

BIRDS

K - 8 Science Unit Study



Birds

CREATED BY THE GOOD AND THE BEAUTIFUL TEAM



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Unit Information

Science Journal



All The Good and the Beautiful science units include activities for a science journal. For each child, prepare a 1–2-in. 3-ring binder to function as his or her science journal. Tabbed

divider pages can be used to separate the different units. Also, have wide-ruled paper and blank white paper on hand for journal activities. All completed journal activities are to be kept in the science binder. If desired, have the child create a cover and insert it under the clear cover of the binder.

Science Wall



All The Good and the Beautiful science units include vocabulary words to be placed on your science wall, which is a wall or tri-fold presentation board in your learning area on which you can attach the vocabulary words and other images. If you bought the PDF download only, print the pages single sided. **Cut out the vocabulary word cards at the beginning of the unit.** The course will indicate when to place them on the wall.

Lesson Preparation

All The Good and the Beautiful science units include easy-to-follow lesson preparation directions at the beginning of each lesson.

Lesson Mini Books



Some lessons in this unit incorporate science mini books. If you bought the PDF download only, print the pages single sided.

To assemble the mini books, cut them in half along the dotted lines, stack the pages together with the page numbers in the correct order, and staple twice along the left side.

Activities



Many of The Good and the Beautiful science lessons involve hands-on activities. **An adult should always closely supervise children as they participate in the activities to ensure**

they are following all necessary safety procedures.

Unit Videos



Some lessons include videos that were created by The Good and the Beautiful. Have a device available capable of playing the videos from goodandbeautiful.com/sciencevideos.

Content for Older Children



Some lessons include extra content that is more applicable for older children (grades 5–8). Parents or teachers may choose to skip this content if instructing only younger children.

Content for Younger Children



Some lessons include extra content that is more applicable for younger children (grades K–4). Parents or teachers may choose to skip this content if instructing only older children.

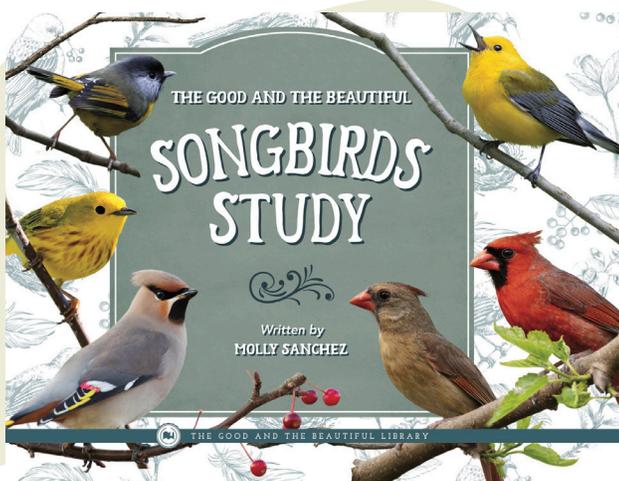
Versions

New discoveries about birds are being made on an ongoing basis. This course is reviewed and revised periodically to keep information as up to date as possible. This version is the first edition of this unit.

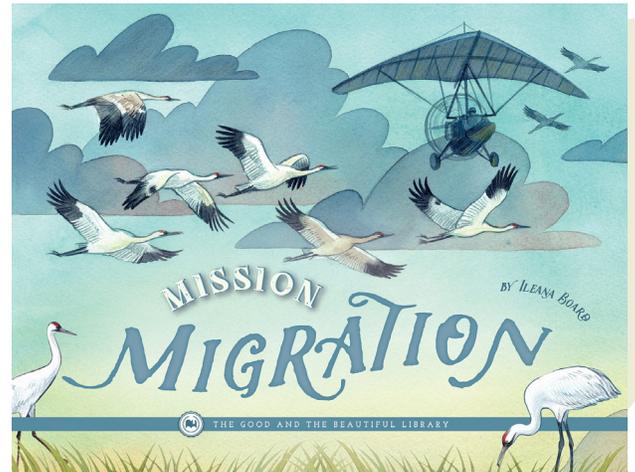


Read-Aloud Book Pack

The books below are optional read-aloud books that complement this unit. These books can be purchased as a book pack by going to goodandbeautiful.com/science and clicking on the *Birds* science unit product page.



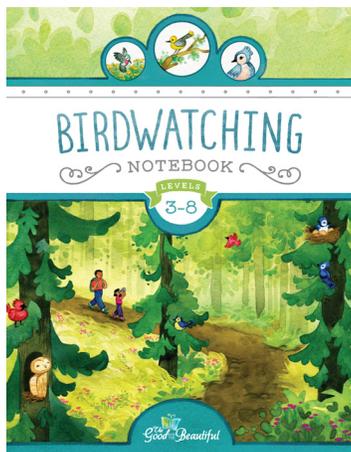
The Good and the Beautiful Songbirds Study
by Molly Sanchez



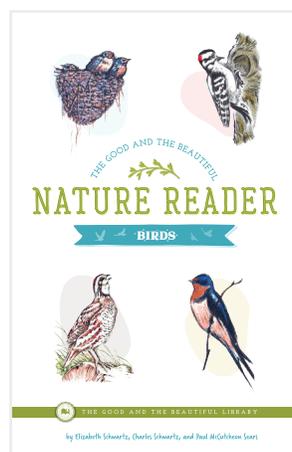
Mission Migration
by Ileana Board

CORRELATED LEARNING

The Good and the Beautiful has several books and activities that correlate well with the *Birds* unit. It can be a wonderful experience for children to interact with hands-on activities related to the subjects they are learning in science. Find these correlated products by going to goodandbeautiful.com/science and clicking on the *Birds* science unit product page.



Birdwatching Notebook



The Good and the Beautiful Nature Reader: Birds
by Elizabeth Schwartz, Charles Schwartz, and Paul McCutcheon Sears



Snatch! A Birds of Prey Game



Lesson Extensions

How the Extensions Work

Each lesson has an optional lesson extension for children in grades 7–8. Complete the lesson with all the children, and then have the older children complete the self-directed lesson extension. These extensions are located at the end of each lesson.

Answer Key

The answer key for the lesson extensions can be found by going to goodandbeautiful.com/science and clicking on the *Birds* science unit product page.

Flexibility

The amount of time it will take to complete each lesson extension will vary for each child. The average time is about 10–15 minutes per extension. Parents/teachers and children may choose to omit parts of the lesson extensions if desired. Encourage the children to stretch their capabilities, but also reduce work if needed.

Science Journal

The extension pages are nonconsumable. The children will do their work on separate sheets of paper and insert them into their science journal binders along with any science journal pages done during the lessons.

Children are encouraged to take ownership of their science journals and put forth effort to make the journals visually appealing. The journals will be something the children can treasure. The children should use color and illustrations where possible. Have the children view the sample page below.

Taking Notes

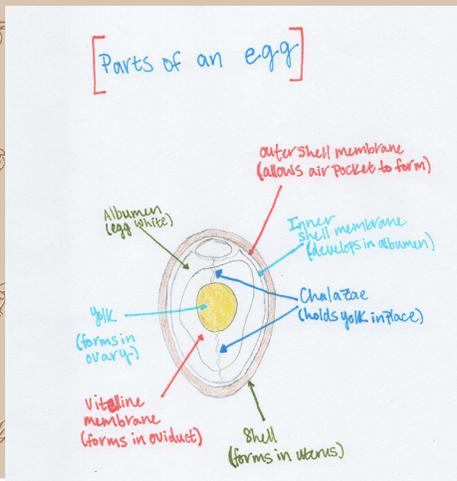
Some of the grades 7–8 lesson extensions have the children summarize the material read. Teach the children to look for key information, summarizing the most important points. Students can also add drawings and notes with their thoughts and the facts that are most interesting to them.

Optional Grades 7–8 Reading Book

We recommend *The Story of John J. Audobon* as extra reading for students in grades 7–8. This book can be purchased by going to goodandbeautiful.com/science and clicking on the *Birds* science unit product page.



The Story of John J. Audobon
by Joan Howard



Supplies Needed

This section lists all the extra supplies needed for the activities within the lessons. There are no experiments in this unit.

Lesson 1

- Glue stick

Lesson 2

- Clipboard or 3-ring binder for each child's Birdwatching Notebook
- Binoculars (optional)

Optional Activity Supplies (per child):

Pine Cone Bird Feeder

- 1 pine cone
- 2 Tbsp nut butter, seed butter, or shortening
- 1/4 c birdseed in a bowl
- Butter knife
- 20 cm (8 in) string

Plastic Bottle Bird Feeder

- Clean, dry plastic bottle with a cap
- 2 chopsticks or pencils
- Birdseed (enough to fill about 1/3 of the bottle)
- Sharp scissors
- 30 cm (12 in) string

Lesson 3

- 5 small bowls
- Dried beans or rice
- Peanuts or sunflower seeds in the shell
- Gummy worms, cooked spaghetti, or cut rubber bands
- Cracker crumbs or sugar
- Water
- Large marshmallows

- Tweezers
- Pliers
- Tongs
- 1 drinking straw
- Scissors
- Glue stick

Lesson 4

- 1 sheet of paper, cut in half, for each child

Lesson 5

- 1 round-head paper fastener (brad)
- Glue stick
- Scissors
- Thermometer (analog or digital—one per child if possible)

Lesson 6

- Tape
- Cooking oil
- Paintbrush (optional)
- Construction paper
- Scissors
- Sponge or water dropper

Lesson 7

- Measuring tape
- 2 pinto beans or jelly beans
- 1 quarter (coin)
- 1 penny (coin)
- 1 average-sized canteloupe (optional)

Supplies Needed

(CONTINUED)



Lesson 8

- 1 sheet of newspaper
- Masking tape
- Measuring tape
- Colored pencils

Optional Activity Supplies (per child):

- Owl pellet (*Note: SANITIZED owl pellets need to be purchased from a reputable seller, allowing enough time for shipping.*)
- Tweezers and toothpicks
- Bowl of water (optional)
- Plate or piece of paper
- Rubber gloves
- “Vole Skeleton Chart”
- Piece of cardboard, if desired
- Glue, if desired
- Magnifying glass, if desired

Lesson 9

None

Lesson 10

- Pencil
- Paper clip
- Compass or compass app (optional)

Lesson 11

- Bandana or necktie for each child
- Painter’s tape
- Measuring tape or yardstick

Lesson 12

- Glue stick

Lesson 13

- Colorful sock
- 1 banana per child
- 1 toothpick or skewer per child
- Handful of chocolate chips or raisins per child (optional)
- 2 bowls of water
- Small strainer or slotted spoon
- Several pieces of dry cereal
- 1–2 Tbsp uncooked rice
- Toothbrush
- Spoon
- Metal container, such as a can or water flask

Lesson 14

- Bingo markers such as coins, beans, buttons, or small pieces of candy

Vocabulary

Instructions: Cut out the vocabulary cards in this section. Place them on your science wall when prompted to do so in the lessons. Review the vocabulary words several times during this unit and, if desired, at various times throughout the school year.



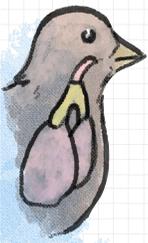
Plumage

the feathers of a bird



Aves

the class containing birds;
warm-blooded, bipedal vertebrates
that lay eggs and have feathers, a bill,
wings, and lightweight skeletons



Syrinx

the vocal organ, or voice box, of birds

Raptor

bird of prey with a hooked beak and sharp talons



Talon

the sharp claw of a bird of prey



Stoop

a high-speed dive usually used to attack or catch prey



Pelagic

refers to spending the majority of life at sea



Introduction to Birds

Objective

Learn about the characteristics of birds and understand their worldwide presence.



Preparation:

- Cut out the “Characteristics of Birds” cards.
- For each child, print one copy of the “Birds of the World” map page.
- Cut out the labels from the “Classification of Birds” page.

Activity Supplies:

- Glue stick

The Amazing World of Birds Video



To introduce the children to this *Birds* unit, show them the video called “The Amazing World of Birds” at goodandbeautiful.com/sciencevideos.

Bird Characteristics



Spread the prepared “Characteristics of Birds” cards in front of the children. Read to the children: It is estimated that there are between 200 and 400 billion birds living on

the earth today. Let’s explore how you can tell if an animal is a bird.

Allow the children to select a card from the “Characteristics of Birds” cards, then read it aloud. Once all the cards have been read, help the children staple them together into a book and place it on your science wall.

Birds of the World Activity



Read to the children: All over the world, in any outdoor setting you find yourself, there is a good chance you will encounter birds. Birds live everywhere! From the harsh climate of

the desert to the frigid temperatures of the Antarctic, from the tops of trees to underground

burrows and across the vast oceans, birds have found ways to create homes in every earthly environment. In fact, birds are so common that all 50 US states and many countries have adopted a representative bird. While the presence of birds may be common, there is great beauty and variety in the birds found throughout the world.

Give each child a copy of the “Birds of the World” map page. As you read the clues below, have the children find the number next to the country and guess which bird is the national bird. Have them either write the country number in the white circle next to the bird or draw a line between the white circle and the correct country. Have the children place the completed page in their science journals.

1. Argentina

This reddish-brown bird with an elongated, slightly curved beak is the national bird of Argentina. It is known as a red ovenbird because of its color and the interesting domed nest it builds off the ground out of mud and grasses, resembling a clay oven. Together, the parents build the nest with a protected inner chamber where their eggs will hatch. [Rufous hornero]

2. Finland

Finland’s national bird is one of the heaviest



Birds of the World



SAKER FALCON



EMPEROR PENGUIN



RUFIOUS HORNERO



INDIAN PEAFOWL



CANADA JAY



RAGGIANA BIRD-OF-PARADISE



BALD EAGLE



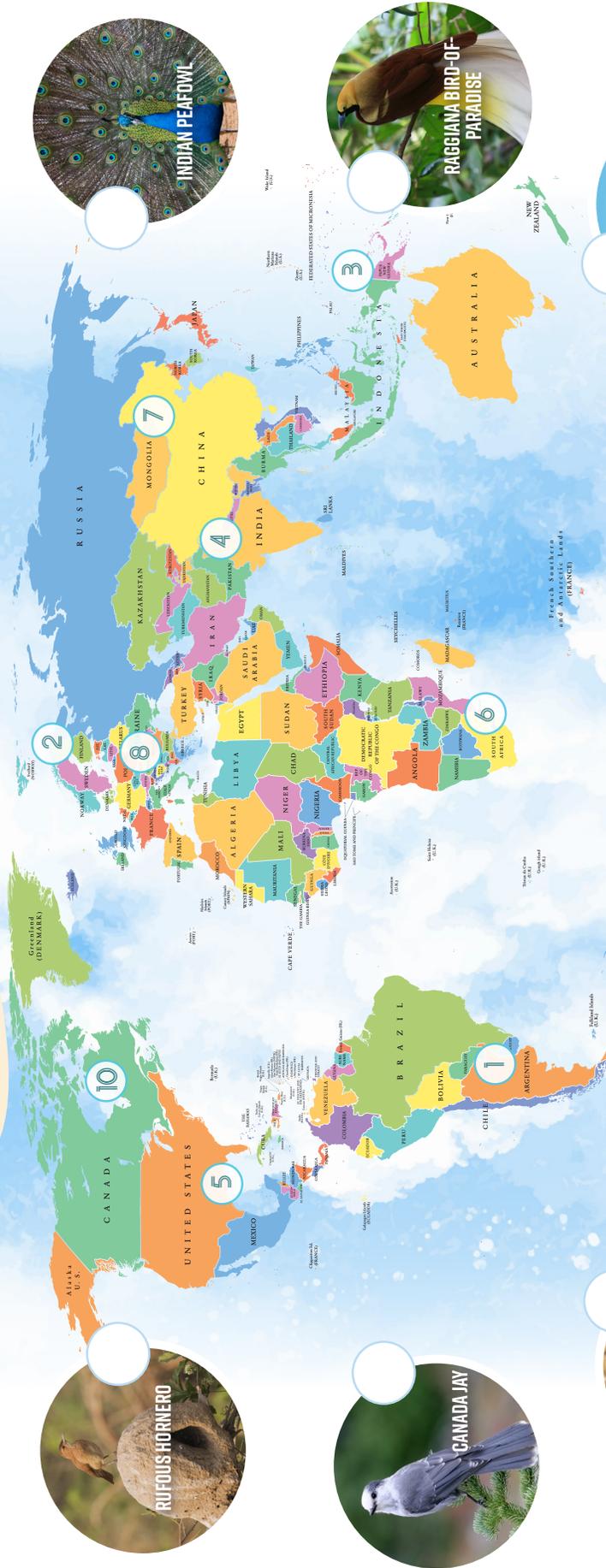
WHOOPER SWAN



BLUE CRANE



GREAT WHITE PELICAN



Instructions:

1. Read the information below. In your science journal, describe the different types of bird plumage and the purpose of each one.
2. In your science journal, explain how and why a bird's plumage changes color.

EXTENSION

Bird Plumage

Birds are beautiful creatures with a wide variety of colors and patterns that help us identify them. This collective feathered covering is called plumage. It can range from vibrant, bold colors to soft, muted patterns. Plumage serves many purposes throughout a bird's life and can change at different stages to meet the specific needs of the bird.

Hatchlings have natal plumage, which is often very plain and subdued in color. As the bird grows, it will develop juvenile plumage. This plumage may have some color but is still relatively plain to provide camouflage.



BABY COCKATIEL

Finally, birds develop a mature plumage, which is the adult coloration and patterning that we are accustomed to seeing. Some birds also change into their breeding plumage during mating season. This plumage is vibrant and colorful and typically worn by males to attract a mate.

Not every bird will develop every type of plumage; it depends on factors such as species, gender, and environment. Some adult birds have plumage that changes with the seasons. The male American goldfinch, for example, looks completely different in winter, when it is a gray-green color, than in the summer, when it is bright yellow and black.

Birds do not have color-changing plumage though; feathers are much like our hair or fingernails and are made of the same keratin substance. Feathers are “dead,” meaning they cannot heal themselves or change in any way. Birds undergo a molting process—a feather falls out and is replaced by a new one. This process can completely replace all feathers, partially replace a few damaged feathers, or replace one area of the plumage.

Though we typically focus on the color of bird plumage, a closer inspection reveals a broad range of patterns classified into four main groups: spotted, mottled, scaled, and barred.

SPOTTED



Spotted plumage is a dotted pattern. The spots can be found all over the bird's plumage or only on certain sections, such as the chest area.

MOTTLED



Mottled plumage is the most common pattern found on birds. Mottled patterns can include a combination of spots, stripes, and smears of color.

SCALED



Scaled plumage is a pattern that starts as one color at the base of the feather, then transitions to a different coloration on the edge of the feather.

BARRED



Barred plumage has stripes, or bars, of alternating dark and light color. This pattern is very striking but also relatively common.

God made birds with all of these beautiful colors and patterns for distinct purposes. The downy plumage of a baby bird helps to insulate and camouflage it. The bold and vibrant colors of a male bird's breeding plumage catch the eyes of the females of its species. Different patterns and colors can help the birds blend into their environments.

It's hard to fathom that vibrantly colored tropical birds can be camouflaged, but it is true! They blend in perfectly with the sun flecks, foliage, and shadows of the lush canopies they call home. Can you find the bird in this picture?



Birdwatching

Objective

Learn to find, identify, and study birds in the wild. Recognize differences between species.

Preparation:

- ❑ Go to the *Birds* link at goodandbeautiful.com/science and print a copy of the free “Birdwatching Notebook” PDF for each child. Print as many copies of the last page in the PDF as needed; one page will be used for each bird the child observes.
- ❑ Locate a birdwatching book, app, and/or website for your area (optional).

Activity Supplies:

- Clipboard or 3-ring binder for each child’s “Birdwatching Notebook”
- Binoculars (optional)

Optional Activity Supplies: supplies to create a bird feeder (see “Make a Bird Feeder Optional Activity”)



❑ How to Be a Birdwatcher

Read to the children: Have you ever seen a bird in flight and wished you could soar through the skies, too? Many people are so intrigued by birds that they become lifelong birdwatchers, also known affectionately as “birders.” They like to watch and study birds so they can identify the ones they see. In fact, birdwatching is one of the most popular hobbies around the world! Many adults and children have discovered a love of birds and spend time learning about them and observing them. Today, you can become a birder, too!

❑ Start a Birdwatching Notebook



Give each child a printed copy of the “Birdwatching Notebook.” You may wish to use a clipboard or punch holes in the pages and place them in a binder for more stability

when writing or drawing. Read to the children:

Throughout this science unit, we will be looking for a variety of birds in our environment and recording our observations. Scientists like to record the things they have seen so they can look for patterns and



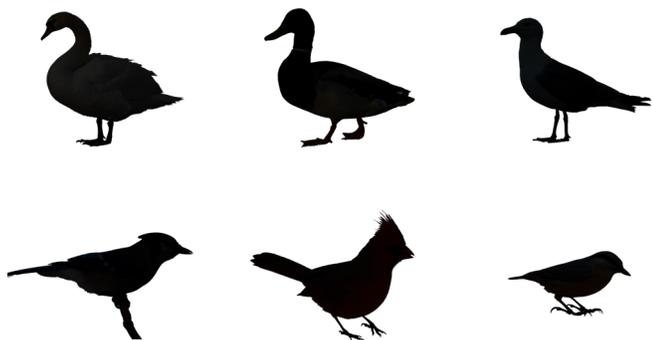
compare details. A great way to keep track of all the birds you see is by putting notes and drawings in a book that you specifically use for birdwatching, so we are each going to create a book. You will use this “Birdwatching Notebook” each time you look for birds.

You will personalize this notebook by drawing pictures and taking notes. Using color will help you easily identify the birds you have seen. Try to make your notebook beautiful and tidy, but do not worry about making it perfect; do your best and enjoy the creative process of making a record.



as another bird you know? Size can be tricky to judge because things look smaller in the distance, but it is still a good guide to start with.

Along with size, you may eventually be able to recognize a bird just by its profile (its outline as seen from the side). Some birds have unique, distinctive profiles that tell you who they are. **Show the children the images below and see if they can name the bird. (An answer key is located at the end of the lesson.)** As you can see, many birds have similar profiles but small, subtle differences. *Note: These profiles are not to scale.*



You will also start to notice differences in the shape and size of the wings, tail, feet, and bill. It will take practice and time to do this, but the more birds you identify, the easier it will become because you will be more familiar. **Have the children turn to pages 11–14 in their “Birdwatching Notebooks” and notice the variety among the feet and beaks of different types of birds.**

COLOR AND PATTERN

Color is the next piece of information that is most helpful in bird identification. Even a small flash of color can help you determine the type of bird you saw. You can first look for the overall color, and then try to spot other color details. Perhaps the head, breast, or wing tips are a different color, or there are rings around the eyes. Some of these small details can be difficult to spot from far away, so you may just notice overall dark or light coloring. Also look for stripes, spots, shading, and other visual patterns.

VOICE/CALL

You will often hear a bird before you see it, so learning to recognize bird sounds is tremendously valuable. It’s easiest to start learning the songs of birds you already know and expand from there.

BEHAVIOR

Observing how a bird behaves is another way to identify the bird. Flying, sitting, running, and eating are all things bird species do in different ways. As you learn to recognize these behaviors, you will be able to spot familiar birds from their movements alone. Notice if the bird is alone or if it stays in a flock. Perhaps it bobs its head or flicks its tail, or it might lean forward or stand up straight. Perhaps it is curious and confident or timid and nervous, and you may see it fly in a straight line or a zigzag motion. As you spend time watching birds, you will start to recognize behaviors, similar to the way you spot a friend from far away just by seeing how he or she walks or recognize a sibling in a baseball uniform by the way he or she throws the ball. **Place the “Tips for Bird Identification” page on your science wall. You may wish to refer back to it as you do your birdwatching throughout the unit.**

■ Make a Bird Feeder Optional Activity



A good way to observe birds is to attract them to your home so you can see them more often. One great way to attract birds is to feed them! There are many different styles of bird feeders that are simple to make at home. We are going to make a bird feeder that you can hang outside. When the birds come to eat, you will get to observe their unique features and behaviors.

#1: PINE CONE BIRD FEEDER

Supplies needed per child:

- 1 pine cone*
- 2 Tbsp nut butter, seed butter, or shortening
- 1/4 c birdseed in a bowl
- Butter knife
- 20 cm (8 in) string



Tie the string in a loop to the top of the pine cone. Have the child apply the butter or shortening all over the pine cone, using the knife. Place the pine cone in the birdseed and roll it around. Hang in a safe location outdoors and watch for birds to come feast!

*You could also substitute a stale piece of bread, a bagel, or a toilet paper roll instead of a pine cone.

Tips for Bird Identification

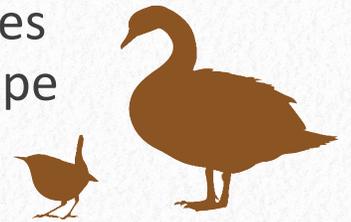
① Habitat

Where do you see the bird? What are its surroundings? What season is it?



② Size and Shape

What objects are similar in size? What does the bird outline look like? What is the shape of its wings, tail, beak, feet, or other distinguishing features?



③ Color and Pattern

Is the overall color dark or light? What colors do you see? Are there colorful details? Does the bird have any stripes or spots?



④ Voice/Call

What bird songs do you already know? Do you hear distinct words or sounds?



⑤ Behavior

How does the bird run, fly, sit, eat, swim, move, and flock?



Specialized Bills Cards



ROSE-BREASTED GROSBK



PAINTED BUNTING

SEED AND NUT EATERS

Birds that eat seeds and nuts often have short, strong, cone-shaped beaks. These beaks can crush outer shells in order to access the seed or nut contained within. The beaks are usually thicker and stronger than other types of beaks.

NECTAR FEEDERS

Birds that drink nectar have long, needlelike beaks that they press deep into flowers to drink the sweet liquid found there. Birds will seek out the best types of flowers for them based on the shape of their beaks. Nectar feeders do not actually suck up the liquid; instead, their beaks protect long tongues that lap up the liquid.



RUFIOUS HUMMINGBIRD



RED-BILLED STREAMERTAIL



COMMON KESTREL



AFRICAN DARTER

MEAT EATERS

Some birds eat meat and use their beaks to tear or spear their food. Raptors must tear their food because it is too big to eat whole. Their sharp beaks may be hooked to help in the process. Other meat-eating birds have long, pointed beaks that they use to trap or stab fish, frogs, and crustaceans.

HOW DOES A BIRD FLY?



The sight of a soaring flock of birds is fascinating to behold. As they glide through the air and dive and turn, their dance appears graceful and effortless. Humans have long been fascinated by the wonders of flight.

Flying is the primary form of locomotion for most birds. Birds use flight to travel and avoid predators, but that's not all. They can eat, mate, hunt, and even sleep while flying. How are birds able to fly?



Hatching

A few days prior to hatching, a baby bird develops an egg tooth made of a small, sharp piece of calcium on the tip of its beak. The baby bird also absorbs the remainder of its yolk at this point.



From inside, the baby bird uses its egg tooth to crack and chip away at the shell, creating a small hole called a pip. This hole allows more air to enter the egg. The baby bird scratches and pecks in a circular path around the large end of the egg, weakening the shell.



Eventually, the egg weakens enough for the baby bird to break it open by pecking, wiggling, and pressing against the shell. This process strengthens the bird and prepares it for life outside the egg.



Hatching is hard work, and the newly hatched baby bird emerges from the egg, exhausted. Its feathers are wet from the fluids in the egg. The bird does not need to eat right away because it has energy stored from the absorbed yolk.



In a few hours, the baby bird dries off and any existing feathers fluff up. After a time, the egg tooth will disappear. Most baby birds need to be fed and protected by adult birds for a time.



Poultry

Objective

Help the children learn about the unique features of birds in the poultry family.



Preparation:

- Cut out the clue cards (the page with the dotted lines) and place each card faceup on top of the chicken picture, attaching it with a small piece of tape. This is the “Most Common Bird Reveal” opening activity.
- Assemble the mini book *Backyard Birds: Poultry*.
- For each older child, print one copy of the “Poultry Comparison Chart.”

Activity Supplies:

- Tape
- Paintbrush (optional)
- Construction paper
- Scissors
- Cooking oil
- Sponge or water dropper

□ Most Common Bird Reveal Activity



Show the children the prepared “Most Common Bird Reveal” with the clue cards completely covering the large photo of the birds. Read to the children: Do you know

what the most common bird in the world is? We are going to read these clue cards and, while doing so, reveal this well-known bird.

Have the children take turns selecting a clue card, reading the clue, and setting it to the side. Repeat until all clue cards have been read.

Read to the children: The most common bird in the world is the domesticated chicken. If chickens were evenly spread out between every person alive on the earth, each person would have more than three chickens!

Chickens are part of a bird group known as poultry. Other types of poultry include ducks, turkeys, geese, and other domesticated birds. People raise poultry for meat, eggs, and feathers. They can also make interesting and funny pets!

□ Poultry in Art

Show the children the artwork by Italian painter Gaetano Chierici called “Uno spaventoso stato di cose,” which translates to “A dreadful state of things.” As they examine this delightful painting, ask them the following questions:

What is happening in this picture?

What do you imagine the child is saying?

What species of birds do you recognize in the picture?

By the end of this lesson, we will have learned about all of these birds!



"Uno spaventoso stato di cose" by Gaetano Chierici (1838-1920)



Poultry Comparison Chart



Chicken



Duck



Turkey



Goose

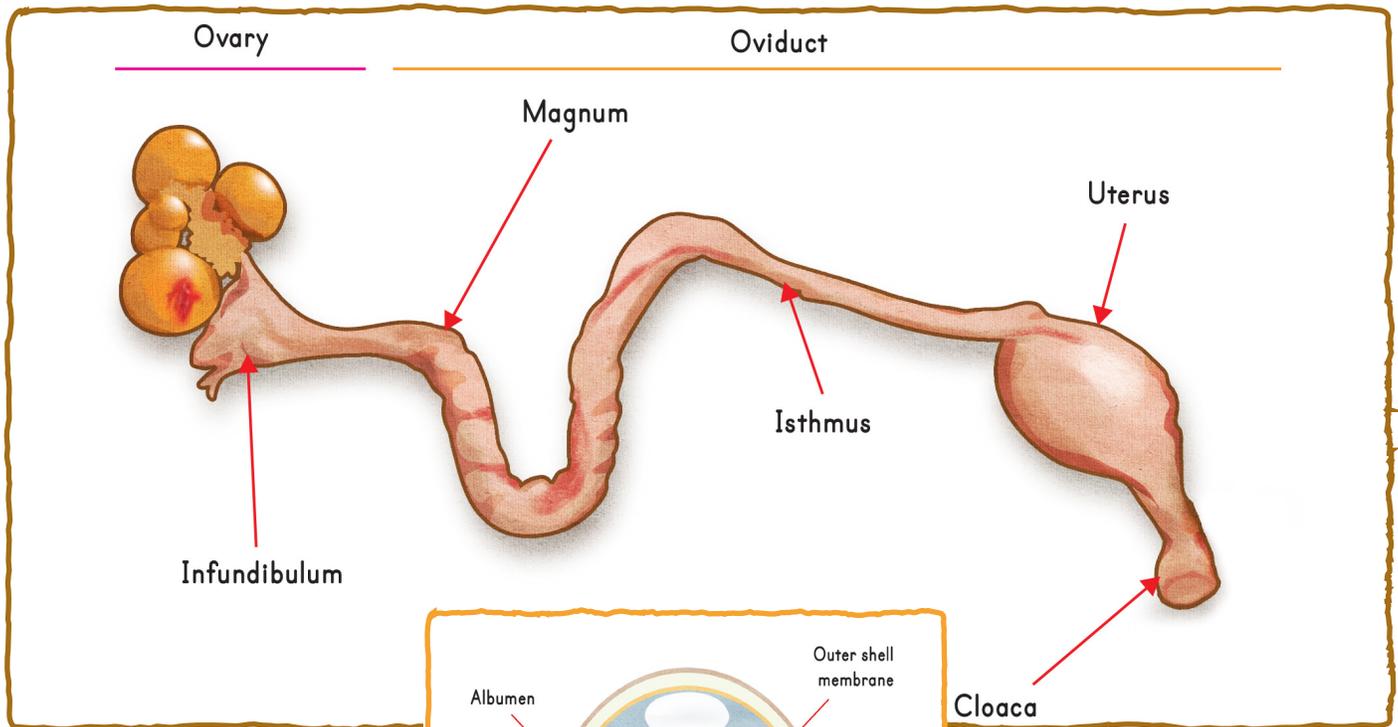
Diet (circle all applicable)	Insects Worms Vegetation Meat	Insects Worms Vegetation Meat	Insects Worms Vegetation Meat	Insects Worms Vegetation Meat
Common Uses (circle all applicable)	Meat Eggs Feathers Pest Control	Meat Eggs Feathers Pest Control	Meat Eggs Feathers Pest Control	Meat Eggs Feathers Pest Control
Names	Male: Rooster Female: Hen Young: Chick	Male: Female: Young: Duckling	Male: Female: Young: Chick, Poultry	Male: Gander Female: Goose Young: Gosling
Male/Female Differences	Roosters are larger, have more prominent wattles and tail feathers, may be more colorful, and have spurs		Males are larger with larger snoods and fanning tails; dark gobblers have plumage with a metallic sheen; hens have duller plumage and feathers on crown	Very similar; may be hard to spot the difference; males may be larger and louder
Special Features	Most common bird in the world			
Eggs	Shades of white, brown, blue, green, and pink 	Usually white; some green or gray 	Pointed at one end; pale buff with reddish-brown spots 	Large, white 
Sounds	Cluck, cock, crow 	Quack 	Gobble 	Honk, hiss 

Instructions:

1. Read the information below. Words in **bold** match the parts of an egg. Words in *italics* are found on the diagram of the bird's reproductive system. In your science journal, draw and label the parts of an egg. You may also wish to crack open an egg and see if you can find each of the labeled parts.

EXTENSION

Egg Development



Unlike mammals, all birds develop in eggs; there are no bird species that bear live young. All bird eggs go through similar stages of development, but the timing and processes may change with different species of birds and eggs. Since chicken eggs are familiar to many people, we will talk about the formation of a chicken egg here.

An egg starts as a follicle, or **yolk**, within a female bird's *ovary*. The follicle is engulfed by the *infundibulum*, then begins its travel down the *oviduct*, where **vitelline membranes** are completed and **chalazae** are formed around the yolk to hold it in the center of the egg. The process of applying the membrane takes about 15 minutes. Next, the membrane-covered yolk rotates and twists the chalazae as it travels through the spiralized oviduct to the *magnum*,

where **albumen** is assembled. This is what we commonly call the egg white, and it takes about three hours to form.

In the *isthmus*, two more membranes form. One is called the **inner shell membrane** and envelops the albumen. The **outer shell membrane** attaches to the shell and allows an air pocket to form between the two membranes in the wide end of the egg. This takes about 75 minutes.

The last step is the formation of the **shell**, which happens in the *uterus* and can take 20+ hours. The shell is mostly made of calcite and is covered in tiny pores that allow small amounts of air and moisture to pass through the shell. The shell contains pigments that give it color and features such as speckles. The entire trip through the oviduct, ending with the egg being laid from the *cloaca*, takes about 25–26 hours in a chicken, and it is quite a miracle.

HOW DO YOU MEASURE UP?

- 1** How wide is your arm span?
Stretch out your arms and measure from fingertip to fingertip.

How does your arm span compare to the wingspan of an ostrich and a hummingbird?
- 2** How tall are you?

How does your height compare to a male ostrich?
- 3** How long is your pointer finger?

How does your finger length compare to the length of a hummingbird?
- 4** How long is your hand?
Measure from your wrist to the tip of your longest finger.

Would an ostrich egg fit in your hand?
Would a hummingbird egg?
- 5** How long is one of your steps?
Measure from the tip of one toe to the back of your other heel after you take a step.

How many of your steps would it take to cover one ostrich step?
- 6** A penny weighs about 2.5 g (0.1 oz).

Which is heavier: a penny or a bee hummingbird?

••• Memory Cards •••



Ostrich Fun Facts



Hummingbird Fun Facts



Ostrich Appearance



Hummingbird Appearance



Hummingbird Wings



Ostrich Wings

Birds of Prey

Objective

Learn about birds of prey and their unique hunting capabilities.

Preparation:

- Tape a page from a newspaper with articles to an inside or outside wall that has clear space in front of it. Use a measuring tape to mark off lengths of 100 feet, 50 feet, 30 feet, 10 feet, and 5 feet on the ground with tape. (If this is not possible, you may use shorter distances.) *Note: 100 feet is approximately 40 steps.*
- For each child, print and assemble a “My Birds of Prey Booklet.”



Activity Supplies:

- 1 sheet of newspaper
- Masking tape
- Measuring tape
- Colored pencils

Optional Activity Supplies (per child):

- Owl pellet (purchased in advance)
- Tweezers and toothpicks
- Bowl of water (optional)
- Plate or piece of paper
- Rubber gloves
- “Vole Skeleton Chart”
- Piece of cardboard, if desired
- Glue, if desired
- Magnifying glass, if desired

■ Snatch! A Birds of Prey Game Optional Activity



The Good and the Beautiful has produced a fun card game called “Snatch! A Birds of Prey Game” that goes beautifully with this unit. It may be purchased at goodandbeautiful.com/science. Through this game you can learn more facts and information about different raptor species.

■ Birds of Prey



Sam Jenkins and Lucy, the red-tailed hawk.

Read to the children:

High above the treetops, a red-tailed hawk soars in a cloudless blue sky, master of the air upon which it glides. Coming to rest on a tall branch, its keen eyes focus on the smooth waves of windswept

grasses below, patiently waiting for the stealthy movement of a mouse, snake, or squirrel. Motionlessly it waits on its perch until it suddenly plummets into a dive, transforming the graceful, majestic bird into an avian bullet of deadly accuracy.

The swift hunters of the bird world are carnivores who silently stalk insects, reptiles, and small mammals, like rodents, or who eat the remains of animals already dead. **Show the children the “Birds of Prey” poster.** Birds of prey consist of two orders of birds. The order Falconiformes includes falcons, hawks, eagles, vultures, kites, and condors. Falconiformes are *diurnal* predators, which means they hunt in the daytime. Owls are in the Strigiformes order, which are birds of prey, but most owls are *nocturnal* predators, so they hunt primarily at night. **Keep the “Birds of Prey” poster available for reference during the rest of the lesson.**

■ My Birds of Prey Booklet



Read to the children: Birds of prey are also known as *raptors*. The word



raptor means “to seize or grasp” in Latin. Raptors have body parts that function as special tools for survival, and these set them apart from other birds. These are what allow birds to be predators that hunt for their food. As we learn about different birds of prey today, we will notice these unique features.

Give each child a “My Birds of Prey Booklet.” Instruct the children to turn to page 1. As you read each of the facts below, have the children write or draw three things they find most interesting in their booklets and then color the eagle. They may refer to the “Birds of Prey” poster for coloring ideas. Children may complete their coloring later if they are not finished by the time you are ready to move on in the lesson.

EAGLE

Read to the children: Eagles are large, powerful birds of prey. Because of the size and strength of many eagle species, they are at the top of the food chain and are known as apex predators.

- There are around 60 different eagle species. They vary in size and are typically measured by weight, length, and wingspan. The smallest species of eagle is the South Nicobar serpent eagle. The Steller’s sea eagle is one of the largest species.
- Eagles have strong legs, powerful *talons*, and hooked beaks. These characteristics help them as they chase down live prey.
- Sight is the strongest of the eagles’ senses. Their eyes are large and can take up almost 50 percent of their heads. Eagles can see more colors and four to five times farther than a human. They can see something as small as a rabbit more than three miles away.

While eagles are all related, they do have differences. Eagles can be divided into four groups based on what they eat. **Have the children turn to page 2 in their booklets.**

Harpy eagles are found in tropical rain forests and are the largest, most powerful raptors there. They have dark bodies, white underparts, and a crest of head feathers. They prey on forest animals including macaws, monkeys, and sloths. **Have the children**



color the harpy eagle and write or draw what it eats.

Snake eagles are found mainly in Africa. They have bulky bodies, golden-yellow eyes, and varying shades of brown on their plumage. Snake eagles primarily prey on snakes, but they also eat lizards and small mammals. Their legs and toes are covered in thick scales, which protect them from snake bites and venom. **Have the children color the snake eagle and write or draw what it eats.**

Booted eagles, also called true eagles, have fully feathered legs, large beaks, and large feet. They are usually gray or brown. They feed on a wide variety of prey, including other birds, small mammals, reptiles, rodents, amphibians, and insects. **Have the children color the booted eagle and write or draw what it eats.**

Sea eagles are very large eagles that live near rivers, lakes, and tidewater. Their large nests are usually built in a tree but are sometimes built on a cliff. Sea eagles are brown with white on the head, tail, or underparts. They have bare lower legs, and their toes have rough undersides that help them keep hold of their slippery prey, which include fish, aquatic birds, and small mammals. **Have the children color the sea eagle and write or draw what it eats.**

Eagle Eyes Activity



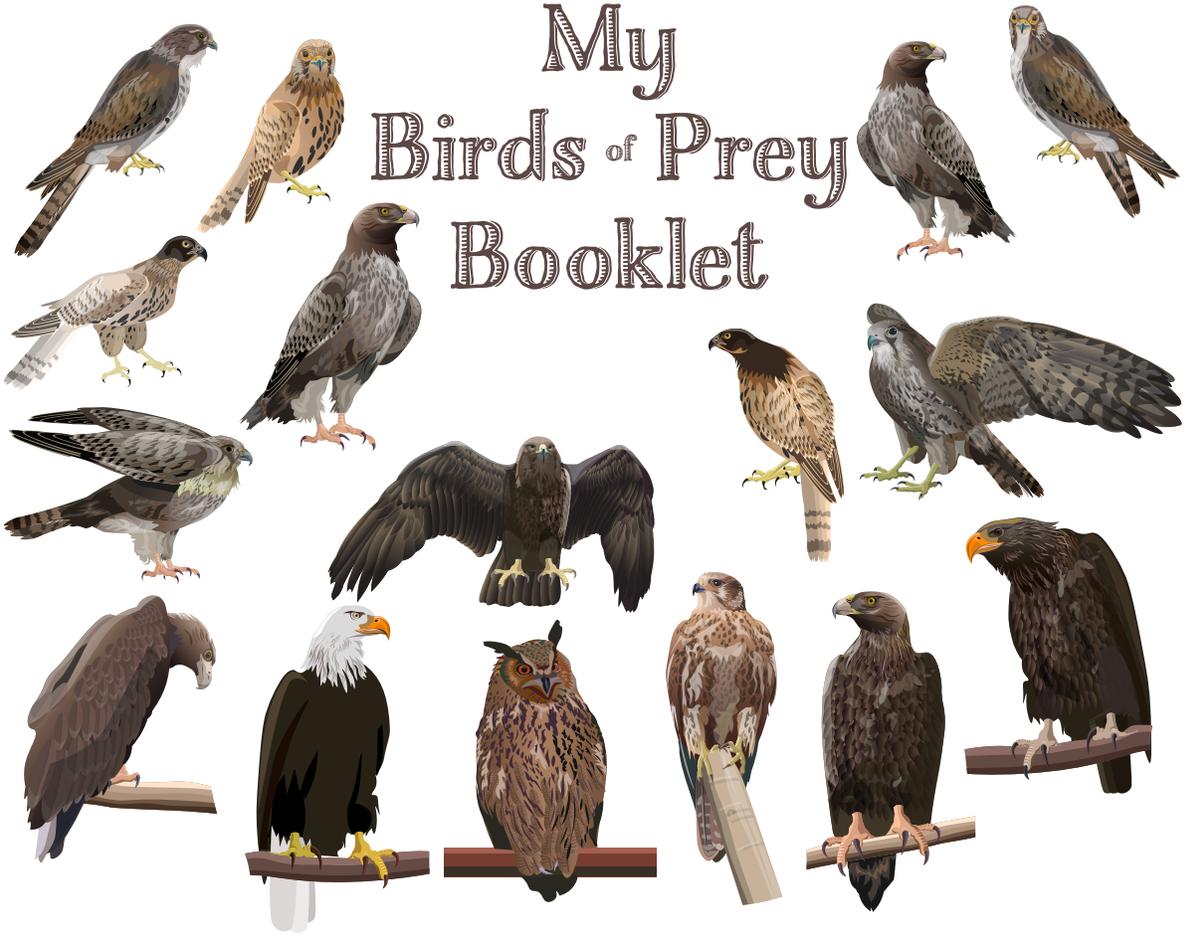
Read to the children: Birds of prey rely on their eyesight for survival. An eagle can see a fish from several hundred feet in the air. Let’s compare our eyesight to that of an eagle.

Take the children to your prepared location. Have them stand at the 100-foot mark (or the farthest marked distance) and ask:

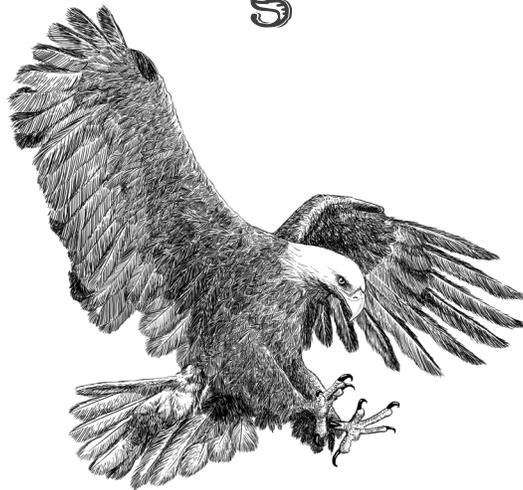
Can you read the newspaper article? How about the headlines? Can you read any part of the newspaper? An eagle could read that newspaper article from 100 feet away—if it could read! **Have the children slowly advance toward the**



My Birds of Prey Booklet



Eagles



1.

2.

3.

Eagles: What Do They Eat?

Harpy eagle



Snake eagle



Booted eagle



Sea eagle



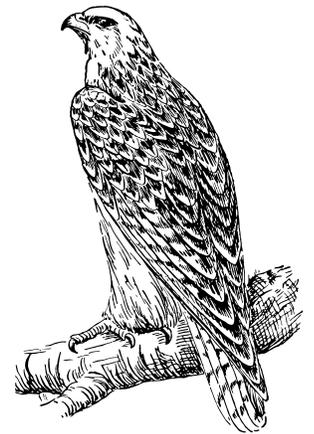
2

Falcons



1.

2.



Peregrine Falcon

- » recorded at diving speeds of _____
- » eats mainly _____
- » attacks prey with a high-speed dive called a _____

3

Birds of Prey



Bald eagle



Peregrine falcon



Booted eagle



Red-tailed hawk



Snake eagle



Secretary bird



Barn owl



Harpy eagle



Sparrowhawk



Snowy owl



Gyrfalcon

Birds of the Galápagos



The Galápagos Islands are a remote archipelago located 1,000 km (620 mi) off the coast of Ecuador in the Pacific Ocean. Made up of 18 major islands and many smaller ones, the Galápagos is home to a diverse array of plant and animal species that cannot be found anywhere else! This includes many species of native birds. For many decades scientists have studied the unique ecosystems of these islands, created by isolation combined with warm sunlight and cool ocean currents. Today we are going to learn about its beautiful array of birds.





Bird Migration

Objective

Learn what migration is and how and why birds migrate.



Preparation:

- Cut out the six “Record Setters” cards.
- Cut out the four “Migration Danger Cards” for the Migration Game.
- Cut out the “Migration Game Spinner and Pieces.”
- Tape the game board together.

Activity Supplies:

- Pencil
- Paper clip
- Compass or compass app (optional)

Optional Read-Aloud



At any point in the lesson, you may read one of the books from the optional Read-Aloud Book Pack. Longer books may be split into more than one reading session.

Mission Migration by Ileana Board is suggested with this lesson.

On the Move

Read to the children: Think of a time when you took a trip. Did you hop in a car? Did you travel on an airplane or on a train? When we want to go somewhere, we have maps to direct us and vehicles to help us arrive at an exact location. We even have weather reports to warn us of dangerous conditions along the way. But not all travelers have these kinds of tools.

At any given time, and under all sorts of weather conditions, birds can be found traveling in various parts of the world. Some travel only short distances, while others cover thousands of miles without a map or a weather report, and somehow they find their way. Why do you think they travel? Do all birds go to the same places? How do they figure out where to go?

For just a moment, imagine yourself as a bird. It isn't always easy to survive in the wild. How would you get the food you need when the weather changes, and how would you cope as the temperature drops in winter? For many birds, the solution to these challenges is found in migration.

Science Wall



Place the vocabulary card **MIGRATION** on your science wall. Read and discuss the word and definition.



Migration Picture Study

As you read to the children, have them view the “Migrating Birds” pictures.

The semiannual *migration* of birds has long been a signal to people that the seasons are changing. Farmers have relied on the appearance of certain species to tell them when to plant or harvest their crops, and even the most casual birdwatchers are filled with



anticipation when they hear the welcome warble of a returning songbird after a long winter.

Animals instinctively know what season it is and what they need to do to survive. Migration is part of God’s design for birds—for protection from predators, the gathering of food, and survival in the wild.

Migration doesn’t always mean traveling great distances, though there are many species of birds that do. Some birds travel a mere few hundred yards up and down a mountain. Where migration is concerned, birds are typically grouped into permanent residents, short-distance migrants, medium-distance migrants, and long-distance migrants.

Read to the Children

It may seem like one day there are birds frequently visiting your backyard, and the next day they have just disappeared, not to be seen again for many months. But birds don’t just decide to fly away one day. They prepare ahead of time, just as we do.

Like airplanes that need fuel to fly long distances over land and sea, birds need a great deal of fuel for flying. Flying requires much more energy than walking or even running. If you watch closely, you may notice your backyard birds becoming rather plump just before the time for migration. That’s because they are storing extra energy in the form of fat in their little bodies, which they will use as fuel on their long journey. Some birds can fly great distances on their fat stores without stopping to refuel!

Let’s learn more about a few birds that hold records for their migratory feats.

Record-Setting Migratory Birds Activity

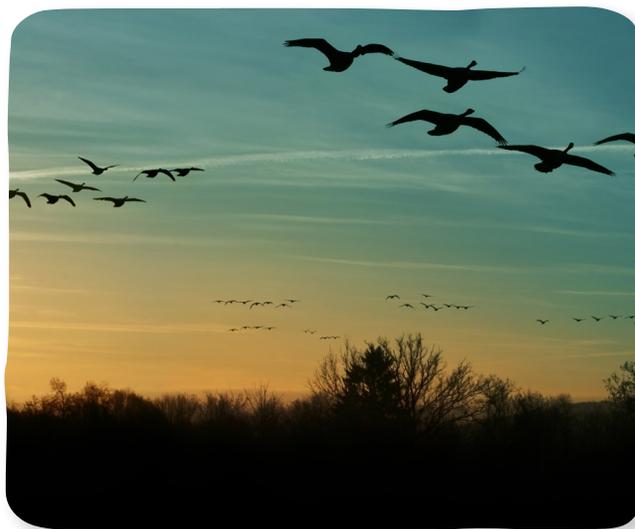


Spread out the “Record Setters” cards and allow the children to take turns choosing a card while you read the corresponding information about each bird to them.

NONSTOP FLIGHT—Alaskan Bar-Tailed Godwit

While this little coastal wading bird doesn’t have the longest migration route, it does have the remarkable ability to fly thousands of miles without stopping!

Each year, Alaskan bar-tailed godwits fly 200 hours nonstop across the ocean to reach their warmer home in Australia or New Zealand. In 2020, an Alaskan bar-tailed godwit flew over 12,000 km (7,500 mi) nonstop over the Pacific Ocean in 11 days!



FOREVER IN FLIGHT—Wandering Albatross

The wandering albatross is aptly named, as it spends most of its life flying, stopping only every two years to breed. Scientists believe that this rugged flier even sleeps while it drifts midair over the ocean! The wandering albatross has the longest wingspan of any bird at 2.4–3.4 m (8–11 ft). It can travel more than 120,000 km (75,000 mi) in a year.

FARTHEST-MIGRATING ANIMAL—Arctic Tern

The Arctic tern breeds in the northern hemisphere during its summer and then travels south for the southern hemisphere’s summer. Altogether, it travels nearly 89,000 km (55,250 mi) each year, eating along the way. The tiny Arctic tern migrates farther than any other animal in the world!

FASTEST NONSTOP FLIER—Great Snipe

Some birds travel long distances, and other birds travel short distances very quickly, but this little racer covers all 6,800 km (4,200 mi) of its migration from Europe to Africa in just 3.5 days, traveling at 97 km (60 mi) per hour! This is faster than any other bird can go over long distances. Scientists can’t understand why



Record Setters

Nonstop Flight



ALASKAN BAR-TAILED GODWIT

Forever in Flight



WANDERING ALBATROSS

Farthest-Migrating Animal



ARCTIC TERN

Fastest Nonstop Flier



GREAT SNIPES

Longest Flight of Any Hummingbird



RUFIOUS HUMMINGBIRD

Highest Migration



BAR-HEADED GOOSE

Tall Structures



Many of today's skyscrapers are built mostly of reflective glass. To a flying bird, it looks like an extension of the sky, and they fly right into the buildings. New York City has hundreds of skyscrapers and is located in a high-traffic area for bird migration. Up to 230,000 birds die each year from flying into the tall New York buildings. Birds have also been found in large numbers at the base of cell towers, water towers, and power line towers. They fly into them at night because they can't see them.

Pesticides



Clouds of sprayed pesticides lingering in the air cause harm to migratory birds, but great damage is also being caused by common pesticides that are applied directly to the seeds or the ground where plants grow. These chemicals enter the plants and are found in water sources, so when birds eat the plants or insects or drink the water, it makes them very ill and causes them to lose their sense of direction.

Landscape Changes



Birds have been following the same migration patterns for centuries. Along the way, they stop in roughly the same places year after year. When urban development and natural disasters, such as wildfires, change those landscapes, the birds lose their refueling locations. These changes cause an already dangerous flight to become a desperate search for food.

Weather



While birds are remarkably equipped to handle all sorts of weather conditions, many birds die when they encounter severe rainstorms, strong winds, hurricanes, and even late-season snowstorms along their migratory routes.

1. Read the information below.
2. With the supervision of an adult, find and watch videos that highlight the amazing vocal abilities of lyrebirds, mynas, and mockingbirds.

EXTENSION

More Birds That Mimic

Outside of the parrot family, some songbirds also have the ability to mimic sounds—including human speech—to various degrees. In fact, it is estimated that 15–20 percent of songbird species are able to mimic sounds around them. Scientists found that birds need to hear their own songs as well as the songs of other birds to refine their vocals and expand their song repertoires. The same thing applies to imitating speech and other sounds; example and repetition are required for a bird to learn to reproduce a sound well. Since birds do not have vocal cords, all sound comes from air passing through the syrinx, and almost 100 percent of that exhaled air is used to make sounds when singing. Read below about some of the best sound imitators in the bird world.

Lyrebirds

In addition to a male's fantastic mating display of wispy tail feathers flipped over its head, Australia's lyrebird is known for its vocalizations; in fact, it is thought to be one of the best imitators of all bird types. Lyrebirds have the most complex muscle groups in the syrinx of any bird, which is believed to give them greater vocal agility and unmatched mimicry abilities. During mating season, a male lyrebird may sing for more than four hours a day, and its song is a mixture of its own song with a variety of other imitated songs and noises.



Any sound is fair game for a lyrebird. They have been recorded imitating the click of a camera, sirens, chainsaws, car engines, gunshots, ringing phones, crying babies, barking dogs, and, of course, human voices, among many other sounds. They also mimic the calls of the birds and other animals around them with near-perfect accuracy. It is believed that lyrebirds can learn sounds from each other, so they may imitate a noise they have never heard themselves!

Mynas



Part of the starling family, beautifully colored mynas are native to India, Pakistan, and Bangladesh, but they have been introduced to other parts of the world. All mynas are musical, but captive mynas are known to produce sounds and speech. Hill and common mynas are popular cage birds because of their ability to imitate the human voice. They can learn up to 100 words when exposed to repetition. They will also sing, whistle, and screech.

Mockingbirds

Northern mockingbirds, the best-known mimics of the family, live throughout the United States, Mexico, and parts of Canada, as well as in the Bahamas and Cayman Islands. Mockingbirds sing all day and often into the night. They change and expand their repertoires of songs with the seasons and as they age, mixing in imitations of frogs, insects, other birds, mechanical sounds, and car alarms.

This intelligent bird is able to remember specific people and animals, particularly if they have threatened the bird in the past. Their vocal ranges help attract mates, who will be partners for life, and many northern mockingbird pairs are now creating homes in urban areas where human interaction is increasing.



Unique Beaks

Objective

Learn about bird species with extremely specialized beaks.



Preparation:

- Before the lesson begins, prepare the materials as described in the “Special Beaks for Special Birds Activity” of this lesson.

Activity Supplies:

- Colorful sock
- 1 banana per child
- 1 toothpick or skewer per child
- Handful of chocolate chips or raisins per child (optional)
- 2 bowls of water
- Small strainer or slotted spoon
- Several pieces of dry cereal
- 1–2 Tbsp uncooked rice
- Toothbrush
- Spoon
- Metal container, such as a can or water flask

Introduction

Read to the children: We’ve learned about the most common types of bird bills, but some bird species have beaks that are one of a kind! These beaks may be large, colorful, or specialized to eat specific diets in certain types of environments. These are some of the truly wondrous creations of God, and we are going to learn about some of them today.

A bird’s beak, or bill, grows directly out of its skull. In most birds, the length of the top portion of the beak is the same or slightly longer than the length of the bottom portion. The beak is made of bone covered in keratin, and although it grows throughout the bird’s life, it may not appear longer because it wears down at about the same rate that it grows. A beak might change shape completely as the bird grows from a chick to an adult, but this is part of God’s creative plan to help the bird thrive in all stages of life.

Special Beaks for Special Birds Activity



Following the numbers, place a picture (located at the end of the lesson) of

each bird along with its associated supplies around the room in various locations. Starting with #1, have the children look at the picture while you read the description. Complete the associated activity, and then move to the next station.

#1: TOUCAN

Supply needed: colorful sock



TOUCAN

Some birds are famous for their unusual beaks. The toucan’s beak is probably its most well-known feature because it is brightly colored and huge! Toucans are large birds that can be 64 cm (25 in) tall with



Bird Bingo #1

B



NORTHERN CARDINAL

I



RED-TAILED HAWK

R



EASTERN BLUEBIRD

D



TUNDRA SWAN



AMERICAN GOLDFINCH



MALLARD



ROSE-BREASTED GROSBREAK



WILD TURKEY



PURPLE FINCH



RING-NECKED PHEASANT



TURKEY VULTURE



OSPREY



BLUE JAY



RUDDY TURNSTONE



BARN SWALLOW



BALD EAGLE

Bird Bingo #2

B



RUBY-THROATED HUMMINGBIRD

I



GOLDEN-CROWNED KINGLET

R



RED-HEADED WOODPECKER

D



RING-NECKED PHEASANT



BARN SWALLOW



HOUSE WREN



BLUE JAY



CANADA GOOSE



EASTERN TOWHEE



NORTHERN BOBWHITE



BALD EAGLE



AMERICAN GOLDFINCH



TURKEY VULTURE



NORTHERN CARDINAL



RUDDY TURNSTONE



TUNDRA SWAN