



Birding Basics:

Become a birder and learn what species live in your local ecosystem.

Grade Level: Middle School but could be tailored for many different age groups.

Essential Question:

What birds live in our local ecosystem? And what can they teach us about species adaptations?

Objectives:

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

- *distinguish* the major classifications of birds and the characteristics of related birds.
- *recognize* some bird songs of common Wyoming species and the importance and differences between songs and calls.
- *locate* and identify several species present in your local area.
- *Create* their own bird species.

Assessment opportunities:

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

- The student's data collection and journal entries.
- The student's bird creation.

Common Student Misconceptions or Challenges

For many students, especially younger ones, hearing or seeing slight differences in birds maybe difficult. Depending on age and ability of your students, focus time on significantly different species such as blue birds and crows. Once students have mastered being able to properly key out species such as these have them progress to more challenging birds-- finches, sparrows or nuthatches, for example.

As you can imagine, little brown birds for the novice birder may seem to be all the same. So, once you and your students are ready, introduce habitat selection for different species as well as behavior. In addition to [plumage patterns/colors](#), [bill shape](#) and [vocalizations](#), these can be significant in helping differentiate between seemingly similar species.

Disciplinary Core Ideas: Next Generation Science Standards:

MS.LS4.C Adaptation

Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support survival and reproduction in the new environment become more common, those that do not become less common. Thus the distribution of traits in a population changes.

MS.LS1.B Growth and Development of Organisms

Animals engage in characteristic behaviors that increase the odds of reproduction.

<http://www.nextgenscience.org/msls4-biological-evolution-unity-diversity>



Part 1: Classifications of Different Birds

Materials:

- Field guides
- Journals
- Pencils
- White board and markers

Time Commitment:

1 hour.

Preparation:

- Have a local area picked out and scouted ahead of time.
- Plan field trip logistics.
- Find and practice using field guides if unfamiliar with them.

Directions:

In this portion of the lesson you will start very broad and then narrow down to giving students the tools on how to identify species.

1. Ask students how they would describe their favorite Wyoming animal. Size, teeth, antlers or horns, hooves versus paws, type of ears, ect. Have them put these characteristics on the board so everyone can see the different ideas.

2. From there, have students develop a key of common local mammals, ones that are significantly different from each other. Such as Antelope, Moose, fox, and weasel.

3. Narrowing down into one family, conduct a visual exercise to compare and contrast two birds. Using two, slightly overlapping circles, note shared features in the overlapping section and unique features of each bird in the remaining portions of the circles (like a Venn Diagram of bird characteristics).

Do the same exercise for males and females of the same bird species! This

is important in understanding sexual dimorphism as well as beginning to identify different birds.

4. Give an overview of the field guides and how to find bird species that represent each family.

5. As an extension of this lesson, students could visit the UW Museum of Vertebrates. Here students would be exposed to different species and variability's within species to provide them with an opportunity to understand specie classification and identification. A good introduction to this is a video from the National Museum of Ornithology: <https://www.youtube.com/watch?v=L2CDKctQeNA>.

Background Information:

Birders use field guides that group species by order. An order, in scientific terms, is a group of species that share a number of characteristics, and evolved from a common ancestor. Orders usually include several families (of more closely related species), many genera (even more closely related species), and bunches of species. For example, the order Accipitriformes, includes the families Cathartidae (New World vultures), Pandionidae (ospreys), and Accipitridae (hawks, eagles and more), The Accipitridae includes approximately 70 genera (the plural of genus), each with more than one species.

To become proficient at using a field guide, you should become familiar with the common groups that are found where you live. Below are some of the major orders or families found in Wyoming.

Heron, bittern: These large, fish-eating birds wade rather than swim.

Duck, goose, swan: These birds are common to wet areas and usually have webbed feet. Their eggs are not spotted.

Hawk: Hawks are diurnal (day) birds of prey.

Pheasant, turkey: Birds in this family have relatively short, rounded wings, are more apt to walk than fly and are year-round residents.

Owl: Most owls are nocturnal (night) birds of prey. Their feathers are modified to allow them to fly quietly, and their eyes are adapted for ability to judge distances.

Pigeon: Birds in this family have a plump body, small head and small beak. Pigeons are known for their "homing" ability.

Cuckoo: Cuckoos have short legs with two toes forward and two back. Their bill is heavy and curved.

Nighthawk: Having a weak bill and a large mouth, nighthawks feed at night by sweeping insects out of the air as they fly.

Hummingbird: Birds in this family are small and have a long, thin bill. They can hover when feeding.

Kingfisher: The kingfisher has a large head and bill. It feeds by diving into water to catch fishes.

Woodpecker: These birds **hammer** into trees searching for insects. They have two toes pointing forward and two backward.

Flycatcher: These birds perch upright while waiting for insects, which they catch in flight. Their flat bill has bristles at the base.



Part 2: Bird Songs

Materials:

- Field guides
- Journals
- Pencils
- Identifier, allaboutbirds.org, or another bird call app.

Time Commitment:

30-40 mins

Preparation:

- Practice identifying bird calls and working with the Identifier or other applications.

Directions:

1. Learn to attract birds with sound. One of the easiest sounds you can make is to suck on the back of your hand, which will attract chickadees.
2. Listen to the bird songs and calls on the "Identifier." Note the key characteristics of the songs and calls of various species. Have a bird sounds contest, seeing who can call like a robin or caw like a crow.
3. After listening to the bird calls, take students outdoors. First have students close their eyes and for minute, count how many different sounds they hear, not just bird calls.
After this, have them try to identify at least one type of bird through its song or call.
4. Conclude this section with asking students to think about the type of bird call they would have, if they were a bird. Remember that calls and songs are very specific to each type of bird and their adaptations to their environment.

Background Information:

Communication is important to birds, especially in habitats where vegetation impedes vision, such as forests, grasslands and wetlands. Birds communicate by vocalizations, such as songs and calls, other noises, like tapping and drumming, and behaviors such as courtship flights and dances.

Songs are specific patterns of notes repeated with few variations. They are used to attract mates and mark the territory necessary for production and rearing of young.

Each species has its own specific song or songs. Some birds have over a dozen calls and songs (northern cardinal). Some birds are able to mimic the songs of other birds (gray catbird, northern mockingbird), humans and our products (European starlings can imitate a car alarm). Just like humans, bird songs have regional dialects. Some birds are born knowing how to sing. Others must listen to calls of adult birds of their kind and practice the calls before perfecting them.

When alerting others of danger, birds call. Calls are also made when feeding or migrating. Precocial (independent) young communicate with their parents through a location call (sort of saying "I am over here, where are you?"). When a covey of northern bobwhite is split up, they locate each other and rejoin the group through a gathering call.

Birds do not have vocal chords. To produce sounds, vibrations are sent across the syrinx (voice box) of a bird. The more muscles a bird has attached to the syrinx, the more complex vocalizations it can make. For instance, northern mockingbirds have many muscles and can produce a variety of sounds, while rock pigeons' singular pair of muscles results in only the single "coo" sound. Altering the bill can also modify the vocalizations (think of moving your lips or size of mouth opening).

A variety of other types of communications are used by birds. Hungry nestlings peck at their parents' beak or open their mouth widely to beg for food. Male ruffed grouse "drum" and greater prairie-chickens "boom" and patter their feet to attract a mate. Sandhill cranes and American woodcocks have elaborate mating dances and flights. A male wild turkey will spread its tail and drop and "rattle" its wings to attract a mate.

Communication is very important to birds. Without communication, many birds would starve, lose their way during migration or be unable to defend a territory or find a mate.



Part 3: Identification of Birds

Materials:

- Field guides
- Journals
- Pencils
- Binoculars
- Data sheets
- Cameras/phones

Time Commitment:

1-2hours depending on length of hike plus computer entry time.

Preparation:

- Have data sheet available for students
- Use of computers and internet available for students
- Depending on where the hike is have necessary equipment for students (clothing, sunscreen, parent chaperones ect.)

Directions:

1. Teach students how to use binoculars. Take a birding hike in a wooded area. Pack a notebook and pencil to record all observations and clues from your hike.
2. Listen for birds: Rustling in bushes, shrubs or undergrowth might be the sound of busy birds. Banging or loud tapping noises can indicate a woodpecker nearby. Listen for different songs, calls or other noises and try to decipher their meanings.
3. Record species present in the student notebook, and take photos when possible. Students should be able to identify five common birds in the area. Encourage students to submit their data online to WyoBio. (Students under 14 years may not register for WyoBio, so an adult may want to register for the class).

Background Information:

Birding in America [really got](#) started with John James Audubon's (1785-1851) travels and publication of his collection of paintings of more than 1,000 birds. For the first time most people had the opportunity to "see" many of the birds and call them by a proper name. Birding was popularized in America in the 1930s when usable field guides were published.

Why is birding a hobby or career that interests millions of people? Some enjoy the challenge of locating and identifying birds and seeing new places. Others see their birding time as a form of exercise and an opportunity to be outdoors. No matter what the reason, birding is a fun sport that can be done year-round anywhere for little expense. Getting started is as easy as a trip outdoors with an experienced birder, joining a club or simply picking up a field guide and teaching yourself.

Your senses of sight and hearing are extremely important tools in birding. Observe the bird. The five basic characteristics used to visually identify a bird are its shape and posture, plumage and color, behavior, habitat preference and voice. Listen to its call or song. The best birders are able to identify 80 percent of the birds by sound only.

Becoming a birder requires studying bird habits and learning to move quietly and slowly. When you go birding remember to take comfortable shoes, a field guide, sketch book, pencil and binoculars. It is recommended that beginners use 7 x 35 power binoculars.

Birds can be found almost anywhere. Look in parks, forest preserves, your backyard, schoolyard and around a pond or wetland. The best times to look for birds are in the morning or early evening during their feeding times when they are most active.

You may want to attract birds to your schoolyard to observe them for extended periods of time. Feeding and watering stations will attract a variety of birds. Remember to offer a variety of feed to attract many types of seed-eaters. Provide suet in the winter to attract meat-eaters. Keep a daily record of the birds seen at your feeder. Over the years it becomes interesting to try and predict when the juncos first appear in winter or the red-winged blackbirds return for the summer. Recording data such as arrival and departure dates is called phenology.

A variety of careers are available to people interested in birds. Ornithologists are people who study birds. Biologists and naturalists study the connections between birds and people, assist others in understanding the role of birds in the world and help people learn to identify birds. Most ornithologists, biologists and naturalists have a college degree. Birds are the focus for many famous artists, including John James Audubon and Roger Tory Peterson, and for writers such as Pete Dunne (The Feather Quest and several other books).



Part 4: Bird Creation

Materials:

- Journals
- Pencils
- Coloring materials

Time Commitment:

30mins

Preparation:

- Collect coloring materials for either in the field or back in the classroom.

Directions:

1. Now that students have learned how to identify birds, and tell them apart by their songs as well as their

physical differences, ask the students to get creative.

Students will create their own bird species. Make sure to have them think about the bird's physical characteristics in comparison to where it lives and how it survives.

Prompting questions include:

What does your bird eat?

Does it migrate? How far?

Where does it spend most of its time? On land or on water?

Where does it build its nest?

How big is it?

What colors is it? Etc..

2. Give students time to be creative and to answer your questions.

3. Once students are done, have some of them present their species, explaining how the characteristics it has been given show adaptation to its environment and life history, and make sure they name it!

