Avian ecology

Lesson plan by Jennifer Eells

At the end of this lesson, students will be able to:

- Describe the unique characteristics of birds
- Observe bird behavior locally and ID common species in the field
- Determine habitat requirements and needs of birds in Florida in NATL's ecosystems
- Describe bird adaptations that make them suitable to life in Florida

ACTIVITIES

- Bird migration hopscotch (click here)
- Predators and Prey (click here)
- Find an image that displays the anatomy of birds relative to your student's ages (see an example of one below). Have students discuss the various features of birds and how they can be used to identify different species. Make ID cards for students of the most common birds (click here). Alternatively, have students make their own.
- Bird scavenger hunt (click here)
- Tour SEEP and explore the different ecosystems found at NATL. Make a list of the birds present and be prepared to ask questions about those birds. For example: Why might the different birds inhabit this area? Do you think the birds live here all year? Do you think they spend their time in one ecosystem only or move around? Why or why not? What characteristics of the bird make it ideal to life in its location? What field marks can be used to ID these birds? Can you ID them by sound? Use the activity sheet (click here)
- Have students make a list of the birds found in NATL's different ecosystems. Discuss the seasonality of these locales – how many birds use this area but may not be present there year-round. Ask students if there are any birds they expected to see in this area but did not see – have them discuss potential reasons for not seeing this species (the area is too small, it is not the right time of year, the bird is cryptic or hiding, etc.).

ASSESSMENTS

- Traditional tests can focus on definitions of ideas and recognition of topics, asking students to define terms and processes.
- Additionally, asking open ended questions as you progress through the activities helps students retain and review information.

JOURNAL QUESTIONS

- List two reasons why birds are important.

- List two reasons for migration.
- What features make a bird unique?
- What is your favorite bird and why?
- What are some adaptations that help this bird survive in Florida?
- What habitat type was your bird in?
- Do you think the bird uses this area year-round?
- Why might you not have seen a species you expected to see?

KEY WORDS

Adaptation, preening, evolution, scavengers, raptors, feathers, migration, frugivores, omnivores, gizzard

INFO

Birds are in the class Aves and defined by the presence of feathers (a unique modification of the outer skin). Other characteristics of birds include hollow bones, wings, bills, a gizzard (a part of the stomach that allows the bird to digest hard materials such as seeds) and the ability to lay eggs. There are over 9,000 species of birds and they are found in all habitats. Birds play important ecological roles in the environment and provide ecosystem services such as pollination (hummingbirds), pest insect control (flycatchers), seed dispersion (cardinals), dead animal removal (vultures), prevention of overpopulation of prey species (hawks), as a food source to humans (ducks), and nutrient cycling (herons). Aesthetically, some bird's songs are very pleasant to listen to and their plumage can be quite beautiful.

Preening- Birds use preening as a method to properly arrange and clean their feathers, as well as spread an oily gland secretion that keeps them waterproof. They use their beaks and feet to comb through their feathers. Dust and water bathing also are performed as well as sitting in the sun with wings outstretched. This allows UV light to penetrate and kill parasites in their feathers. Other birds that are good divers but not waterproof (the lack of oil in their feathers helps them to sink so they can catch prey) may stretch out in the sun to dry off. Both anhingas and cormorants do this.

Eating habits- There are different types of eating habits in birds. These include: raptors (or birds of prey), insectivores, frugivores, and omnivores. Raptors such as hawks and eagles will hunt and eat fish, small mammals, smaller birds, eggs, amphibians, aquatic invertebrates, and reptiles. Insectivores, warblers and flycatchers for example, eat mainly insects and are good pest controllers. Frugivores like cardinals and finches eat fruit, seeds, leaves, and berries. Omnivores like crows and blue jays eat both a plant and meat-based diet depending on what is available to them.

Reproduction- Birds form mating pairs that may last for one season, their entire life or one reproductive event only. The mated pairs generally help to raise the young together by taking

turns sitting on nests, protecting offspring, and bringing food. Adult birds teach their young how to sing, fly, and forage.

Molting- Molting is the process whereby birds shed their feathers to replace old and damaged ones. The process is similar to shedding or losing hair in mammals. Birds cannot afford to molt all their feathers at one time or they would be unable to fly. They generally do so once a year in stages. The exception to this are fledging birds who quickly replace the down feathers they were born with for adult plumage. Birds may also grow extra feathers to display during the breeding season called breeding plumage. Egrets and herons were almost hunted to extinction in the early 1900s for these feathers, which ladies loved to use on their hats.

Nest building- Birds build a nest to protect themselves and their offspring. Nests can be highly variable between species. The main types of nests are cup shaped (traditional nest shape), hanging (no support underneath), cavities (bird boxes or other holes in trees), and ground (some are just scratched dirt while others are elaborate creations of grass or other materials). The birds can use saliva, spider webs, leaves, twigs, moss, and dirt as building materials. Some even carve out their own nests using their bills like woodpeckers!

Migration- Migration occurs because birds need to travel in order to find mates, food, and suitable places to raise young. Migrating birds use many cues to navigate including celestial cues, light polarization, magnetism, and environmental cues. They can travel quite long distances and usually do so in flocks for protection. The traditional idea of migration occurs when birds fly south in the winter to avoid the cold and north in the spring to reproduce. Florida is a winter stopover for many birds from the North because of its mild winters.

Singing- All birds make noise but not all birds sing. Birds that do sing are known as song-birds. Male birds learn to sing from nearby males—usually their father. These songs and noises are used by birds to communicate with each other. Some communications used include those to attract mates, establish territories, find offspring, alert others to danger, and share resources. Birds have the greatest sound producing capabilities of all vertebrates. Mockingbirds can even imitate other species' sounds and calls.

Identification of birds- Bird guides and books are very popular such as Sibley's Guide to Birds (https://www.sibleyguides.com/about/the-sibley-guide-to-birds/) and Kaufman's Field Guide to Birds of North America (http://www.kaufmanfieldguides.com/birds.html). The Cornell Lab of Ornithology (https://www.allaboutbirds.org) offers an incredible amount of information about birds including a guide, Facts and Questions with experts, and tips for developing ID skills. They also have two phone apps for identification of unknown species: eBird and Merlin Bird ID. Birding groups such as the Audubon Society also exist and frequently offer trips. You can use the sounds they make, the color and shape, the location, and behavior to identify a bird species. Their life history can be categorized by looking at a bird's feet, bill, wings, and body

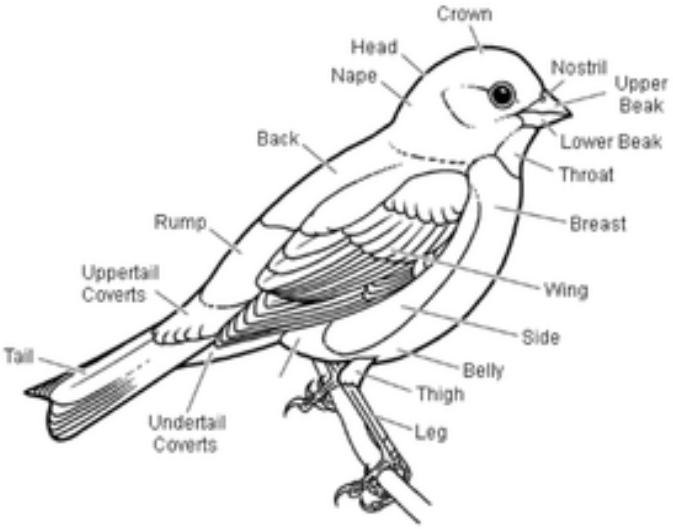
shape and size. Below are some examples of bird adaptations that help them thrive in their environments as well as can be used to identify them.

Bird adaptations- Some adaptations of water birds that allows them to flourish in the water are long legs, pointed long bills, webbed feet, large wings, and waterproof feathers. Raptors have adaptations that help them to hunt—such as large eyes and ears. Forest dwelling species are smaller with hard thick bills for cracking seeds or narrow, long bills for maneuvering and catching insects. Hollow bones are an adaptation that allows birds to fly by reducing their weight. Some birds have evolved to be flightless and either use running or swimming for locomotion.

Common birds of NATL:

Songbirds or Perching birds:
- Northern Cardinal
- House Sparrow
- Carolina Wren
- Common Grackle
- Blue Jay
- Northern Mockingbird
- American Crow
- Red-winged Blackbird
- Pileated Woodpecker

Wading or Diving birds:
- White Ibis
- Little Blue Heron
- Snowy Egret
- Great Egret
- Great Blue Heron
- Muscovy Duck
- Anhinga



Raptors:
- Red-shouldered Hawk
- Turkey Vulture
- Barred Owl

More information on the birds of NATL can be found on the Natural Area Teaching Lab website in the Biota section: http://natl.ifas.ufl.edu/biota/

Sources:

Adapted from materials used at the Jekyll Island 4-H Center

Gill, F.B. (2007). Ornithology: the third edition. New York, NY: W.H. Freeman and Company.