Upham Woods
4-H Environmental Education Center

What Makes a Bird a Bird?

Program Purpose
The purpose of this program is to introduce students to bird characteristics, explore how different beak adaptations enable birds to survive on specific food sources, and discuss how adaptations both limit and enable a bird to survive in a specific habitat.

Length of Program
1½ hours

Age
Grades 2nd – 6th

Maximum Number of Participants
20

Objectives
After completion of all activities, students will be able to:
- List the characteristics that identify birds and explain why those characteristics are useful.
- Demonstrate through a food simulation game how beak shape can influence what foods a bird is able to eat in the wild.
- Explain how a bird's adaptations both enable and limit its ability to survive.
- Apply their knowledge of bird adaptations to create an imaginary bird with adaptations appropriate to a given habitat.

Preparation
Before the class arrives:
- Obtain the "What Makes a Bird a Bird?" kit from the storage room.
- Set up the eight stations for the "Fill the Bill" activity
- Copy the "Fill the Bill Copycat Page" so that each student gets one.
- Tear off five large pieces of butcher paper

Basic Outline
I. Introduction *(5 minutes)*
II. Bird Dress-up *(20 minutes)*
III. "Fill the Bill" activity *(30 minutes)*
IV. "Adaptation Artistry" *(20 minutes)*
V. Conclusion *(10 minutes)*

Materials
Bird parts: feather boa, cloth wings, toucan beak, flippers, plastic eggs, thermometer, straw)
Can of feathers
overhead of bird beaks and feet
Fill the bill: Station signs (8), plastic vase, 13" X 9" pan, gummy worms, oatmeal, bowl of peanuts, 2 small aquariums, box of Styrofoam, puffed rice, bag of miniature marshmallows, hollow log, bag of rice, jar of cherries, string, 3 eyedroppers, 2 fish nets, plastic slotted spoon, 2 prs. chopsticks, 3 envelopes, 3 metal strainers, 2 nutcrackers, 3 sets plastic tongs, 1 fork, 1 spoon, 3 tweezers
Copies of "Fill the Bill Copycat Page"
Box of pencils
Adaptation Artistry: Five large sheets butcher paper, bucket of crayons

Introduction
Introduce yourself and the class. Explain that this class will focus on birds. The students will learn about the characteristics that identify an animal as a bird, the physical adaptations that help birds survive in different habitats, and how the shape of different bird beaks both enable and limit a bird's ability to survive in a particular habitat.

Ask the students what identifies an animal as a bird? Like other animals, birds have specific adaptations which allow them to survive in different environments. First, ask the students to define "adaptation."

- *An **adaptation** is a characteristic that helps a plant or animal survive in its environment.*

In this class, we are going to focus on the physical adaptations of birds.

- *A **physical adaptation** is a characteristic that a plant or animal HAS (is born with) that helps it survive in its environment.*

Bird Dress-up

In this activity, a volunteer from the class will be dressed up as a bird. Tell the class that in order to help us learn what makes a bird a bird, you will need a volunteer and bring him/her up to the front of the class. Then announce that you are going to magically transform the volunteer into a bird before their very eyes, and they are going to help you do it. Ask the class to name some physical adaptations of birds. Then, add each component part to the volunteer, talking about the functions of each physical adaptation as you add it to the volunteer.

- **Feathers (feather boa):** ALL birds have feathers- feathers are the one characteristic that separates the birds from all other animals. There are different types of feathers that perform different functions: down feathers are short, soft, and provide insulation for warmth; flight feathers are long and sturdy and keep the bird aloft. At the base of some feathers are oil glands which birds use to waterproof their feathers. Pass around the bucket of feathers so the students may examine feathers up close.

- **Wings (cloth wings):** Wings are used for flight and swimming. Birds are not the only animal with wings (bats are mammals, but they also have wings and can fly). Not all birds fly either. Some flightless birds include ostriches, emus, penguins, and the long extinct Dodo bird.

- **Beak (toucan beak):** Beaks have different shapes to collect different types of foods. The shape of a beak can help you guess what type of food a bird eats. (We'll learn more about bird beaks in the next activity). Some birds, like ducks, use their beaks to spread oil over their feathers to waterproof them (called preening).

- **Feet (flippers or bird feet slippers):** Like beaks, the shape of a bird's feet can give you clues as to where the bird lives. Birds that live in different habitats have feet which are adapted to that environment. Show the bird feet overhead and ask the student to guess where each bird lives based upon the shape of its feet. Bird feet are used for walking, running, perching, grasping and killing prey, and swimming.

- **Eggs (plastic eggs):** Have the student squat over these to simulate incubation. Other animals, such as reptiles and amphibians (and even some mammals!) lay eggs, but bird eggs are different in they have hard calcium shells. The eggs need to have a hard shell so that they are not crushed during incubation. Also, the shape of a bird egg (elliptical) is designed to have it roll in a complete circle, not in a straight line.

- **Warm blooded (thermometer):** Like mammals, birds are warm blooded and must maintain a minimum body temperature. This enables birds to virtually everywhere on the planet, including the tundra in the Artic Circle and the southern tip of South America.

- **Hollow bones (straw):** Bird bones are full of hollow sacs filled with air. This makes the bird sturdy, but extremely light weight, enabling the bird to fly. Not all birds have hollow bones though! Loons have solid bones because they dive deep into lakes to eat fish, and hollow bones would make them bob on the surface, like a cork.

In short, a bird is a warm-blooded, egg-laying feathered animal with wings and a beak. Most have hollow bones and can fly. When finished with the dress up, allow time for taking photographs. Let the volunteer bird strip off the physical adaptations one by one and quiz the class about the function of each physical adaptation.

"Fill the Bill" Activity

(For a complete description of this activity, see Appendix 1). Students will need to be split up into groups of three. Explain that in this activity, the students will be visiting eight different stations. At each station will be a sign showing what type of bird food is represented. Also at each station will be three different tools, each representing a different bird beak. The students must determine which bird "beak" works best to collect each type of food. Pass out the "Fill the Bill Copycat page" so that each group gets one and a pencil. Go through the copycat page with the students. For example, at station #1 the food represented is nectar. The students should write the name of the tool that works best to collect "nectar" in box #1 on their copycat page. Then, the students should write #1 on the line next to the bird at the bottom of the page that eats nectar. The students will go through this process at every station. Ask the students to explain what they are to do to check for understanding. Give the students about 5 minutes at each station, then call to switch stations. (The instructor must operate the "Flying insects" station by tossing miniature marshmallows into the air.)

After the students have rotated through all the stations, review the answers to the copycat page (see Appendix 2 for a correct copycat page.) Asked the students what they learned from this activity. Ask why a hummingbird cannot eat a mouse for food. Why can a hawk not slurp nectar from a flower? Ask the students how a specialized beak might help a bird survive. (A bird with a specialized beak may be able to eat food that no other bird can eat.) Ask how a specialized beak might hurt a bird. (If a food source suddenly becomes unavailable, the bird may be unable to find other foods to eat.) After this discussion, students should be able to explain that the shape of a bird's beak determines what foods that bird is able to eat. As such, birds do not necessarily have a *choice* about what food to eat – they must eat the food source they have adapted to. Specialized beaks both enable a bird to survive, yet limit the manner in which a bird can survive. Over time, some birds have evolved to have very versatile beaks which enable them to eat multiple food sources (i.e. crows). These birds may survive successfully in many different habitats.

Adaptation Artistry

(For a complete description of this activity, see Appendix 3). Now that the students understand what birds are and how their adaptations enable them to survive in different environments, tell the students that

in the next activity they will be able to create a totally new bird which has adaptations appropriate for a given habitat. Split the students into five groups of four and pass out the butcher paper and crayons. Tell the students that you will whisper a habitat and a food source to them, and they will have about 10 minutes to draw a picture of the bird that is adapted to survive in that habitat. The students should be prepared to present their bird to the class and explain how each adaptation helps the bird survive in its environment. Sample habitats and food sources include:

the moon; moon rocks as food
a dumpster; plastic bags as food
a dresser; socks as food
a garage; motor oil as food
a parking lot; asphalt as food

Conclusion

If time remains, a good summary story to read is May Garelick's *What Makes a Bird a Bird?*

To review, ask the students to name the physical characteristics that identify an animal as a bird, and one function of each. Ask the students to define "adaptation" and "physical adaptation." Ask what can be learned from observing the shape of a bird's beak. Ask in what ways the shape of bird beaks help a bird survive in a particular habitat.

References

Wolf Ridge "Birds" lesson plan.
Ranger Rick Nature Scope – Birds!, *Fill the Bill* activity, pg. 29.
Project WILD K-12 activity guide, *Adaptation Artistry* activity, pg. 114.
Garelick, May. *What Makes a Bird a Bird?*.