualities, and specific uses. It includes facts about beaks, the different ways birds use their beaks, and how the shape and size of their beaks relates to what birds eat.

The author’s writing style is straightforward and clear. This book is well written, and students will enjoy hearing it read aloud. The level of information included also makes it a great source for student research on the topic of Beaks!”

In partnership with this book, and the Cornell Lab website itself, these activities are available with detailed instructions:



Activity 1: Beak Adaptations – Eat Like a Bird

Explore how bird beaks are adapted for eating different foods with the fifth lesson in our Feathered Friends resource (available as a free download). In this lesson, students explore the concept of which beaks are best for what food. They learn that birds’ beaks come in many different sizes and shapes according to their specialized function for that species of bird.

Activity 2: Look for Beaks

Go outside and observe birds. Have students pay particular attention to the beaks of any birds they see. Ask students to draw or list the characteristics of the beaks of two different birds that they see. *(Keep in mind, the time of year you take your students out to look for birds will determine the number and kinds of birds found in your*



area. This is due to migration or on nesting behaviors – birds on nests are harder to find.)

When you're back inside, discuss the observations with students, asking:

- Are the beaks different? How so?
- What were the birds doing?
- How might their behavior differ because of the beaks they have?

Help students explore the beak shapes of common birds found in your area, for example woodpeckers, sparrows, finches, shorebirds, herons, raptors, ducks, warblers, and wrens. Use field guides (books or online) to look at the beak similarities within each group. For example, what are woodpeckers' beaks like? Sparrows' beaks? What else do the birds belonging to these groups have in common? (Their coloring? Wing size and shape? Habitat?) See this article, [Teaching Bird ID](#), for further information about exploring bird groups.

Activity 3: I'll Have What You're Having

Ask each child to choose a beak to draw from Collard's book. Have them label it with the species of bird, and a description of what that bird eats. Challenge students to find other bird species with a similar diet. Then, compare the beaks of all these birds. What about the beaks is the same? What is different? Next, compare the habitats of these birds. Even though they eat a similar diet, are their habitats the same? If not, how are they different. Where in the habitat does each species find its food?



Activity 4: What's on the Menu?

Find pictures to cut out (online or in magazines) of different kinds of birds. Be sure each bird's beak is easy to see and that the birds differ in what they eat. Here is a short list of the kind of birds to include and some examples of each:

- **Hummingbirds:** Birds that have long, hollow beaks that protect the bird's tongue; they use their tongue to slurp up nectar – Ruby-throated and Anna's,
- **Hérons and egrets:** Birds that hunt for fish in shallow water have long, sharp beaks that they use to catch or spear fish – Great blue heron and snowy egret,
- **Birds of prey (raptors):** Birds that eat other animals have strong, sharp beaks to tear the meat into pieces small enough to swallow – Great horned owl, bald eagle, and Cooper's hawk,
- **Shorebirds:** Birds with very long, thin beaks that they use to probe for food in the sand or mud – Spotted sandpiper, American woodcock, and Wilson's snipe,
- **Woodpeckers:** birds that drill for food under bark have strong beaks which are sturdy and taper at the tip, forming a chisel for pecking holes in trees – Downy, hairy, and pileated,



- **Seed eaters:** birds that have short, strong, triangular-shaped bills that can crack open seeds – Northern cardinal, American goldfinch, song sparrow, white-throated sparrow, and rose-breasted grosbeak,
- **Aerial insectivores:** birds that feed while in flight, catching and eating airborne insects have beaks that are very short and flat; their mouths open very wide and act like nets to trap flying bugs – Tree and barn swallow, common nighthawk, purple martin, and chimney swift,
- **Flamingos and some ducks (only certain ducks are filter feeders.):** birds that have beaks that act like strainers; they filter their food, plants, seeds, and small animals, from the water using the comb-like edge of their beak; water enters at the tip of the beak and exits out the sides – Flamingo, mallard, and blue-winged teal,
- **Warblers and thrushes:** birds with sharp, pointed beaks; used to pick insects from leaves, logs, and twigs – Yellow warbler, common yellow throat, american robin, wood thrush, and ovenbird.

Glue the pictures to an index card or card stock and give them to students or groups of students.

Ask:

- What do you think this bird eats?
- What makes you think that?
- What bird do you think this is?

Then, have students use field guides and/or [All About Birds](#), the Lab's online bird guide, to determine what species their bird is and to help them make a list of how and what it eats. Have students find classmates whose birds have a similar diet. Then, compare and contrast beak design and the habitat of the birds.

Extensions



Using cloze sentences for critical thinking...

Prior to students doing research, I have found it beneficial to provide an exercise involving cloze sentences which allows learners to monitor their reading and focus on content specific vocabulary.

Individual students, or by teams, can research different types of birds and complete a sentence with the necessary information.

"A _____ (type of bird) has a beak that is used to _____ (verb) _____ (type of food) because it is _____ (adjective) and shaped like a _____ (description of an object).

Examples:

A bald eagle has a beak that is used to tear meat from its prey because it is sharp, curved and strong.

A cardinal has a beak that is used to crack sunflower seeds because it is short and shaped like a cone.

Students may also illustrate the bird, its beak and include the food source in the labeled picture. To complete the project, the bird's habitat can be included.

Using field guides when not in the field...

Field guides are a rich source of information for bird beak inquiries providing excellent illustrations and close-up photographs and images of birds and their beaks. The National Audubon Society suggests six kid friendly bird guides with vibrant colors, sleek lay-outs and approachable text.

<https://www.audubon.org/news/six-kid-friendly-bird-guides>



Data driven representations...

When conducting the experiments about various bird beaks and which work best with assorted food type representations, students may keep tallies in times trials. These group/individual results may then be collected for graphing and analysis. Students can also decide what type of graph to use and why it provides the best depictions.



Next Generation Science Standards

Interdependent Relationships in Ecosystems

2-LS2-1 Structure and Function: The shape and stability of structures of natural and designed objects are related to their function(s).

2-LS4-1 Connections to Nature of Science Scientific Knowledge is Based on Empirical Evidence: Scientists look for patterns and order when making observations about the world.

2-LS4-1 Engineering Design K-2 – ETS1-2 Crosscutting Concepts Structure and Function: The shape and stability of structures of natural and designed objects are related to their function(s).

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction

English Language Arts K-12

Anchors

NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text

NJSLSA.R9. Analyze and reflect on how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

NJSLSA.R10. Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.

New Jersey Learning Standards for Mathematics

Measurement and Data - Represent and interpret data. These elements are found throughout the standards.

For more information about how to use any aspect of this lesson, contact Kate Reilly, Manager of Education, Duke Farms. kreilly@dukefarms.org