



Brilliant Birds

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Lesson Title: Brilliant Birds	Lesson Duration: 45-60 minutes
Suggested Grade Level: 3-5	
Lesson Objectives: Students will learn to identify distinguishing characteristics of birds while becoming better acquainted with a variety of species commonly found in urban New Hampshire.	
NGSS Covered: 3-5-LS1-1, 3-5-LS1-2, 3-5-LS2-1, 3-5-LS2-2, 3-5-LS4-2, 3-5-LS4-4,	

Instructor Notes

The following instructor notes are meant to accompany the Urban Mammals PowerPoint PDF located on the NH Fish & Game Website.

Slide 1: Title Slide

Slide 2: What makes a bird a bird? Ask student(s) to respond with what they know about birds already.

Slide 3: Eggs: All birds, every single one, begins their life inside of an egg. The shape of a bird's egg suits the shape of the nest their parents created. Large species create large nests as their eggs (and resulting chicks) require more space than smaller species. A hummingbird nest is only the size of a quarter, while an eagle nest can be 5-9 feet across in diameter! Bird eggs, unlike fish, reptile, or amphibian eggs, have hard outer shells. Bird eggs require incubation in order to hatch; incubation is a period of time the eggs are kept under a certain condition: in regards to bird eggs, that condition is temperature. Bird eggs are kept warm by the body heat of their parent bird. Birds, like mammals, are warm-blooded, capable of producing their own body heat. Since a parent bird is physically resting atop the clutch of eggs in order to keep them warm, the eggs need that tough outer shell so they don't crack under pressure. Bird shells are made up almost entirely of calcium. Which body parts in your body are made up of calcium (answer: bones and teeth). Incubation time varies depending on the bird species as does the amount of eggs a mama bird lays in a clutch. Eggs come in an amazing array of colors and patterns. Have you ever seen a wild bird egg? The eggs in this image belong to a chipping sparrow.

Slide 4: Birds grow feathers in a similar way that mammals grow hair. In fact, feathers are made out of the same material as your hair and nails. Take a close look at your arm. Do you see any hair growing there? If you were to use a magnifying glass to look at those individual hairs, you would notice that each tiny hair sprouts from an even tinier hole in the topmost layer of your skin. That



teeny tiny hole is called a pore. Birds have pores in their skin too, but instead of a single hair developing below the surface and appearing through the pore, a bird's body develops... you guessed it: a feather! Feathers come in many shapes and sizes and have many different purposes. From

keeping birds warm in winter to allowing them to float on water, feathers are essential to a bird's ability to survive in the wild. Some birds have feathers from the tip of their beaks all the way down to their talons or claws! Can you think of a bird that has feathers on their feet? Why might they have this adaptation? What might it tell you about where they live?

Slide 5: All birds have beaks or bills that include an upper and lower mandible. A bird's beak is specially adapted to suit their dietary needs. Both the great blue heron and the herring gull share a similar habitat and can be found near both fresh and saltwater. Look closely at their beaks. Based on what they look like, what do you think they eat? How would they use their uniquely shaped bills to acquire what they eat?

Slide 6: Can you figure out what each bird on this slide eats based on the shape and size of their beak? The American Goldfinch in the top left corner is using its beak to crack open sunflower seeds in order to eat the soft protein rich meal inside. Goldfinch are seed eaters. Birds have beaks that allow them to crack nuts and seeds, crop grass (geese), tear meat (raptors like the barred owl and bald eagle), siphon plants from water (aquatic species like this duck), pierce fish and swallow them whole (like the great blue heron), sip nectar (hummingbirds), excavate holes to reach tree-dwelling insects (like the pileated woodpecker) and so much more! While birds use their beaks or bills primarily for eating, they are also used in a variety of other ways. Can you think of anything else a bird uses their beak for besides snacking?

Birds use their beaks like fingers to help them siphon dust, debris or bugs from their feathers as well as spread oil throughout each one individually in an action called preening. Birds spend hours a day preening their feathers to ensure that they remain strong and supple for floating, flying, and keeping them warm or cool and dry.

Beaks are also necessary for transporting nesting materials to nesting sites. Have you ever seen a bird with grass or twigs in their beaks? If you have, you witnessed the beginning stages of a nest! Some larger birds like eagles employ their strong feet to grasp the large branches they use to construct their nests, but smaller species typically use their beaks for transporting material.

Beaks can also be used for defense and some birds can inflict a very serious bite! The beak of a bald eagle is certainly intimidating but let's not forget that many songbirds are capable of cracking walnuts with their beaks as easily as we can squish a baked bean between our teeth!



While beaks aren't required for singing (they have a special organ for that!) they are often used to make sounds that can signal different emotional states. Many owl species will snap their upper and lower mandible together in a series of loud clacks if threatened. A parrot may make a rattling sound with their beak when they are relaxed or content.

Lastly, all birds use their beaks for acquiring water with most birds using their lower mandible like a little cup to scoop water before tilting their beaks skyward and allowing gravity to send the liquid down their throat. They don't have lips to sip with, afterall, so don't bother giving a bird a straw!

Slide 7: All birds have wings even if they don't serve the same purpose from bird to bird. What are the birds in this slide doing with their wings? Do they all use them for the same purpose? Some birds use their wings to balance while on ground and swim when in water like the penguin; some use their wings to soar in the sky while looking for food like the bald eagle and American crow; some use their wings to hover in place like the ruby-throated hummingbird while it sips nectar from flowers. Some spread their wings to stretch muscles or dry feathers like this female mallard duck. Wild turkeys, geese, hawks and even owls, will even use their strong wings to smack a possible intruder! Don't venture too close to a mother goose and her goslings...between her beak and stiff wings, she could pack quite a punch!

Slide 8: If you're going to lay eggs, you need a place to keep them safe. Different birds create very different nests. They make these nests for the sole purpose of holding their eggs. Contrary to popular belief, birds don't actually use their nests for shelter. Some birds use sticks and spiderwebs to build their nests, others use old feathers and hair. Cliff swallows make their nests out of mud and spit! Some birds don't even make nests themselves; owls use hawk nests or tree cavities that woodpeckers made, falcons and plovers scrape a depression in their respective terrain, and cowbirds lay their eggs in the nests someone else made and let those birds raise their young! Birds transport nesting materials to nest sites by using their beaks to carry them; it would be rare to see a bird using their claws or feet to hold and transport materials with which to build a nest. Nesting materials vary depending not only on species but on the habitat in which a bird survives. Would you expect to see a nest made out of leaves and moss in an arid desert? Why or why not? Look at the nest containing the three baby birds. These are robin chicks. What do you think their mother made their nest out of? Does her nest look the same as the chipping sparrow? Why or why not?

Slide 9: Birds are capable of many things from flying to diving to sprinting and climbing. Many camouflage with their surroundings but some have feathers that mimic the rainbow! They can be as tiny as your pointer finger to as tall as the ceiling in a school bus! Birds can live in freezing temperatures and super hot tropical temperatures and everywhere in between. Do you have a favorite bird? Why do you think it's special? Birds in this slide from left to right: red-breasted



New Hampshire Fish and Game and NH Audubon
Wildlife Education Resource
September 2021

nuthatch climbing headfirst towards the ground, an
osprey clutching a fishy meal, Canada goose paddling in

Autumn.

Slide 10: Common Urban Birds. Can you recognize any of these three species? All of the birds in this slide are well-adapted to living near people and in urban environments. They have learned that

cities provide all they need to survive: food, water, and shelter! Have you seen them before in your neighborhood? Do you know their names, what they eat, whether they are year-round residents or migrate south for winter?

Slide 11: How about these birds?

Grab a bird book or check out an online bird identification site like The Cornell Lab of Ornithology at <https://www.allaboutbirds.org/news/> and see how many you can accurately identify before checking your answers with the key on the final slide!

Slide 12 & 13: Answer Key

Additional Activity:

What are some other ways birds are different from other animal classes? What are some ways in which they are similar? Instruct students to create a graph to represent their reasoning or present them with the available sample [template](#). Leave time for discussion.

Assessment: Upon completing this lesson, students will be able to:

- Identify at least 3 characteristics of a bird;
- Identify 3 urban birds by common name;
- Discuss 2 adaptations of urban birds that enable them to live in urban settings;
- Formulate at least one question about birds in their neighborhood.