

## BEAKS AND FEET: ADAPTATIONS



CLASS



1 HOUR

### KEY CONCEPTS:

Classification, similarities and differences, observation, habitat, adaptations, form and function

### COLORADO ACADEMIC STANDARDS:

- *Science 2.2: Life Science:*  
An organism is a living thing that has physical characteristics to help it survive.

### LOCATION:

Indoors

### SUGGESTED TIME OF YEAR:

Spring (Late April, May, June)

### GOAL:

The goal of this session is to introduce the concept of adaptation by highlighting different physical features of birds.

### LEARNING OBJECTIVES:

- Students will examine different types of bird beaks and feet.
- Students will relate how the shape of the birds' beaks and feet help the bird find a specific food.
- Students will use kitchen tools to form analogies about the relationship between the type of bird beak and the food the bird eats.
- Students will record the results of the bird beak exercise into a table and graph.

### COMMON CORE:

- *Writing Standards #8:* With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

### MATERIALS NEEDED:

- Bird Field ID guide with good pictures
- Pliers (representative of hawk)
- Large salad tongs (representative of duck)
- Tweezers (representative of chickadee)
- Screwdriver (representative of woodpecker)
- 3 small Tupperware bowls in which to place the following:
  - Shredded green paper
  - Very small bird seed
  - Sunflower seeds
- Piece of wood
- Pictures of bird beaks of hawk, duck, chickadee, woodpecker
- Pictures of feet of hawk, duck, chickadee, woodpecker
- Following habitat pictures:
  - Pond or river
  - Forest
  - Meadow

### BACKGROUND INFORMATION:

Form follows function. This simple phrase says so much when applied to all living things and how they react to their environment. The form of an animal is derived and adapted over time, to the functions needed in its environment. We are a perfect example. Many, many generations ago, we were much hairier, had larger teeth, larger feet and hands and smaller brains. Our form "fit" into our environment at the time by having a thicker fur for warmth, larger teeth to gnaw foods with, larger feet to support a very active lifestyle, and larger hands for the

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## BACKGROUND INFORMATION: (CONT.)

tremendously strenuous work we had to do. We have adapted to today's "form" by losing the fur (and having nice puffy jackets), reducing the size of our teeth (our foods are much more refined), feet (we rarely travel as far as we did in the past) and hands (today's hands are used for delicate manipulations). In contrast our brain has increased in complexity to "fit" our new environment.

All living things either adapt to their environment or die. Birds are a great example of how their form has been modified over time to their food sources. Birds of prey have heavy hooked beaks designed for ripping and shredding. They are typically not used to catch prey, just to tear them apart. The thick beaks are hooked on the end to assist holding prey. Woodpeckers are phenomenally refined for their role as wood borer. Straight, thick bills act as drill points as they are hammered into wood. Grosbeaks have unique bills for a unique function. They have large, heavy bills that are used to pry open woody cones or fruits. Sparrows typically have fine, delicate bills to peck seeds out of seed heads. You can see the definite "form follows function" throughout most of the bird world. The feet of birds are also well adapted. A duck's webbed feet for water, a hawk's sharp and strong talons for grasping and killing prey, a songbird's foot of two toes forward and two toes back assisting in perching and a woodpecker's three toes forward and one toe back to help it climb tree trunks.

### ACTIVITY:

1. Show several pictures of birds with different food sources (ex: birds of prey, robins, grosbeaks, hummingbirds) and ask the students to comment on the beaks. Discuss if they are all the same size, if the differing sizes and shapes possibly help them with food, etc. Do the same with pictures of feet.
2. Explain that on the desk there are 4 items that will be bird beaks (pliers, tongs, screwdriver, tweezers). There are also 4 food items that might or might not work with the beaks (shredded green paper, very small bird seed, sunflower seeds, wood). Go through each one and get good descriptive word from the students. Use the descriptions to draw a graph on the board. Across the top write the name of the tool, and down the side write the name of the food. Explain that the empty boxes will be filled in as each student experiments with the tool and the food. Have students hypothesize which tool may work best with each food.
3. Ask a student to come up, pick one "tool" and one food item. They will try to transfer food into the bowl. Give them a couple of minutes, and then ask them how easy it was to use the tool with the food. Record their results on the board using a smiley face, a straight face, or a frown.
4. After they have finished, discuss which item was the easiest to use for the different food items, why would that one be easier, if there was one item that didn't seem to work for anything, if there were different ways to use it to get food, etc.
5. Show students pictures of each beak and ask them if they can match the beak up with the tools they had. Examples: The broad duck bill matches up with the tongs for grabbing grass and vegetation. The hawk's hooked beak matches up with the pliers for strength and ability to crush an item. The drill matches

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## ACTIVITY: (CONT.)

up with the woodpecker's sturdy bill. Have them come up with their own analogies.

6. Discuss if feet might be adapted to a certain habitat like the bills are adapted to a certain food. (Make sure they understand the concept of habitat before going any farther). Show them pictures of different feet, talking about their unique characteristics. Make sure to show the feet along with the complete bird picture so they know what the bird looks like.
7. After each description of a foot, hold up a habitat picture and ask if that is the habitat they might be found in. Discuss why they think this particular bird would be good at living there.
8. Have the students take out their journals or get a piece of paper and explain that each student will receive a card with the name and picture of a bird. They will write the name and draw a basic picture in their journals (this picture will be improved upon later). Collect the cards. They will be using this bird in the next two sessions, and in their own classroom with teacher instruction, to build on their knowledge of that bird, its adaptations and habitats.
9. Conclude the session by discussing that only two animal traits (beaks and feet) were presented, and how they are adapted to their environment. The world is full of amazing animals and how they fit into their world. The students will be visiting their field site and taking the ideas they have learned today out into the field.



## BIRDS ABOUNDING



FIELD



1 1/2 HOUR

### KEY CONCEPTS:

Similarities and differences, observation, habitat, adaptations

### COLORADO ACADEMIC STANDARDS:

- *Science 2.2: Life Science:* An organism is a living thing that has physical characteristics to help it survive.

### LOCATION:

Field site

### SUGGESTED TIME OF YEAR:

Spring (Late April, May, June)

### GOAL:

The goal of this session is to have students practice observation skills by watching birds in their habitats at the field site.

### LEARNING OBJECTIVES:

- Students will observe the physical traits of birds and bird habitat during an outdoor field session.
- Students will list food, shelter and water sources for their bird.
- Students will identify habitats for their birds.

### COMMON CORE:

- *Writing Standards #8:* With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
- *Language Standards #1:* Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

### MATERIALS NEEDED:

- White board and marker
- Bird search, one per group, attached
- Pencil

**Parent volunteers are recommended for the field session.**

### BACKGROUND INFORMATION:

The classroom session discussed the concept of how certain birds have evolved different beaks and feet to assist them with finding and gathering food and living in certain habitats. Children are born with a natural sense of wonder and desire to explore. Insects, birds, water, plants... The natural world is a vast area, wide open to the inquisitive mind. Birds are a fairly easy item to study as they are common, easy for beginners to get the hang of, and kids seem to love watching them. They are also fairly consistent in the habitats they tend to use for feeding and nesting. Ducks will not be found feeding and nesting in the forest, woodpeckers will not feed in the meadows and chickadees won't feed and nest in the water. The four birds we focus on in this program are the hawk (generic), duck (generic), woodpecker (generic) and chickadee. In a quick nutshell their habitats can be defined as the following:

Hawk (Red-tailed) –

Shelter: forests

Food: Mice, rabbits, small animals, needs open meadows to hunt as they soar over the open areas looking for food.

Duck –

Shelter: Ponds, lakes, streams. More stationary bodies of water

Food: Plants in the water, bugs in the water.

Woodpecker –

Shelter: Forests, holes in trees

Food: Insects found in trees, nuts, seeds, bird feeders

Chickadee –

Shelter: Forests holes in trees



## BIRDS ABOUNDING



FIELD



1 1/2 HOUR

## KEY CONCEPTS:

Similarities and differences, observation, habitat, adaptations

## COLORADO ACADEMIC STANDARDS:

- *Science 2.2: Life Science:* An organism is a living thing that has physical characteristics to help it survive.

## LOCATION:

Field site

## SUGGESTED TIME OF YEAR:

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## BACKGROUND INFORMATION: (CONT.)

Food: Insects, spiders, seeds and bird feeders.

When we begin to study the needs of animals and plants we begin to see the interconnections of all living things. We should include humans in this equation. We are part of the natural world, after all.

## ACTIVITY:

1. Welcome to the field site! Orientation to the site for the students, then right into the activity.
2. Review very quickly the classroom lesson on beaks and feet. Discuss if the students remember that these birds have adapted to their habitat with some of their physical characteristics. Ask for examples covered in class. (Ducks with their large bills to eat vegetation, woodpeckers with their strong, straight bill to drill, etc.) Apply some of those examples to some of the habitats at the field site.
3. Explain that at the field site there are many areas where birds live. Review what all living things need to survive; food, water, shelter, space. Remind the students of the bird groups. As each of the birds is named, have the students raise their hands if they have that bird. Explain that each of those birds is looking for really good habitat. Go into detail about what a couple of those birds need so students understand each of the habitat needs. Explain that the groups will go outside and look for each of these things to see if they are available here, and if this area would be a good fit for these birds.
4. Review rules of bird watching. (What to do, not to do, how to act, how to walk quietly, stay away from the birds, move slowly).
5. Show the students the papers they will be taking out for their bird search. Go through each paper reading through each food, shelter and name of the animal. Explain that each student will receive a paper with habitat items to look for at the field site. Emphasize that some students might not find anything on their sheet, and that is okay. It's more about the looking, not just for the bird, but for the availability of habitat for the bird. If they find something they can either check it off, or write next to the list item what they found.
6. Head outside for the bird walk, helping the students to identify and check off each source of habitat for each bird.
7. Return to the classroom and create a graph of the four birds, humans, and their habitat needs (Example attached). Call out one of the birds or humans. Have the students tell you the food/water/shelter they found and as they say the food, put a check mark in the corresponding square. The more checks, the better the habitat. Go through each bird/human this way until finished.
8. After they have finished for each animal, go through each column and discuss it with the students. Discuss if the bird has everything they need to survive at the field site and if this would be a good habitat for the bird.
9. Discuss why humans are included in this activity. Humans share our habitats with other animals. Discuss if we help any birds with their habitat needs (bird feeder, shelter in barn, big trees).
10. Remind the students that there is one more session in their classroom that will look at how humans can improve habitat for birds.

## A LITTLE HELP HERE



SERVICE-LEARNING 1 HOUR

### KEY CONCEPTS:

Association, problem-solving, improving our world

### COLORADO ACADEMIC

#### STANDARDS:

- *Geography 5.1:* Students know how human actions modify the physical environment.
- *Science 2.2:* An organism is a living thing that has physical characteristics that help it survive.

#### LOCATION:

Field site

#### SUGGESTED TIME OF YEAR:

Spring (Late April, May, June)

### GOAL:

Students are introduced to human interactions with nature, if influences are “good” or “bad”, and how they might enhance their homes and landscaping to improve bird habitat.

### LEARNING OBJECTIVES:

- Students will review their birds’ beaks and feet by drawing them on the board.
- Students will define a “good” and “bad” bird habitat.
- Students will evaluate their own back yard bird habitat.
- Students will make a simple bird feeder.

### COMMON CORE:

- *Writing Standards #8:* With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
- *Speaking and Listening Standards #1:* Participate in collaborate conversations with diverse partners about grade 1 topics and text with peers and adults in small and larger groups.
- *Speaking and Listening Standards #2:* Ask and answer questions about key details in a text read aloud or information presented orally or through other media
- *Speaking and Listening Standards #3:* Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.
- *Speaking and Listening Standards #4:* Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
- *Speaking and Listening Standards #5:* Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.
- *Speaking and Listening Standards #6:* Produce complete sentences when appropriate to task and situation.
- *Language Standards #1:* Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- *Language Standards #6:* Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships.

### MATERIALS NEEDED:

- The students’ journals (optional)
- White board
- Two landscape pictures: one suitable bird habitat, one unsuitable bird habitat
- Bird seed
- Crisco
- Egg carton cups cut into thirds (each student gets 4 cups)
- Spoons
- Large bowl
- Newspaper or tablecloth

## A LITTLE HELP HERE



SERVICE-LEARNING



1 HOUR

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## COLORADO ACADEMIC

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## LOCATION:

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## BACKGROUND INFORMATION:

Of all the animals, birds could probably be the most likely to leave an area of disturbance and head to a more beneficial area. However, many birds are creatures of habit, and leaving areas that have been used for generations because of habitat loss or another disturbance doesn't always come easy to them. And just like most other animals, their natural world continues to shrink. Small changes in our landscaping and building can be quite beneficial to birds and other wildlife. Of course the most obvious is to cease the destruction of native habitats. We can apply many positive things to our own home and landscaping. The typical American backyard is an empty moonscape for most animals. Large tracks of grass cover most of the area, with chemicals used to keep this brilliant green. A monoculture is always abhorred in nature. The healthiest habitats will have a good amount off diversity. So when looking at these vast tracks of green, all an animal would see is a vast desert. When plants are added to landscapes they tend to be non-native, pretty for humans but useless for most animals.

There are many ways of making your landscaping more wildlife and bird friendly. But the simplest ones, covered above, include reducing the lawn to a reasonable size or eliminating it altogether and using ground covers or hard-scaping, eliminate the use of chemicals, increase plant diversity, and plant native and native-adapted plants. Ask your local nursery for ideas, or check out the fantastic variety of books to get started. Students love to get involved in projects that are helping the environment and one step leads to another.

## ACTIVITY:

1. Review that birds need certain things to survive, and that they can adapt to live in certain areas. Review the concept of habitat and what birds need to live there. Review some examples of how birds have adapted to their habitats.
2. Remind students of what was found at the field site and if all birds live in all habitats. Explain to the students they will have a couple of minutes to come up to the board and draw their birds' beak and feet, as well as list their birds' food sources on the board. Spread them out along the board, giving each group a piece of the board. Then call each of the bird groups up and have them present their bird to the class. Ask quite a few leading questions to get the information out.
3. Birds are pretty lucky that they can fly to find a new area if their habitat is destroyed somehow. Maybe a house or business was built or a new road put in and took away the trees they nested in or found food in. Discuss if there is anything that can be done to change the loss of habitat for birds (nesting boxes, bird feeders, and plant our yards in natural environments that the birds will feel comfortable in).
4. First, show them two pictures of landscapes; one with a huge lawn, a couple of trees and everything perfectly manicured. Then a natural landscape with lots of trees and shrubs, very little lawn. Discuss which area birds would find the most food and shelter in. Discuss if their yards look like one of these; with a lot of trees and shrubs where birds can find shelter and some natural food like berries. Ask if any of the students have a bird feeder. It is possible to make really simple bird feeders and nesting boxes and place them at houses to help the birds.

## A LITTLE HELP HERE



**SERVICE-LEARNING** 1 HOUR



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## ACTIVITY: (CONT.)

5. Pull out the materials to make simple feeders. Use string, egg cartons, bird seed, and Crisco. Mix the bird seed and Crisco in a bowl. Spoon into the containers; tie a string on to hang them up. Ask the students if they know of a good place nearby to hang them. Trees right outside the window work great. Remind students that bird feeders are bear food and that in the summer they should always be taken in at night.
6. Remind them that they can do this at home as well. Every little bit helps!



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