Science Essential Standards:
- 4.L.1.1, 4.L.1.2, 4.L.1.4 (animal adaptations)
- 5.L.2.1, 5.L.2.2 (ecosystems)

Time:
45-60 minutes

Audience:
4th or 5th grade

Learning Objective:
Observe birds and their adaptations.

Materials:
- ☐ binoculars
- ☐ NC birds field guides

Optional Materials:
feathers, bird mounts, nests, Audubon plush birds, pictures

Vocabulary:
behavioral adaptations, field guide, migrate, physical adaptations, species

Preparation:

- ✓ Familiarize yourself with the area in which you will be teaching. Check for poison ivy and other safety concerns.
- ✓ Gather the materials needed for the lesson. Know how many binoculars and field guide sets you have. They will likely need to share.
- ✓ Know how many students are in your group.

Background:

Birds can be found on all continents of the world. Different **species**, or kinds, of birds are adapted to live in different types of habitats. From the mountains to the sea, North Carolina has a wide variety of birds inhabiting its many ecosystems. Some birds live here year-round while others choose to spend only part of the year here. Northern Cardinals, Carolina Wrens, and Northern Mockingbirds are examples of year-round residents. Yellow-bellied sapsuckers migrate to North Carolina for the winter. Chimney swifts and yellow-billed cuckoos spend most of their year here but migrate to Central and South America for the winter.

Birds have different behavioral and physical adaptations to survive in their particular environment. **Behavioral adaptations** are activities and behaviors that animals engage in to survive. Examples of behavioral adaptations include **migration**, when a bird hunts, and where they live. American Robins are often seen on the ground where they forage for insects and worms to eat. **Physical adaptations** are the physical structures of an animal's body that helps it survive. Examples of physical adaptations are beak shape and coloration. For instance, Northern Cardinals have thick, short beaks for cracking open seeds to eat.

Birds that live in the forest have different characteristics than birds who live by a lake or river. Aquatic birds typically eat fish and plants, while forest birds more frequently eat seeds, fruits, and small insects. Forest birds have physical adaptations to help them live in and on trees, whereas, aquatic birds are adapted to living on and near water. Forest birds have toes that wrap around branches while aquatic birds may have webbed feet to help them swim.

Instructions:

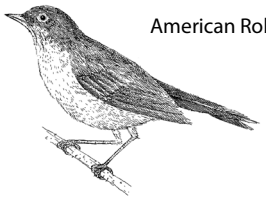
1. Greet the students and explain the **learning objective** of this activity. Ask students what they know about birds in North Carolina.
2. Pass out bird **field guides**. Let students know if they need to share. Ask for students to give you a thumbs up if they have ever used a field guide.

3. Explain how to use the **field guides**. Have students practice with a few of the different birds listed below. When they find the right bird, tell them to show a neighbor.
4. Birds to look for in the **forest** include:

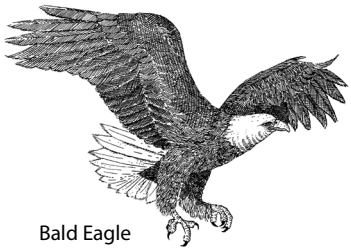
Northern Cardinal

   a. **Northern Cardinal:** Male cardinals are bright red with a black mask and throat. Female cardinals are pale brown with some red on their wings, tail, and crest. Cardinals have a thick beak to be able to crush the shell of seeds. Adults have a bright reddish-orange beak. This is the North Carolina state bird as well as the state bird of six other states.
   b. **Chimney Swift:** Swifts are relatively small with a slender, tube-like body. Their wings are long and curved inward. They are a grey brown color throughout their whole body.
   c. **Downy Woodpecker:** Male woodpeckers have a white underside and back, with black wings and white spots. Their head is black and white striped with a red spot. Females lack the red spot. Downy woodpeckers are small woodpeckers, between the size of a sparrow and a robin.
   d. **Carolina Wren:** Both males and females are reddish brown on their back and wings, while a pale-yellow underneath. They have a white chin and a long, curved bill.
   e. **Carolina Chickadee:** Both males and females have a black head and chin, separated by a white stripe on their cheeks. The back, wings, and tail are light grey.
   f. **Eastern Bluebird:** Males are bright blue on their head, back, and wings, while rusty orange on the throat. Females are a much lighter grey blue than the males.
   g. **Red-shouldered Hawk:** Adults have a reddish-brown underside. Their wings and back are black and white checkered. Their talons are bright yellow.

American Robin



   h. **House Finch:** Adult males are red on the chest and head, with a white and brown back. Females are brown and white streaked on their whole body.
   i. **American Robin:** Both males and females have a red brown chest, though the female's is much paler. The wings and back are brown black. The beak is yellow with a dark tip.
5. Birds to look for near **water** include:
   a. **Great Blue Heron:** Both males and females have a characteristic gray-blue body with a long neck, long legs, and long yellow beak. They often nest in swampy areas and eat mostly fish.
   b. **Wood Duck:** Males have a green crested head while females have a grey crested head. They eat mostly acorns and can be found perching in trees. They nest in tree cavities.
   c. **Belted Kingfisher**: Both males and females are blue gray in color with a white chest and collar. Females have a chestnut belly band. They dive for small fish and dig a tunnel to nest.
   d. **Osprey:** Both males and females have a white chest with a dark brown back and wings. They nest at the top of large dead trees and man-made platforms. They eat mostly fish.
   e. **Bald Eagle:** Both adult males and females have white head and tail feathers while the rest of their body is brown. Juveniles are solid brown with some white mottling. They eat mainly fish and will scavenge for a meal.



Bald Eagle

6. If using **binoculars**, pass them out. Explain that students should find a bird they want to look at more closely. Then, while they keep looking at the bird, they should raise the binoculars to their eyes. This will allow them to keep track of the bird more easily if it flies to a new perch. **Model** how to use the binoculars, including safety tips such as hanging the binoculars around their neck when walking and not looking through them when they are moving. Have students practice using the binoculars.

7. Ask students what they might need to do in order to see more birds. Students should tell you that they will need to be quiet while walking. The **quieter** they are, the **more birds** they are likely to see. Remind students that if they spot a bird, they should remain quiet and calm, so as not to scare the bird causing it to fly away. Have the students **model** the expected behavior for you.
8. Ask students what they could do to let others know when they spot a bird. Have the group agree to some variation of **pointing** or other silent hand signal and **tapping** their neighbor.
9. Whenever students spot a bird, ask them to notice its **characteristics** such as: size, color, shape, what it's doing, sounds it is making, etc. Have students use what they notice to look up the bird in the field guide. Then prompt the students to discuss that bird's **adaptations**.
    a. **For 4th graders,** discuss more in-depth the bird's **physical and behavioral adaptations**. Ask the students if a characteristic is a physical and behavioral adaptation.
    b. **For 5th graders**, connect the bird's adaptations to its **ecosystem**. Discuss how the birds in different ecosystems have different adaptations. Have students give food chain examples that include birds.
10. **Stop periodically throughout the hike to allow students to look for birds.**
11. At the end of the hike, ask students why some birds look different than others. Ask if they noticed that males are often brighter and more colorful than females. Explain this is so the male can get the female's attention. Additionally, the females usually sit on the nests where being camouflaged is important. Ask why some birds might have a larger beak than other birds. Explain that birds have different beaks depending on what they eat. Ask students for examples of connections between a bird's beak and what it eats. Explain how all of these are examples of **adaptations**.

Downy Woodpecker

Opportunities for Extended Learning

- Have students answer this **nature journaling prompt** before or after the hike:
    - Look or listen for birds around you. How are they adapted to live in the ecosystems present here? Do you see evidence to support this in your observations?

Behavior & Materials Management Tips:

- ✓ Remind students to **share** the field guides and binoculars. If enough, pair students so that one can use the field guide while the other uses the binoculars.
- ✓ Remind students that they need to **walk quietly** when looking and listening for birds.
- ✓ Give students **clear boundaries** for where they can go to look for birds. Remind students to **stay on trails.**

References:

National Audubon Society. (2019, October 11). American Robin. Retrieved from https://www.audubon.org/field-guide/bird/american-robin

National Audubon Society. (2019, October 11). Belted Kingfisher. Retrieved from https://www.audubon.org/field-guide/bird/belted-kingfisher

National Audubon Society. (2019, October 11). Great Blue Heron. Retrieved from https://www.audubon.org/field-guide/bird/great-blue-heron

National Audubon Society. (2019, October 18). Northern Cardinal. Retrieved from https://www.audubon.org/field-guide/bird/northern-cardinal

National Audubon Society. (2019, October 22). Bald Eagle. Retrieved from https://www.audubon.org/field-guide/bird/bald-eagle

National Audubon Society. (2019, October 22). Osprey. Retrieved from https://www.audubon.org/field-guide/bird/osprey

National Audubon Society. (2019, October 22). Wood Duck. Retrieved from https://www.audubon.org/field-guide/bird/wood-duck

National Audubon Society. (2019, November 20). Carolina Chickadee. Retrieved from https://www.audubon.org/field-guide/bird/carolina-chickadee

National Audubon Society. (2019, November 20). Carolina Wren. Retrieved from https://www.audubon.org/field-guide/bird/carolina-wren

National Audubon Society. (2019, November 26). Downy Woodpecker. Retrieved from https://www.audubon.org/field-guide/bird/downy-woodpecker

National Audubon Society. (2019, November 26). Eastern Bluebird. Retrieved from https://www.audubon.org/field-guide/bird/eastern-bluebird

National Audubon Society. (2019, December 9). House Finch. Retrieved from https://www.audubon.org/field-guide/bird/house-finch

National Audubon Society. (2020, January 2). Chimney Swift. Retrieved from https://www.audubon.org/field-guide/bird/chimney-swift

National Audubon Society. (2020, January 14). Red-shouldered Hawk. Retrieved from https://www.audubon.org/field-guide/bird/red-shouldered-hawk

Credits:

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Header photo of feather by Lauren Greene taken at Kerr Lake State Recreation Area on June 5, 2019.

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