INTRO TO BIRDING

A teacher resource all about birds!

fraserriverdiscovery.org

Fraser River Discovery Centre
The Voice of the Fraser

INTRODUCTION

Welcome to the Fraser River Discovery Centre's birding resource! This guide serves as a valuable tool, detailing intriguing features and attributes of birds. Each section provides an in-depth exploration of these characteristics, culminating in a hands-on activity that complements the lesson.

How to Use the Resource

This resource provides detailed information for an inquiry unit on birds, featuring specific topics and related activities that align with the BC curriculum's core competencies. Activities promote critical thinking, personal awareness, and effective communication. Educators can adapt this resource for any grade to fit their classroom needs, but is best suited for grades 2-6.

SECTIONS

Section 1: Connection to Dinosaurs

Scientists have been curious about the link between birds and dinosaurs for a long time. Recent discoveries show that birds have bones, and even feathers, that are similar to those of dinosaurs, like the mighty Tyrannosaurus rex. In this section, we will explore the features that birds share with their dinosaur ancestors.

Section 2: Feathers

Feathers are a special feature of birds and their dinosaur ancestors. Over time, they have changed a lot, developing into different colours and shapes. In this part, we'll learn about the history of birds' feathers, the use of feathers in flight, the anatomy of feathers, as well as the processes of molting and preening.

Section 3: Migration Patterns

This section explores why birds transition from regions with limited or declining resources to those with abundant or increasing resources. In the Northern Hemisphere, birds head north during the spring. As winter draws near, they travel south once more in search of warmer conditions and better food supplies.

Section 4: Habitats

This section delves into the different habitats that birds deem as their home. We will explore four primary habitats: woodlands, aquatic environments, scrub areas, and open habitats.

Section 5: Bird Songs

One of the signs of spring is the cheerful songs of birds coming from trees and bushes. For birds, these songs are really important. They help birds find mates, protect their home areas, and ensure their families continue to grow.

Section 6: Life Cycle

In this section, we will delve into the bird life cycle. This cycle consists of several stages, beginning as an egg. The stages of the bird life cycle encompass egg laying, incubation, hatching, fledging, and maturation.

Section 7: Bird Friendly Resources

This part will show students how to make a nice home for birds in their neighborhoods and schools. Activities include setting up bird feeding spots, taking care of a birdhouse, and more fun ideas! You'll also find other resources you can use to learn even more!

Section 8: FRDC Resources and Conclusions

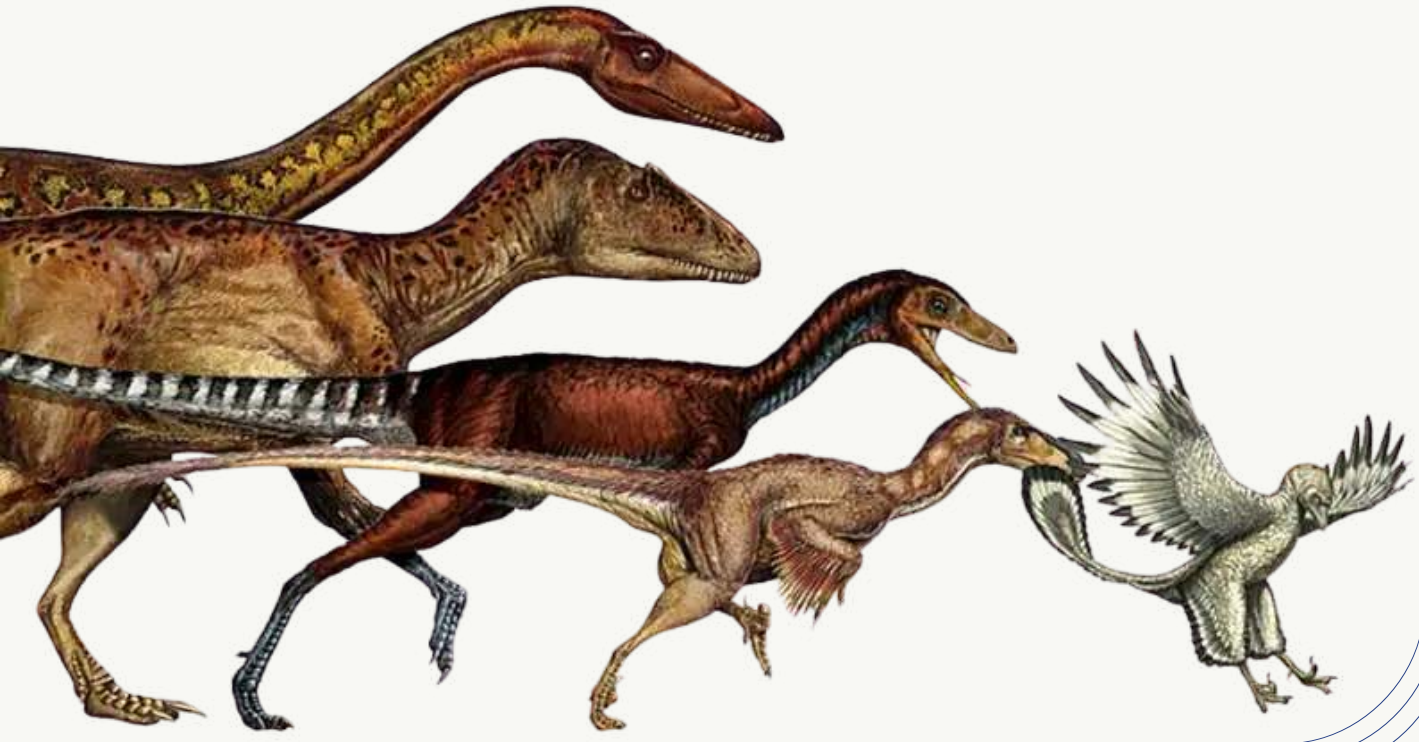
This guide ends by going over the main ideas and sharing some resources available on the FRDC website.

1

DINOSAUR CONNECTIONS

Where might birds come from?

Birds have changed a lot over millions of years. A fascinating connection between dinosaurs and today's birds are found in old fossils. Modern birds have some cool features in common with their dinosaur ancestors, like hollow bones and three toes with claws. Did you know that birds are actually part of the same group as the Tyrannosaurus rex and Velociraptors, called theropods? Over time, these theropods got smaller, and their skulls started to look more like birds.



DINOSAUR CONNECTIONS

Hollow Bones

Flying is not as easy as it looks! Birds have to create enough lift to stay in the air, which means their bones have to be light and strong. But bird bones are not just hollow; they have tiny spaces inside reserved for air. These spaces allow continuous air flow. This makes them lighter and helps them fly. Humans have some bones with air spaces too, mostly around our noses.

Just like some dinosaurs, today's birds have hollow bones. But why do they have this special feature? Well, these hollow bones help birds fly! They make the bird's body lighter, which is important for flying. Plus, birds need a lot of air to soar in the sky, and their lungs are connected to these hollow bones, giving them the extra air they need to fly high.

Do we think hollow bones are used only to only make birds lighter? It might seem that way, but actually, hollow bones aren't just about being light. Birds' bones are made from a special strong material that keeps them from breaking easily. This strength helps birds fly better! Just think about the bones in a bird's wings and how they need to be strong to help the bird soar through the sky. Wings are very long compared to birds' bodies, and they withstand many forces like wind, rain, snow and more! As much as light hollow bones are important for flight, strong bones are as well!

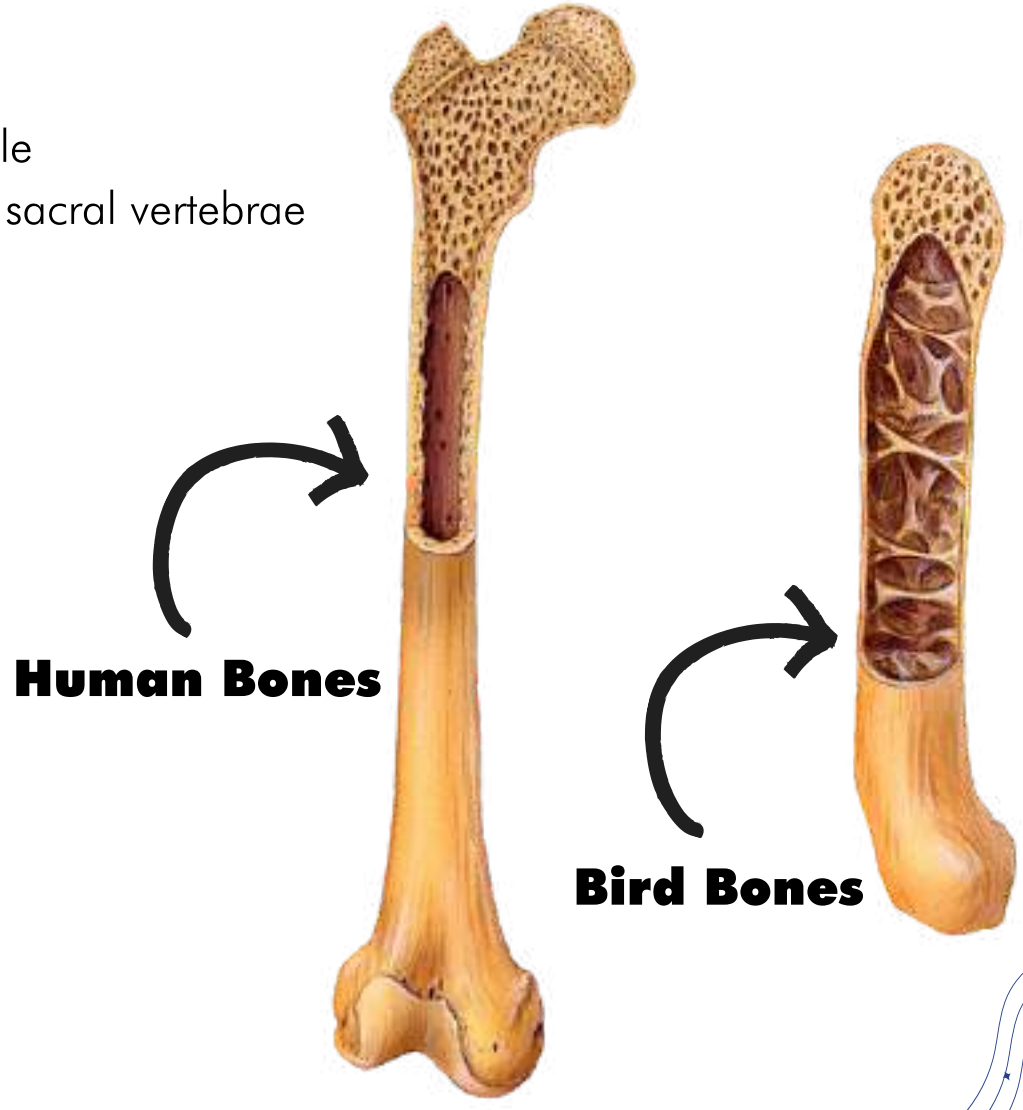
DINOSAUR CONNECTIONS

Hollow Bones

When a baby bird grows, air sacs in its body replace some of the bone parts. These sacs help birds breathe by letting them take in oxygen both when they breathe in and out. Even birds that can't fly, like ostriches and emus, have hollow bones in their legs. These air sacs help keep them cool when they pant.

In most birds, the following bones can be said to be hollow:

- Humerus
- Clavicle
- Sternum
- Pelvic girdle
- Lumbar & sacral vertebrae



HOLLOW BONES ACTIVITY

Ages 6 -14+ years old

Description

Having hollow bones is a special adaptation that birds have in order to be lightweight so they are able to fly! However, it can be hard to understand how hollow bones can still be strong enough to support a bird's muscles and the physical stresses of take off and landing. In this science experiment, children will test how much weight a structure supported by hollow paper "bones" can hold and see just how strong hollow bones can be!

Background

One of the special adaptations that birds have to make them lighter is hollow bones. Mammal bones, including ours, are much heavier because they have thick walls and are filled with marrow. Hollow bird bones are still very strong (so they can withstand take off and rough landings) as they are reinforced with crisscrossing struts or trusses for structural strength.

Materials

- Paper plate
- 3 pieces of scrap printer paper
- Scotch tape
- Pennies/rocks/anything with weight that you have lots of!
- Books, water bottle, etc.

HOLLOW BONES ACTIVITY

Directions

1. First, use the background information to discuss why birds have hollow bones and why this is needed.
2. Roll 3 pieces of paper, starting from the short side, into a tube approximately 1 inch in diameter. Use tape to secure the tubes so they don't unroll.
3. Balance the "bones" on one end so they are standing tall and make a triangle.
4. Balance the paper plate on top of the paper "bones".
5. Ask students how many objects (pennies/rocks/etc.) they think the structure will hold. Have them write down the estimate on paper and write down your estimate as well.
6. Add the small objects one at a time to see how many the structure can hold. Make sure to spread them evenly around the center of the plate to stay balanced.
7. Continue until either the structure collapses or you run out of the small objects and then count them. Were either of your estimates close?
8. If your structure is still intact, you can experiment further by finding other heavy items (e.g. books, water filled bottle, apple, etc.) and balance those on the plate instead. You may be surprised at how much weight it can hold! Remember your structure may eventually collapse so be careful not to place anything on top that could spill or break if it falls.

HOLLOW BONES ACTIVITY

Debrief: Ask students whether they were surprised by how strong the hollow "bones" were. Did it hold more weight than they expected?

The complementary activity for this section is designed by the Allan Brooks Nature Centre. In this engaging exercise, students construct their own hollow bone models using scrap paper and paper plates. They will then test the durability of their models by determining how many objects they can balance on them before they break or topple over.

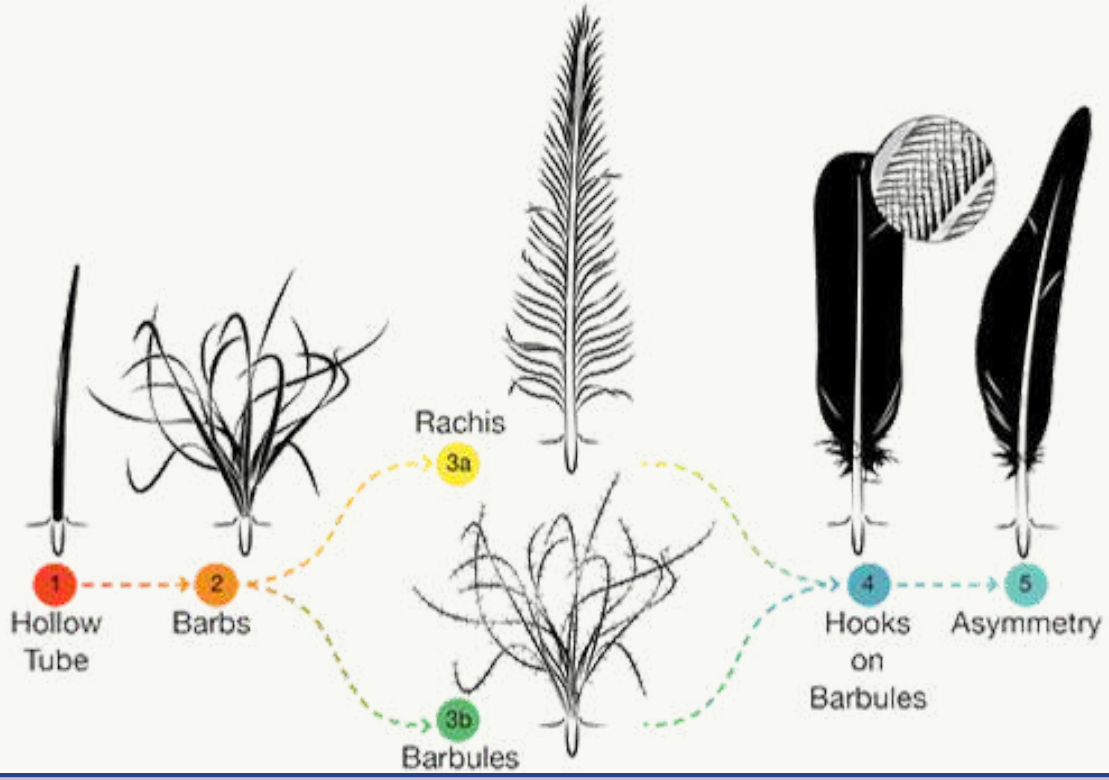
Find more about hollow bones through the Bird Bones Experiment by the Allan Brooks Nature Centre:
https://abnc.ca/wp-content/uploads/2020/05/Bird-Bone-Experiment.pdf

2 FEATHERS

What is the relationship between feathers and the dinosaur ancestors of birds?

Feathers connect today's birds to their ancient dinosaur relatives. Take Deinonychus, for example, a small dinosaur that lived about 115 million years ago. Scientists have found that it had feathers all over its body, making it look a lot like the birds we see today.

A long time ago, dinosaurs had simple feathers that helped them stay warm and were used in social situations. Even though they couldn't fly, these feathers were important for showing off to others. Dinosaurs used them to look impressive, scare away rivals, and attract mates. Eventually, these feathers evolved into more complex structures like quills and wings.



FEATHERS

Feathers and Flight

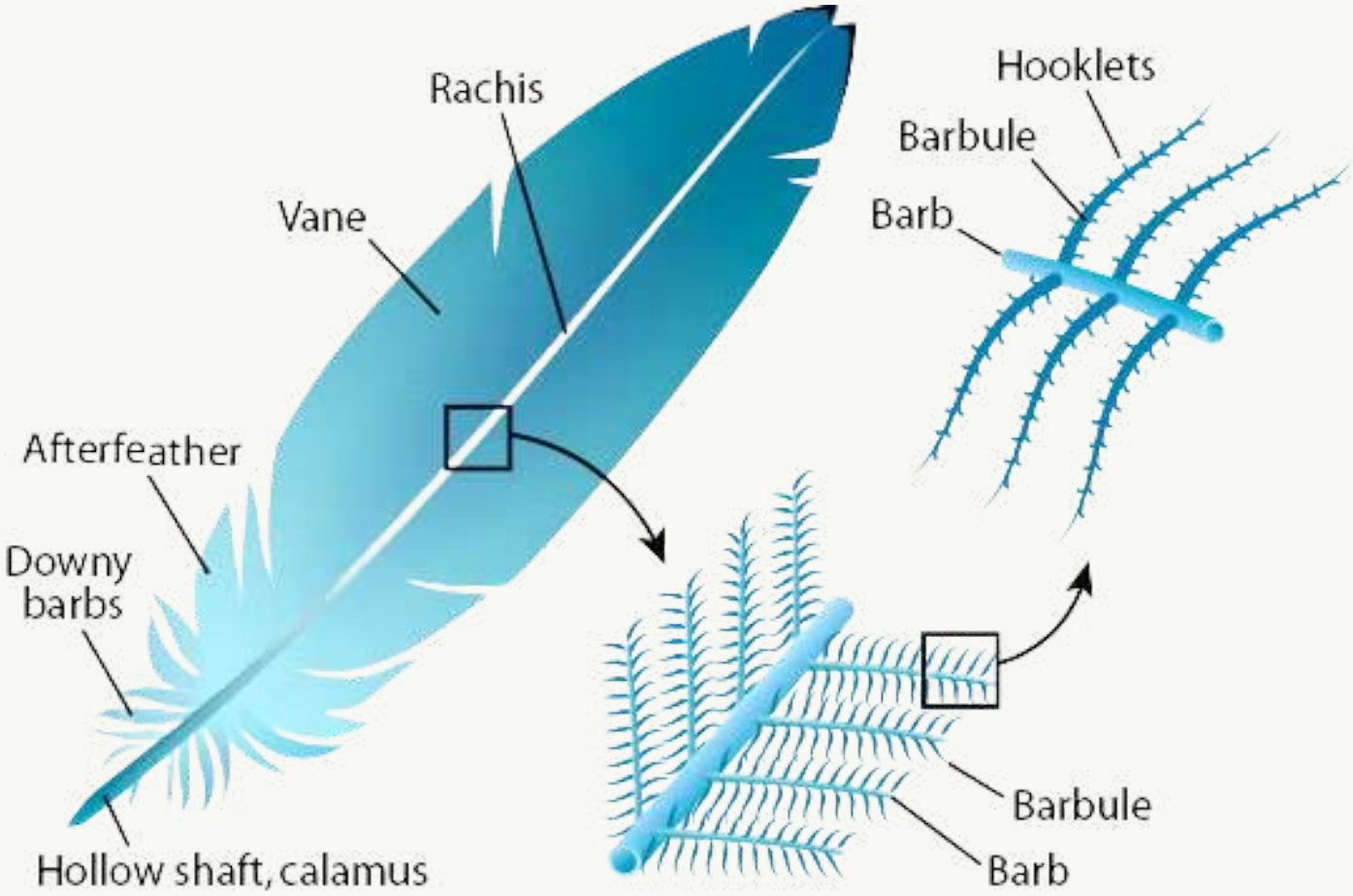
Over millions of years, birds have learned to fly, and their feathers help them in many ways, like finding food and deciding where to fly. Feathers keep birds warm by trapping air, just like how we wear jackets to stay cozy. They also protect birds from wind and rain, acting like a shield. Plus, feathers help protect a bird's skin from getting scratched when they fly through branches and bushes. Feathers are pretty amazing!

A bird's feather grows from its skin, like how hair grows on people. Some special feathers, called flight feathers, help birds fly. These include big ones, called primaries, on the outer part of the wing and smaller ones, called secondaries, closer to the body. Tail feathers also play a big role by helping birds lift, steer, and stop when they're flying. All the body feathers, known as contour feathers, help give the bird its shape.

FEATHERS

Feather Anatomy

A feather is made up of different parts: the shaft, barbs, and barbules. The shaft is like the feather's backbone. The barbs are like hair that stick out from the shaft, and the barbules are tiny hooks that connect all the barbs together. This keeps the feather strong and smooth! The main part of the feather is a small stick-like structure known as the rachis. On both sides of this stick are the vanes, flattened, broad structures that extend outward from the central stick on either side. Vanes make up most of the feather and look like lots of tiny hairs. These little hairs, called barbs, stick together because they have tiny hooks called barbules, a bit like Velcro. Barbules also help keep water out and keep birds warm, just like wearing a raincoat when it's raining!



FEATHERS

Molting and Preening

Wing and tail feathers are super important for birds to fly. But what happens when birds lose these feathers? Birds need to change their feathers now and then through a process called molting. Since it takes a lot of energy, birds usually molt when they're not doing other big activities like flying long distances or building nests. Sometimes they lose feathers slowly, and other times it happens all at once.

Birds also have a special way to keep their feathers neat and tidy called preening, where they clean off dirt and bugs and make sure their feathers are in the right shape.

Preening is a special grooming activity for birds. Some birds, like ducks, have a special gland called a preen gland near their tail. This gland makes a special oil that helps keep their feathers waterproof. When birds preen, they spread this oil all over their feathers to keep them safe and dry.

Not all birds have feathers that protect them from the rain. Owls, pigeons, parrots, and hawks don't have a special gland that helps make their feathers waterproof. Instead, they have special fluffy feathers that turn into tiny bits like dust. This dust is a little oily and sticks to their feathers, helping to keep them a bit dry.

FEATHER ANATOMY ACTIVITY

Ages 8+ years-old

Description

This activity comes from Arizona State University. Students will try to label the different types of feathers and the different parts of a feather.

Find more about feather anatomy at Ask a Biologist: https://askabiologist.asu.edu/sites/default/files/resources/coloring_pages/pdf/aab_feather_activity.pdf

Feather Types

1. Tail
2. Flight
3. Semiplume
4. Filoplume
5. Bristle
6. Downy

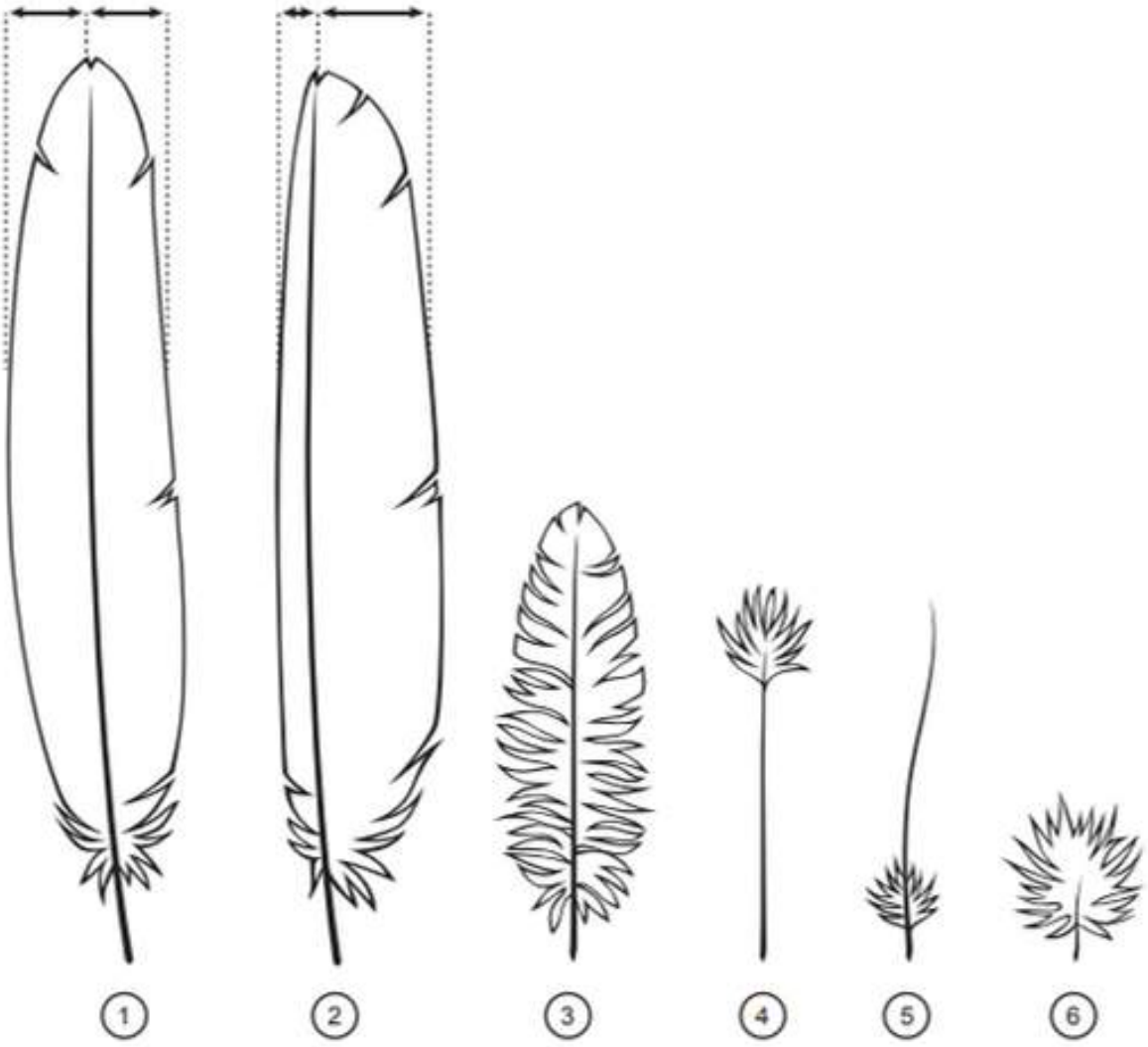
Feather Anatomy

1. Vane
2. Rachis
3. Afterfeather
4. Downy Barbs
5. Hollow shaft, calamus
6. Barbule
7. Barb
8. Hooklets

FEATHER ANATOMY ACTIVITY

Feather Type Activity

The different types of feathers have been labeled. Your challenge is to write name for each feather type.
If you need some help, visit the web article listed below.



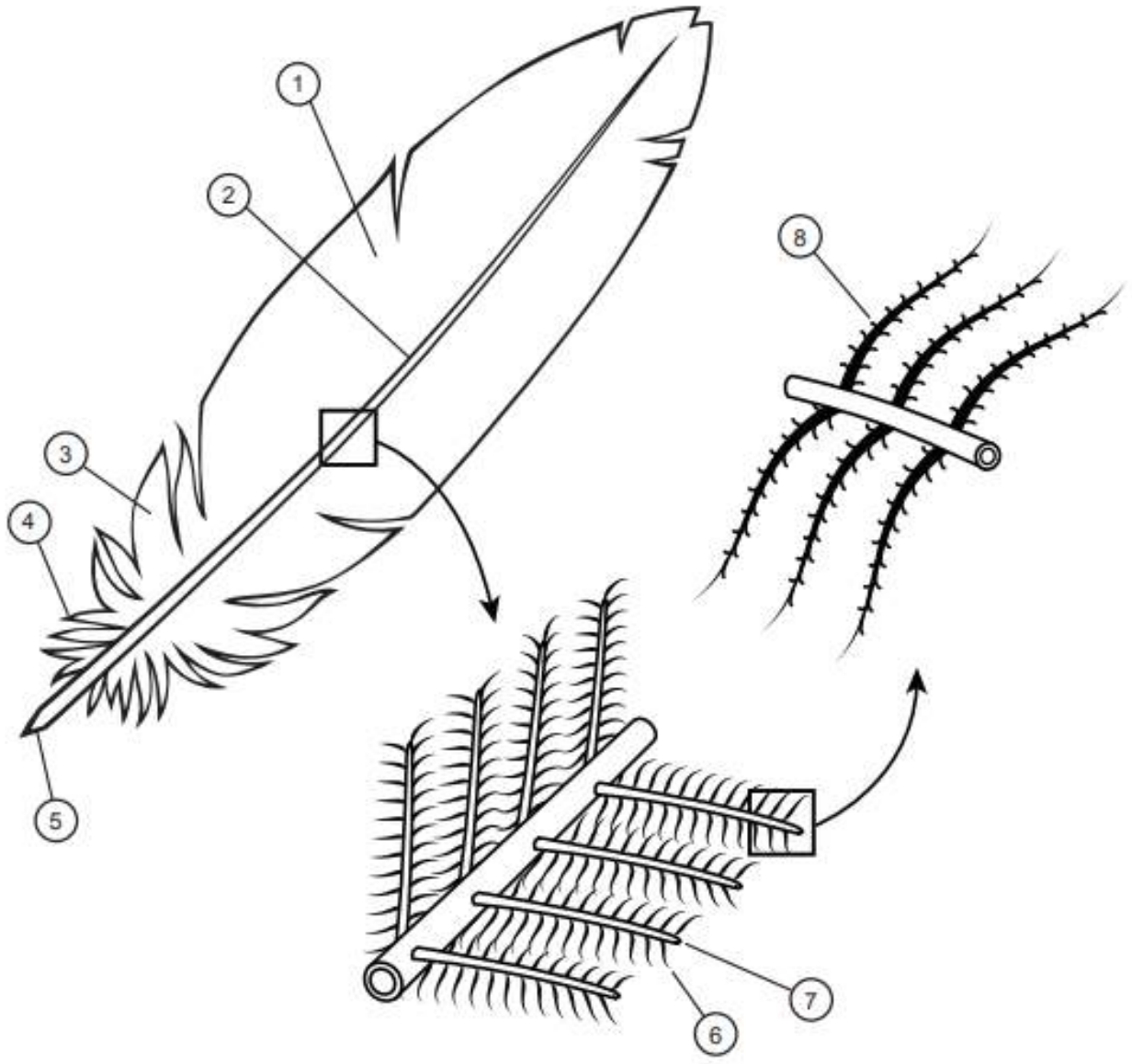
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Ask A Biologist coloring page | **Web address:** askabiologist.asu.edu/activities/coloring

FEATHER ANATOMY ACTIVITY

Feather Anatomy Activity

The parts of a feather have been labeled. Your challenge is to write the correct name for each part.
If you need some help, visit the web article listed below.



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Ask A Biologist coloring page | **Web address:** askabiologist.asu.edu/activities/coloring

FEATHER SCIENCE OBSERVATION

Ages 8+ years-old

Description

Feathers are truly remarkable creations. To assist birds in flight, they must be lightweight, sturdy, and designed to create a wide surface area for pushing against the air. We can better understand this by examining the structure of a feather more closely.

Find more about feather activities at the Teacher's Corner: https://lesson-plans.theteacherscorner.net/science/experiments/feathers.php

Materials

- a feather (You can get them in craft stores if you don't have one.)
- scissors
- paper
- tape
- a magnifying glass/ microscope

FEATHER SCIENCE OBSERVATION

Steps

1. Begin by taking a pair of scissors and carefully cutting through the rachis, the central shaft of the feather. You'll notice that it resembles a hollow tube. The thickest part of the feather is a narrow, air-filled tube, which contributes to its lightweight nature.
    a. You can illustrate the strength of such a lightweight wing using a sheet of paper. When flat, it bends easily, but when you roll it into a tube, you'll find that it resists bending much more effectively and can support a greater amount of weight.
2. Additionally, the feather must be able to push against the air. The part of the feather that does this is known as the vane. Use a magnifying glass to examine it closely, and you'll see that the vane consists of numerous long, hair-like structures called barbs. For the feather to function properly, these barbs need to adhere together, forming a continuous surface.
    a. If you gently pull them apart, you can easily separate the barbs, allowing air to flow through the feather.
    b. Use your fingers to smooth the barbs back into position. You should find that they once again adhere together, creating the continuous surface that the bird requires.
    c. If you have a magnifying glass handy, look closely at the barbs. Each barb features many tiny hooks known as barbules. These hooks interlock with the barbules of adjacent barbs, functioning similarly to Velcro. This design allows the feather to be easily repaired. Birds can realign the barbs by pulling the feather through their beak, ensuring the feather remains functional.

3 MIGRATION PATTERNS

Migration Basics

Migration is the seasonal movement of animals, like birds, from one location to another. Birds typically travel from north to south and back, seeking suitable breeding and wintering areas. Recognized for centuries, even ancient Greeks documented it 3,000 years ago! Before understanding migration, people thought birds vanished, with amusing theories like flying to the moon or hiding in river mud. Birds migrate mainly for food and nesting sites. In the north, longer days bring more insects, plants, and seeds, but as it gets colder and food becomes scarce, they head south to warmer climates.

There are four primary types of migration:

- Permanent residents: remain in one place, as they find sufficient resources throughout the year.
- Short-distance migration: minor movements, such as shifting from higher to lower elevations on a mountainside.
- Medium-distance migration: travel of only a few hundred miles.
- Long-distance migration: the type most commonly associated with the term "migration." These animals typically stay in northern regions, like the United States and Canada, during the warmer months. However, when winter arrives and resources become scarce, they migrate southward to Central and South America.

MIGRATION

Origins of long-distance migration

It might seem strange that birds who spend the winter in warm tropical places, fly north. But there's a good reason! Many years ago, their tropical relatives started flying north to have babies. In the north, there are more insects to eat and longer days, which means they can have more baby birds—usually 4 to 6 instead of just 2 to 3 in the tropics. As the ice melted and new places to make nests appeared in the north, these birds kept going back to the tropics for the winter. They did this because it was hard to find food and stay safe in the north during the cold months.

MIGRATION

Bird Navigation

Birds are amazing travelers! They use lots of cool tricks to find their way. They look at the sun and stars, and even sense the Earth's magnetic field, like having a built-in compass. During the day, they watch where the sun sets and notice familiar landmarks to stay on track. Some birds, like homing pigeons, even use their sense of smell to help them get home. Isn't that incredible?

Migration Hazards

Migration can be really tough for animals! Imagine having to travel very far with not enough food, facing bad weather, and being more at risk from predators. These are some of the big challenges they have to deal with. Lately, animals that migrate long distances have even more problems. Tall buildings and communication towers with bright lights can confuse them. Many animals accidentally fly into these structures, which can be very dangerous for them.

MIGRATION POST CARD ACTIVITY

Description

Students will choose a bird of their choice and write them a post card for their migratory journey

Steps

1. Students choose a bird (aim for a native birds to your area!)
2. Provide a blank section for students to draw their bird or something that represents it.
3. Provide a lined section for students to write to or about their bird. They can include:
    a. Type of migration
    b. Why the bird migrates
    c. Hazards the birds may encounter
    d. How the bird navigates
4. Provide a communal map where students can use push pins and string to track their bird's migration. This can show all the different routes these birds travel as well as any similarities or differences.

MIGRATION POST CARD EXAMPLE

Make a Migration Post Card.

Choose a species and write them a post card for their migratory journey.

Pacific Salmon

Salmon are anadromous, inhabiting both freshwater and saltwater

They navigate to river mouths using chemical cues, sunlight, and the Earth's magnetic field.

During "the salmon run," they swim up to 400 kilometers (250 miles) against currents, overcoming rapids and predators

Man-made sources like dikes can interfere with salmon's innate urge to migrate.

HABITAT

4

A bird's habitat is intrinsically linked to its identity. Bird habitats can be classified into four primary categories:

1. Woodland Habitats: Dominated by coniferous trees, these areas are home to species such as the wood duck, northern cardinal, and American robin.
2. Aquatic Habitats: Includes lakes, ponds, marshes, and oceans, this category hosts birds like pelicans, herons, and geese.
3. Scrub-Shrub Habitats: Comprising short woody plants and bushes, these habitats are inhabited by birds such as the scrub-jay and chestnut-sided warbler.
4. Open Habitats: Encompasses grasslands and agricultural fields, this environment supports species like the golden-crowned sparrow and red-tailed hawk.

Understanding the specific birds associated with each habitat will enhance your ability to identify them in the field.

HABITAT

Heathland

Heathlands are special places found in shrubland habitats with lots of low-growing plants found near the beach. They don't have tall trees, and most of the plants are shorter than a basketball player! These areas are a bit prickly because the plants have tough leaves, making cozy homes for little birds. Many plants, like banksias, have flowers full of sweet nectar, which is like candy for honeyeater birds. These birds love visiting heathlands to snack on the nectar!

Woodland

Woodlands are places where lots of trees grow, but they aren't super close together, so there's still plenty of sunlight. This allows native grasses and other plants to grow underneath. Sadly, many woodlands have been cut down. At first, people cleared them to make farms, and now they are often cleared to build houses.

HABITAT

Rainforest

In the Lower Mainland, we live in a temperate rainforest, a unique type of forest that thrives in areas with moderate temperatures. These forests feature a mix of trees with broad leaves and those that retain their leaves year-round. Temperate rainforests are incredibly wet, receiving substantial rainfall and fog every year, which enables plants to grow exceptionally well. Unlike tropical rainforests, which are warm year-round, temperate rainforests have mild weather, meaning they don't get too hot in the summer or too cold in the winter.

Wetland

Wetlands are special places where water covers the ground, like a big puddle, during certain times. These areas are home to many different animals and plants that you might not find anywhere else. Wetlands are like nature's playground for creatures!

HABITAT

Coastal

Coastal habitats are home to different ecosystems like sandy beaches, rocky headlands, estuaries, and rock platforms. These places are important homes for many kinds of seabirds.

HABITAT

Habitat Loss

Habitat loss is a big problem for the animals and plants. In Canada, turning natural areas into farms makes it hard for animals and plants to survive because their homes are changed into unprotected fields with limited food supplies. When cities grow bigger and spread out, they also take over these natural places, splitting them up and making it difficult for animals to navigate and live comfortably. Birds that live in grassy areas have a tough time with these changes.

When people change the places where animals live, it can be hard for those animals to find safe homes. Humans play a big part in this, like driving off-road vehicles that can damage places where special birds, like the piping plover, lay their eggs.

Climate change also affects where birds live. Birds are use to certain places, but when these places change, the birds have to move too. Many birds travel long distances and rely on the arrival of bugs in early summer to feed their babies. But as temperatures rise, bugs are appearing earlier than usual. This causes a problem for birds because they might arrive too late to find enough food for their chicks, making it harder for them to raise their young.

HABITAT

Habitat Loss

Many birds are losing their homes, which is a big problem for nature. Birds help plants grow by moving seeds and spreading pollen, just like bees do. They also help keep bugs from taking over. When there are fewer birds, it can cause problems for both land and water environments. Birds help keep coastal areas healthy by recycling nutrients, so when their numbers drop, it can upset the balance of life.

To help protect the homes of animals and plants, we need to work together on conservation projects, take care of the land in a way that doesn't harm nature, and help fix places that have been damaged. By focusing on keeping natural areas safe and building responsibly, we can help keep animals and plants safe so that ecosystems thrive well into the future.

HABITAT DIORAMA ACTIVITY

Description

Based on a blog by Gillian Candler, your challenge is to create a diorama of one of the bird habitats discussed in the blog. This diorama should be a mystery for the class and include clues about the animal that inhabits the area. Keep your bird a secret and then get your friends or classmates to guess Whose Home is This?

Find more about habitat diorama:
https://exploreddiscovernature.blogspot.com/2019/08/create-nest-or-habitat-diorama-craft.html

Materials

- A cut-down box from the supermarket, or a shoebox, or even a shoebox lid
- Pictures of habitats or your own illustrations
- Craft knife or scissors
- Glue
- Blu-tack or tape
- Natural items such as rocks, moss, shells, sticks, feathers
- Modelling clay
- Toy animals or pictures of animal

HABITAT DIORAMA ACTIVITY

Steps:

1. Research facts about your selected animal.
    a. Where is its natural habitat?
    b. Does it have a tendency to conceal itself?
    c. Does it build a nest or den?
    d. What materials would it utilize for this purpose?
2. Collect images and materials to design your scene. Consider the clues you want to incorporate. Can you depict your animal hiding in the scene to reveal later?
3. Shape your box as desired; you might want to create openings at the top and front.
    a. Select (or create) a large image, at least A4 size, to place at the back of your diorama. This could represent a forest, wetland, mountain, or reef, depending on your animal's habitat.
4. Arrange additional materials like small rocks, shells, and moss. If using natural items, ensure they are dry and clean. If you cannot dry them—such as damp moss—place some plastic underneath to prevent the box from becoming soggy.

Now, find a way to conceal your animal within the scene, or leave space to add it later for a surprise reveal.

5 LISTENING FOR BIRDS

Birds make two main types of sounds: songs and calls. Bird songs are special tunes that males usually sing to show off and find a mate. These songs help them keep other male birds away and tell female birds that they are strong and healthy. Songs can be elaborate and specific to the type of bird. Most bird song is done by males, though females do also sing territorially or for pair bonding, especially in the tropics.

Calls, on the other hand, are simpler sounds that birds use to talk to each other. They help birds stay in touch with their friends, warn each other of danger, and find their way when flying in groups. Birds use calls all year round to communicate and stay safe.

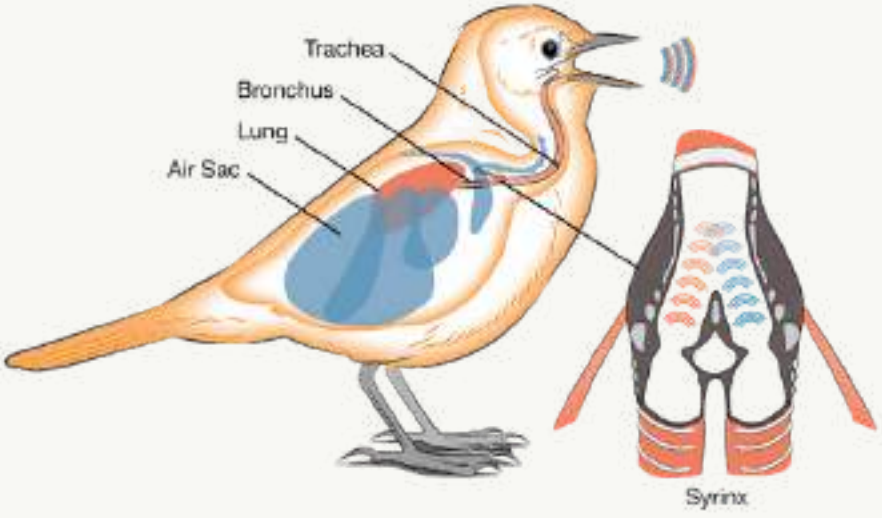
Both songs and calls are important for birds. They help them survive and find partners to have baby birds with. By listening to these sounds, scientists can learn more about birds and help protect them and their homes.

LISTENING FOR BIRDS

Why and how birds sing

Not all songbirds are born knowing how to sing their tunes right away. Most of them have to learn how to sing by listening to the adult birds around them. Baby songbirds start learning when they're still in their nests, paying attention to the songs of nearby adult birds. This helps them pass down their songs from one year to the next, kind of like how people pass down stories or traditions. Plus, songbirds have their own special "accents," which means their songs can sound a bit different depending on where they live!

Birds sing their songs using a special part of their body called the syrinx. Unlike humans, who use their voice box, birds have a syrinx that splits into two tubes shaped like an upside-down Y. When air moves over the vibrating parts at the meeting point of these tubes, it makes sound. What's really cool is that birds can control the air in each side of the syrinx separately, letting them make two different sounds at once!



LISTENING FOR BIRDS

Why and how birds sing

People have the amazing ability to learn and recognize bird songs, allowing them to identify different kinds of birds just by listening. To get good at this, you need to practice and spend time listening to bird songs. A great way to learn is by watching birds while they sing. This way, you can connect the sounds you hear with the birds you see, making it easier to remember which bird makes which song.

To make it fun and easy for you, try describing a bird's song using your own words. This exercise helps you remember better and makes you listen closely to each tune. Start with a bird song you already know well because it gives you a good starting point. As you get the hang of it, you can learn songs from different birds, noticing the little differences and patterns that make each one special. With practice and listening, you'll get really good at recognizing and enjoying all the different bird songs around you!

MAKE YOUR OWN BIRD- CALLER

Description

Students create their own bird caller in this activity. A bird caller works by recreating bird calls and songs in order to attract birds for bird-watching purposes.

Materials

- 8x11 paper
- Scissors
- Ruler
- Decoration supplies (i.e., felts, crayons, pencil crayons)
- Pencil
- Tape

Steps

1. Fold the long side of the paper about 1cm from the edge.
2. Unfold and draw a 1 cm tab along the fold and cut the rest of the flap.
3. Decorate the center part of the paper.
4. Use a pencil to roll up the paper, keeping the decorated part on the outside.
5. Take the pencil out, keeping the paper rolled up.
6. Tape the tube and slightly bend up the little tab on the end.
7. Gently breathe in to make the sound of a baby duck.
8. When you breathe in you pull the small paper tab in towards the tube, which causes the paper to vibrate and make a sound.

MAKE YOUR OWN BIRD- CALLER

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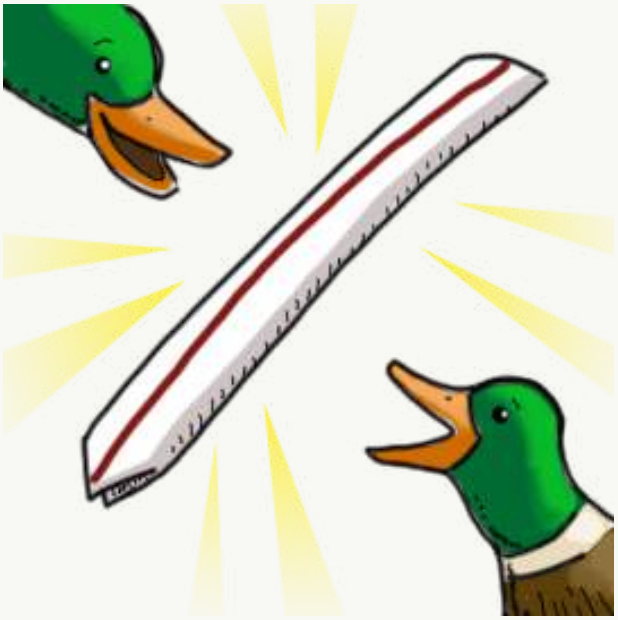
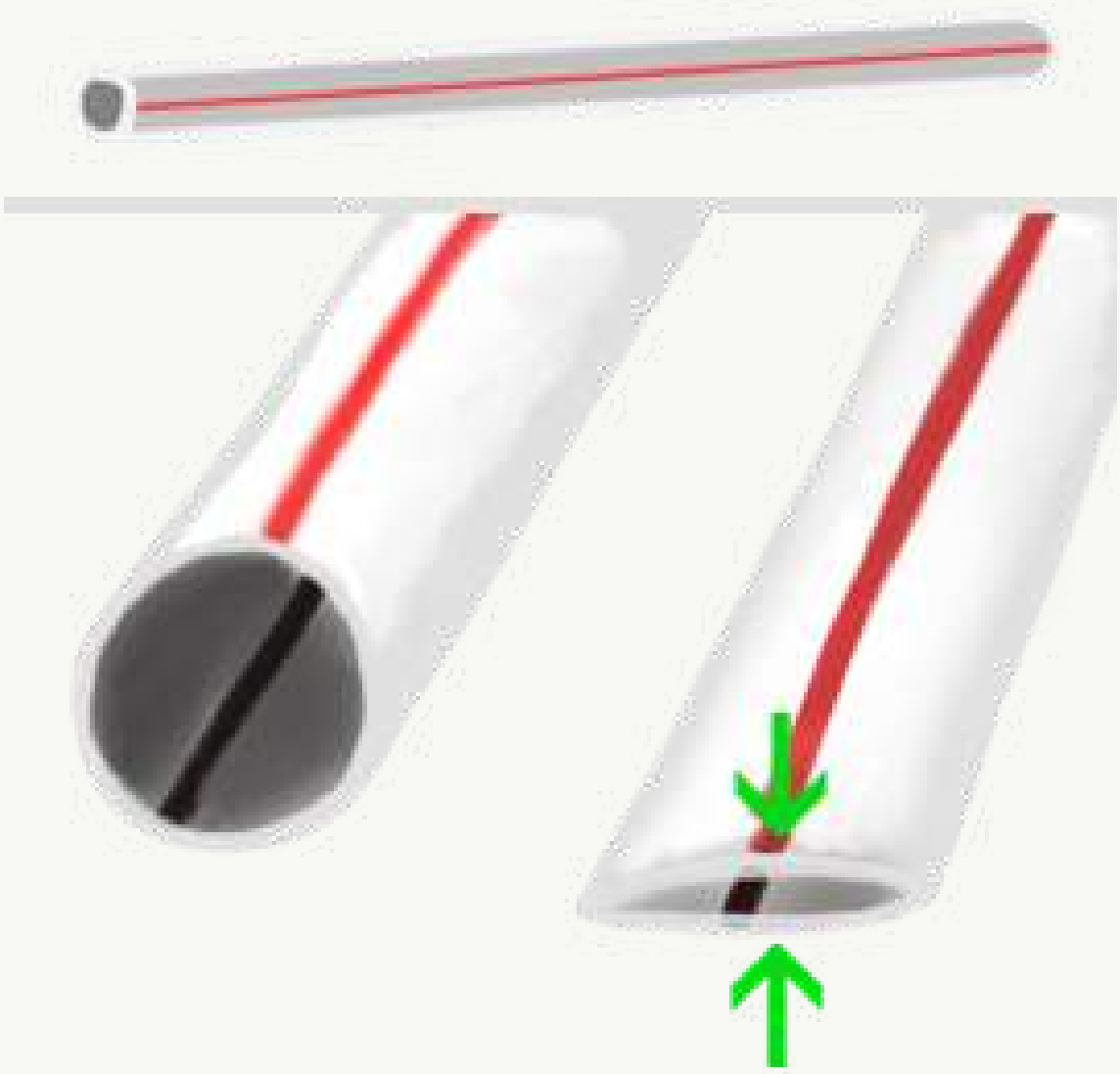
Students create their own bird caller in this activity. A bird caller works by recreating bird calls and songs in order to attract birds for bird-watching purposes.





SIT SPOTS AND LISTENING TO BIRDS

Activity Description

A "sit spot" is a natural place you visit often to become more aware, sharpen your senses, and notice nature's patterns. This practice helps with mindfulness, routine, and focus.

Sit spots are important for birdwatching. You engage your senses, notice bird calls and behaviors, and might even start a journal to write down your observations.

Steps

1. Choose a location: Select a spot where you can sit comfortably and watch birds for 10 to 20 minutes. This could be your window, backyard, or a nearby park.
2. Sit and be mindful: Get into a comfortable position and calm your mind. Tune into your surroundings, focusing your attention on the birds.
3. Observe and explore: Approach the experience with curiosity. Ask yourself questions such as, "What activities are the birds engaged in?" or "What might they have eaten today?"
4. Identify bird species (optional): If you're interested in learning more about the birds you see, consider using a field guide or the Audubon Bird Guide App for identification.

Find more about sit spots on the FRDC YouTube channel: https://youtu.be/eWr-MoZgYBc?si=K6edeqpwiJey2VIJ

SOUND MAPS AND LISTENING TO BIRDS

Activity Description

A sound map is like a fun picture that shows all the different sounds you can hear in a certain place, like a park or neighborhood. It uses symbols and spots on the map to show where each sound comes from, like birds singing or cars driving by. This helps people notice the sounds around them and understand where they come from.

Steps

1. Find a quiet spot: Choose a place where you can focus on the sounds around you.
2. Mark your location: Draw a symbol (like an "X") in the center of your paper to represent yourself.
3. Listen and identify: Pay close attention to bird sounds and try to identify which direction they're coming from.
4. Draw or write: For each bird sound you hear, draw a symbol or write a word to represent the sound and its direction on your map. For example, if you hear a bird chirping to your left, draw a musical note near the left side of your "X".
5. Reflect and share: After a while, gather your group and share your sound maps, discussing the different sounds you heard and how you represented them

Find more about sound maps on the FRDC YouTube channel: https://youtu.be/XAZv44WroIc?si=FaHuKsrYqAgzQhVT

LEARN THE LANGUAGE OF BIRDS

The Tracy Aviary Conservation Organization provides a very helpful resource to help students learn the songs and calls of birds.

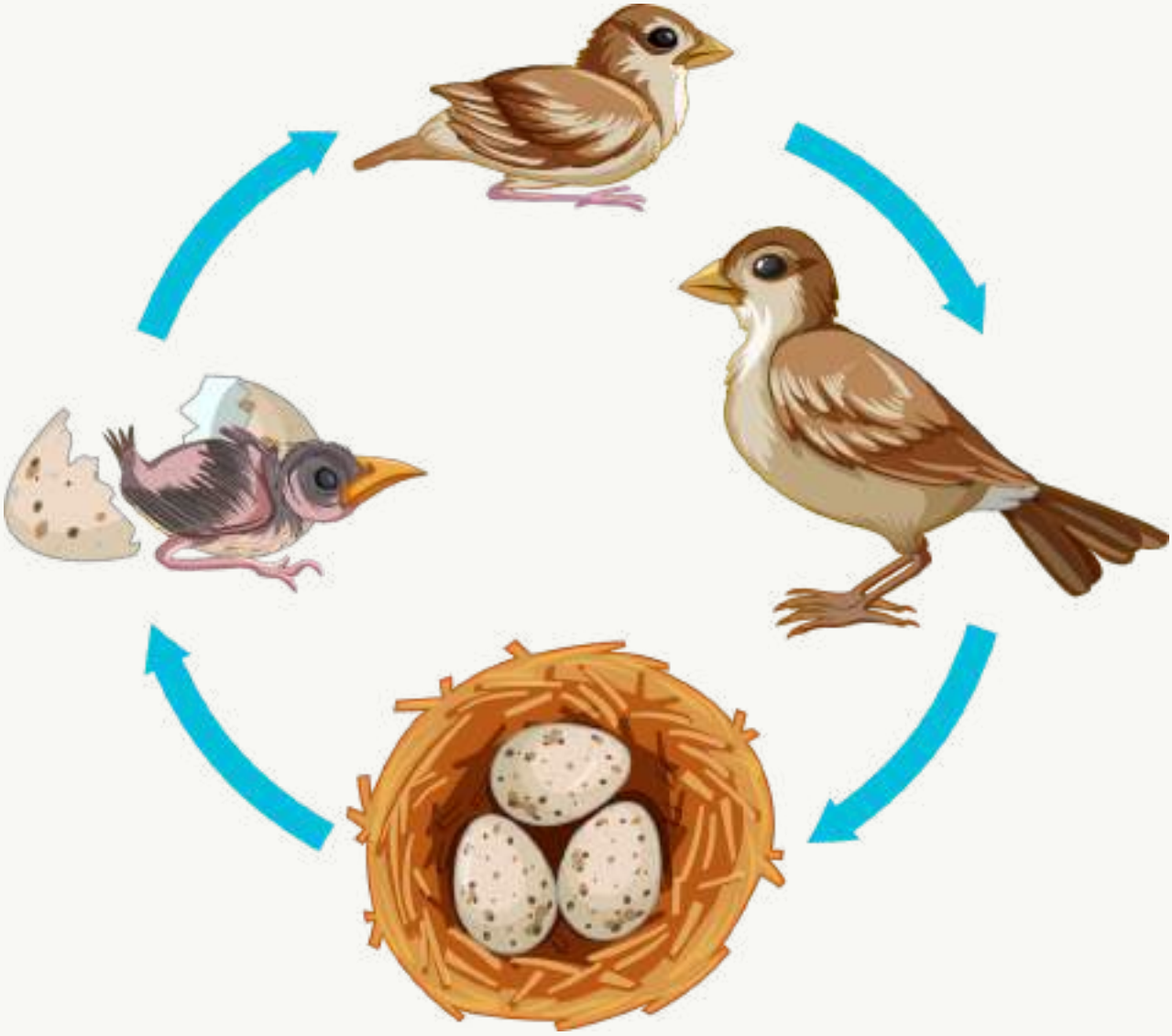
The resource has three lessons. the first lesson goes over what bird calls and songs mean and how to describe what you hear. The second lesson is about seeing bird songs and working with spectrograms. The final lesson talks about mnemonics and how those relate to birds.

Find more about bird calls and songs at Tracy Aviary Conservation: https://www.tracyaviaryconservation.org/learnbirdsongs

6

BIRD LIFE CYCLE

Birds are an important group of animals that have adapted well to their environments. No matter where they live, all birds go through a similar life cycle. Every type of bird experiences this process.



BIRD LIFE CYCLE

Egg

The life cycle of a bird begins when a mother bird lays her eggs. These eggs are often laid in groups called clutches. The number of eggs in a clutch can be different for each bird type. For instance, a Laysan albatross lays just one egg, while red-tailed hawks usually lay three eggs, and wood ducks might lay between 7 to 14 eggs! The eggs are kept warm by one or both parents until the baby birds inside, called embryos, are ready to hatch. Hatching is quite a tough job! It can take a chick hours or even days to break out of its eggshell. Most baby birds have a special tool called an egg tooth, which is a tiny bump on their beak. This helps them crack open the shell so they can finally come out and see the world.

During this time, the baby chick might make gentle peeping sounds to encourage its brothers and sisters to hatch too. This is called "pipping" when the chick makes a little hole in the egg. After working hard for hours, the chick slowly makes the hole bigger until it finally breaks out of its shell. This isn't just a tough job; it also helps the chick get ready for life outside the egg by making its muscles and breathing stronger.

BIRD LIFE CYCLE

Hatchling

A hatchling is a baby bird that has just come out of its egg. At this stage, it is very delicate and usually has only a little bit of fluffy feathers. Its eyes might still be closed, and it can't take care of itself yet.

The word "hatchling" is mostly used for certain birds that are born needing lots of help from their parents. These birds, like robins and owls, are not very developed when they hatch and rely on their parents for warmth and food. They usually stay in the nest for a while.

In contrast, some birds, like ducks and chickens, are more ready when they hatch. They can feed themselves and leave the nest soon after hatching.

BIRD LIFE CYCLE

Nestling

A nestling is a baby bird that's only a few days old. At this stage, it has soft, fluffy feathers called down, and you might start to see its first flight feathers growing. Even though nestlings can usually open their eyes, they stay safe in the nest and rely on their parents for food, protection, and warmth. They can't leave the nest or take care of themselves yet, so they need their parents to survive

BIRD LIFE CYCLE

Fledgling

As baby birds grow, they get their special feathers and wing muscles strong enough to start flying. These young birds are called fledglings, and they begin to explore the world beyond their nests. Even though they're learning to do things on their own, they still need their parents' help to get food sometimes. During this time, fledglings might look a bit funny and clumsy. They often hop around and can only manage short flights. How long it takes for a baby bird to learn to fly depends on the type of bird. For example, baby great frigatebirds need about six months to learn to fly and still get help from their parents for another 14 months.

BIRD LIFE CYCLE

Juvenile

Juvenile birds are like the teenage version of birds. They've just left the nest and are learning to live on their own, but they aren't quite grown-ups yet. These young birds have their first set of feathers, called juvenile plumage, which usually isn't as bright or colourful as the feathers of adult birds. This can make it tricky to tell what kind of bird they are. However, they don't stay in this stage for long, as many bird species grow up pretty quickly.

BIRD LIFE CYCLE

Subadult

Young birds that are a bit older than baby birds but not yet fully grown are called "subadult" birds. These birds haven't got all their adult feathers or become grown-up enough to have babies. Different kinds of birds take different amounts of time to grow up. For example, small birds like house sparrows grow up in just a few months. But bigger birds like golden eagles might take four to five years to become adults. Some bird scientists use the words "immature" and "subadult" to mean the same thing, but "immature" can be any bird that isn't grown-up yet.

BIRD LIFE CYCLE

Adult

Grown-up birds are fully developed and ready to have babies. They have all their adult feathers, which can change with the seasons. For example, some birds show off brighter colours or special patterns when it's time to find a mate. Birds like puffins even have changes in their beak shape or colour. When they're ready, these adult birds can find a partner and lay eggs, starting the bird life cycle all over again.

BIRD LIFE CYCLE ACTIVITY

Phenology Wheel

Description

Students will document their observations and gather data regarding the birds that visit feeders outside their school. They will subsequently compare their findings with historical records from local birding experts, online resources, or library materials. This information will assist students in identifying patterns of bird activity in their area and understanding how these behaviors may shift due to phenological changes.

Materials

- Access to historical records- either local bird experts, online data or library access
- Bird feeder and bird seed
- bird identification guides/resources
- Binoculars
- Camera - optional
- Journal to record predictions and observations

Read more about a study on Phenology Wheels from the University of Main:
https://extension.umaine.edu/signs-of-the-seasons/wp-content/uploads/sites/6/2012/12/Bird-Feeder-Notebook_11_30_12.pdf

BIRD LIFE CYCLE ACTIVITY

Phenology Wheel

Time Needed

- 19-20 minutes weekly over an extended period of time
- Two 30-40 minute class periods to collect information from sources
- Two 30-40 minute class periods to write up summary of conclusions and findings
- One 30-40 minute class period for presentation

Research Procedure

1. Before spring or fall migration, set up a bird feeder (or multiple) in an accessible area for your group to make weekly observations
2. Organize a datasheet and notebooks for observations. Useful data may include:
    a. Species name
    b. Date
    c. Time of day
    d. Precipitation (rain, snow and how much)
    e. First sighting of the year
    f. Last sighting of the year (may need to correct this)
    g. Any other thoughts, observations or drawings
3. Discuss as a class possible seasonal changes that can affect the timing of bird migration. Possibly also talk about what migration is and why birds migrate
4. Have students research commonly seen species in the area and make predictions about what birds might they expect to see

BIRD LIFE CYCLE ACTIVITY

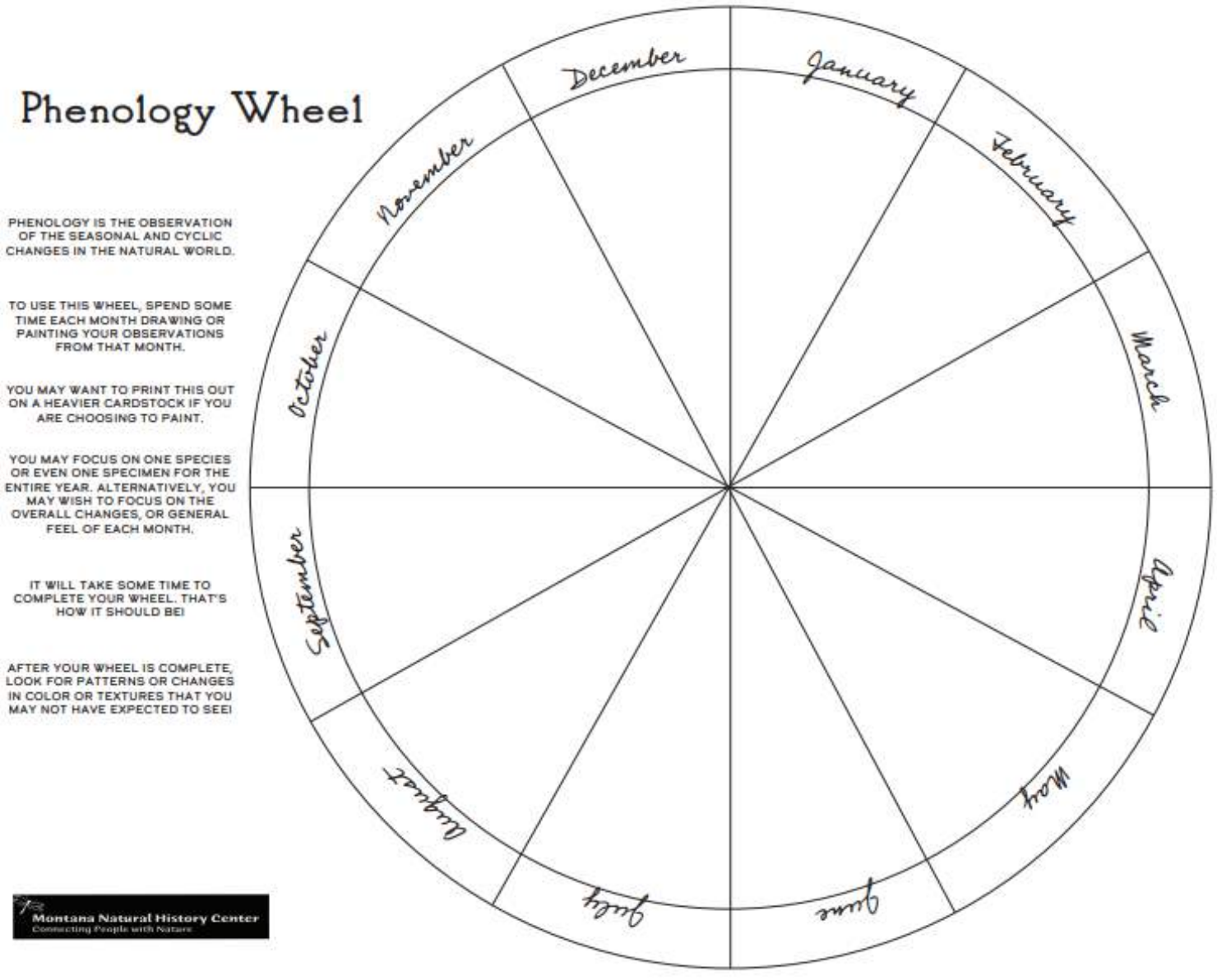
Phenology Wheel

Activity Procedure

1. Instruct students to select two species:
    - One bird species
    - One species of animal or plant that birds depend on
2. Present a phenology wheel to the class and explain its purpose:
    - A phenology wheel is a visual tool for recording and tracking seasonal changes in nature, particularly focusing on plants and animals. It aids in observing and documenting cyclical events, such as flowering plants or bird migrations, by capturing these changes on a wheel-shaped chart monthly or even daily.
3. Inform students that they will create two phenology wheels: one for their chosen bird species and another for the species that birds rely on.
4. Decide on a specific time frame (e.g., once a month or once a season) and have students use their observations to illustrate what each time period looks like.
5. Once students have completed their two wheels, compare them. Consider these questions:
    - How do the two species compare? What activities do they engage in during summer, winter, autumn, and spring?
    - In what ways do the species depend on each other? How can you tell?
    a. What might occur if these seasonal changes did not happen as expected? For example, what if summer arrived late? What if winter was milder than usual?

BIRD LIFE CYCLE ACTIVITY

Phenology Wheel



Learn more about phenology wheels and sit spots on the FRDC YouTube channel: https://youtu.be/PeaZlS2XwUw?si=BP1EzGZ6NOMWC1Iz

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BIRD FRIENDLY RESOURCES

Birdhouse Considerations

There is a wide variety of birdhouses with numerous designs to choose from. You can either craft your own or purchase pre-made options. However, there are several factors to keep in mind when selecting the ideal design for your feathered friends.

1. Use untreated, unpainted wood. Cedar, Pine, and Cypress are a good bet.
2. Use galvanized screws for the best seal. Nails can loosen over time, which can cause the house to leak. Do not use staples.
3. A sloped roof that overhangs the front by 2-4" and the sides by 2" will help keep out driving rain, while also thwarting predators.
4. A recessed floor keeps the nest from getting wet and helps the box last longer. Drainage holes on the floor also allow water to drain.
5. No perches that can help predators gain access. Adding baffles helps keep birds safe from predators.
6. The interior wall below the entrance hole should be rough to help nestlings climb out of the box. You can roughen smooth boards with coarse sandpaper.
7. Ensure your entrance hole is the same size as the bird you are trying to attract. An appropriately sized entrance hole can attract desirable species to your birdhouses while excluding predators and unwanted occupants.

Find more about bird house considerations at NestWatch:
https://nestwatch.org/learn/all-about-birdhouses/right-bird-right-house/

BIRD FRIENDLY RESOURCES

Nest-Cam Considerations

With nest box cameras, you can observe interesting behaviours that cannot be seen outside of the nest box while learning about the cycle of life unfolding in your backyard.

1. The ideal time to install a camera is before birds begin to nest, as you should only visit a nest for a minute or two. Excessive disturbance could lead to birds abandoning their nest. Choose cameras that don't require frequent battery changes or memory card swaps.
2. An essential factor to consider before purchasing a camera is the distance from your viewing area to the nest box. There are limitations on how far a camera can transmit images without additional equipment, and even wireless cameras still require a power source.
3. Think about the type of camera:
    a. USB webcams are the most affordable and easiest to set up for nests located near a computer.
    b. Analog cameras take a bit more time to set up but are a solid mid-range option for monitoring nests that are farther away.
    c. Network (IP) cameras offer excellent video quality, even in dim nest boxes, making them the best choice for online streaming.
4. Once you've selected a camera, it's time for installation. First, ensure the camera is functioning properly before mounting it in the box! Most cameras can be attached to the underside of the nest box roof using a few screws.

Find more about nest box considerations at NestWatch:
https://nestwatch.org/learn/all-about-birdhouses/installing-a-nest-box-camera/

BIRD FRIENDLY RESOURCES

Types of Bird Feeders

Tray or Platform Feeders

Pros:

- Excellent for attracting a variety of birds.
- Birds can easily be observed while feeding.
- Provides a generous amount of seed across a broad area, accommodating multiple visitors at once.
- Adaptable: can be mounted on deck railings, posts, stumps, or hung up.

Cons:

- May attract unwanted birds, which can dominate the feeder.
- Offers no protection from rain or snow, leading to wet seeds that may sprout, mold, or spoil.
- Bird droppings can contaminate the seeds.
- Can also attract squirrels, chipmunks, deer, raccoons, and other wildlife.

BIRD FRIENDLY RESOURCES

Types of Bird Feeders

Hopper or House Feeders

Pros:

- Attractive to most feeder birds, including finches, jays, cardinals, buntings, grosbeaks, sparrows, chickadees, and titmice.
- Holds enough seed to last several days.
- The roof helps keep the seed dry
- Birds are less likely to soil the food with droppings.

Cons:

- Most designs offer easy access for squirrels.
- Seeds can spoil if they get wet and stay wet, without regular cleaning/changing.
- Harder to clean than a tray feeder.

BIRD FRIENDLY RESOURCES

Types of Bird Feeders

Tube Feeders

Pros:

- Helps keep seeds out of the elements, helping guard against spoiling.
- With no platform, birds can't contaminate seeds with their droppings.
- Can be sized to offer a range of seeds.
- Tube sizes and perch configurations provide the option to target different birds.

Cons:

- Multiple birds often visit the same perches repeatedly and can pass diseases, so you must clean regularly.
- Squirrels can cause considerable damage to plastic tubes by gnawing to widen the openings. Metal tube feeders are more resistant.

BIRD FRIENDLY RESOURCES

Types of Bird Feeders

Window Feeders

Pros:

- Suitable for small birds such as finches, chickadees, titmice, nuthatches, sparrows, and more.
- Wonderful, close-up views.
- Birds see the feeder before they reach the window, helping keep them safe from window collisions.
- Easy access for refilling.

Cons:

- Birds can soil the feeding tray with their droppings.
- Attaching suction cups can be tricky.

BIRD FRIENDLY RESOURCES

Types of Bird Feeders

Suet Feeders

Pros:

- Attracts various birds to your feeders, and the birds often feed energetically and acrobatically.
- Versatile: can be attached to a tree trunk, suspended from a branch, or fixed onto a hopper or platform feeder.

Cons:

- Raw suet can quickly become rancid at temperatures above freezing.

Find more about bird feeder considerations at All About Birds: https://www.allaboutbirds.org/news/how-to-choose-the-right-kind-of-bird-feeder/

BIRD FRIENDLY RESOURCES

Bird Bath Considerations

The ideal birdbaths replicate birdbaths found in nature, such as puddles and shallow pools in calm streams. Therefore, seek out a birdbath that is shallow and features a gentle slope, allowing birds to easily wade into the water.

Setting up your birdbath

Birds tend to favor baths positioned at ground level, as this resembles their natural water sources. If there are cats in your area, ensure there is clear open space between your birdbath and the nearest dense shrubs. This will give the birds a chance to spot lurking cats and escape safely.

During the warmer months, try to position your birdbath in a shaded area if you can. Nearby trees have branches for birds to perch on while they dry off after their bath. Additionally, place stones or branches in the water, allowing birds to stand on them while drinking without getting wet, which is especially crucial during freezing temperatures.

To enhance the appeal of your birdbath, consider adding some dripping water. The sight and sound of flowing water are often irresistible to many birds. You can either purchase a commercial dripper or sprayer, or create a DIY version using an old bucket or plastic container. Simply puncture a small hole in the bottom, fill it with water, and hang it above the birdbath to allow water to drip into it.

BIRD FRIENDLY RESOURCES

Bird Bath Considerations

Winter Bird Baths

The simplest way to provide water in winter is to set out a plastic bowl at the same time each day, and bring it in when ice forms.

If you wish to maintain a birdbath during freezing temperatures, manufacturers now provide birdbaths equipped with built-in, controlled heaters. Additionally, immersion heaters can be found at most retailers that sell bird feeders.

Never add antifreeze to a birdbath, as it is toxic to all animals, including birds. Avoid using glycerin, which can soak into and mat a bird's feathers, making them vulnerable to hypothermia.

BIRD FRIENDLY RESOURCES

Bird Bath Considerations

Winter Bird Baths

When temperatures rise above freezing, keeping your birdbath filled at all times is an excellent way to attract a diverse range of birds. However, to ensure a safe environment for drinking and bathing, it's crucial to change the water every day or two.

Bathing birds can leave behind dirty feathers and droppings, leading to unsanitary conditions for others. Additionally, bird baths can become breeding grounds for mosquitoes, including those that transmit the West Nile virus. Regularly changing the water will prevent the eggs from hatching and the larvae from developing.

Find more about bird bath considerations at All About Birds:
https://www.allaboutbirds.org/news/attract-birds-with-birdbaths/

BIRD FRIENDLY RESOURCES

Helpful Actions to Support Birds

Make Your Windows Safer

It is estimated almost one billion birds die each year in North American due to hitting windows. During day, birds mistake the reflection in glass to be a place they can fly to and rest at. While at night, birds are attracted to lights.

What can you do?

To reduce reflections on the exterior of the window, install screens or disrupt the surface by applying film, paint, or other markers. Ensure these markers are evenly spaced. You can also work with public buildings to provide local murals with designs that make the windows safer for birds.

Keep Cats Indoors

Cats are the number one human-caused reason for the loss of birds. Cats are responsible for killing more than 2.4 billion birds in North America.

What can you do?

To save birds and keep cats healthy, it is best to keep cats indoors. Another option are catio's which create an outdoor enclosed area for cats to explore the outside without posing a danger to themselves or birds.

BIRD FRIENDLY RESOURCES

Helpful Actions to Support Birds

Plant Native Species

Birds need a place to rest safely during migration as well as to raise their young. Land development has taken away much of the natural land birds require. Lawns and pavements don't offer enough food or shelter for birds.

What can you do?

Adding native plants to your yard and neighborhood which provides shelter, food, and a nesting area.

Avoid Pesticides

The most commonly used insecticides on the continent, known as neonicotinoids or "neonics," are harmful to both birds and the insects they rely on for food. Pesticides can also harm birds indirectly by reducing the number of available insects, which birds need to survive.

What can you do?

Purchase organic food as it is less likely to contain pesticides. As well as reduce pesticide use in your own home and garden.

BIRD FRIENDLY RESOURCES

Helpful Actions to Support Birds

Bird Friendly Coffee

Many of us don't realize the issues associated with sun coffee. Nearly 75% of coffee farms worldwide cultivate their plants in sunlight, which leads to the destruction of forests that provide essential food and shelter for birds. Also, sun-grown coffee frequently relies on the use of harmful pesticides and fertilizers that negatively impact the environment.

What can you do?

Try shade-grown coffee! Its delicious, and helps more than 42 species of North American birds.

Protect Against Plastic

Plastic pollution is flooding our landfills and ecosystems, extending into our oceans. This poses a toxic threat to wildlife that accidentally consumes plastic or becomes ensnared in the debris. Research indicates that at least 80 different species of seabirds are ingesting plastic.

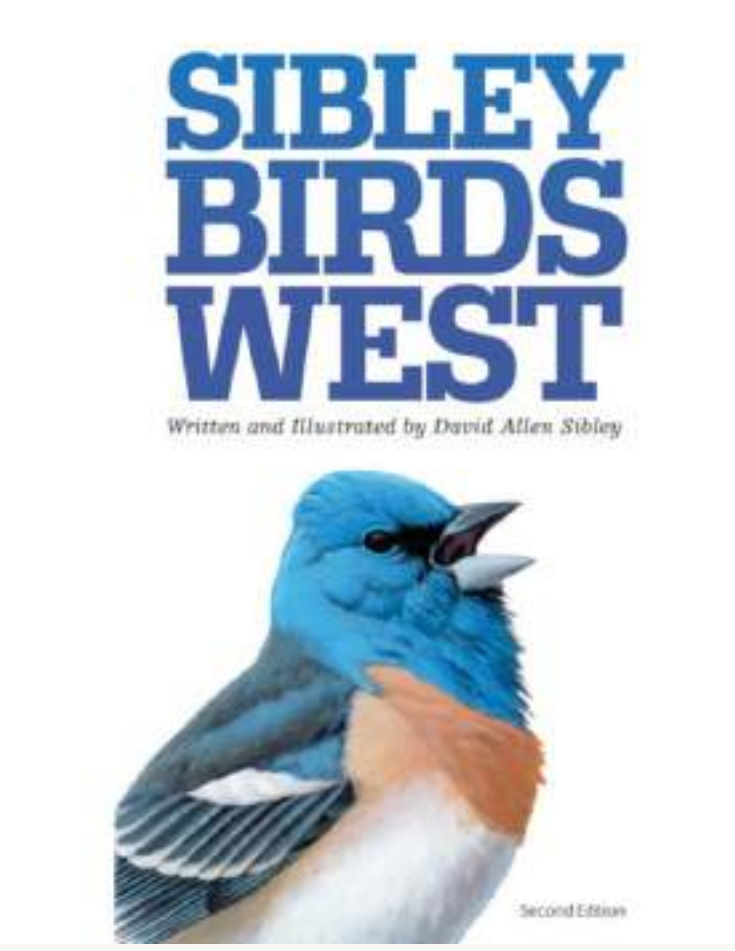
What can you do?

Avoid single-use plastics (such as bags, bottles, cling film, utensil, etc.) and use reusable items! dispose of single-use plastic properly.

Find out more actions to support your local birds at All About Birds: https://www.birds.cornell.edu/home/seven-simple-actions-to-help-birds

8 BIRDING RESOURCES OFFERED AT THE FRDC

The Fraser River Discovery Centre offers many birding resources in our shop! You can check out our shop in person and online.



From renowned birder, illustrator, and New York Times best selling author David Sibley, Sibley Field Guide to Birds of Western is an authoritative guide to the birds of the West, in a portable format that is perfect for the field.

Compact and comprehensive, this guide features 715 bird species, plus regional populations, found west of the Rocky Mountains. Entries include stunningly accurate illustrations–more than 5,046 in total.

This book is available at the FRDC Discovery Shop: https://fraserriverdiscovery.org/product/bateman-backyard-birds/

BIRDING RESOURCES OFFERED AT THE FRDC

The Fraser River Discovery Centre offers many birding resources in our shop! You can check out our shop in person and online.

For the bird nerd or the beginner birder – Bird Feeder Kit
is a unique feeder can easily go anywhere with you and turn any recycled plastic bottle into a bird feeder.

Simply detached the hanger from feeder tray. Twist a clean, dry plastic bottle onto tray. Punch two holes in the bottom of the bottle and insert hanger as shown. Fill with seed, replace plug, hang and watch your feathered friends feast

This feeder is available at the FRDC Discovery Shop:
https://fraserriverdiscovery.org/product/bird-feeder-kit/

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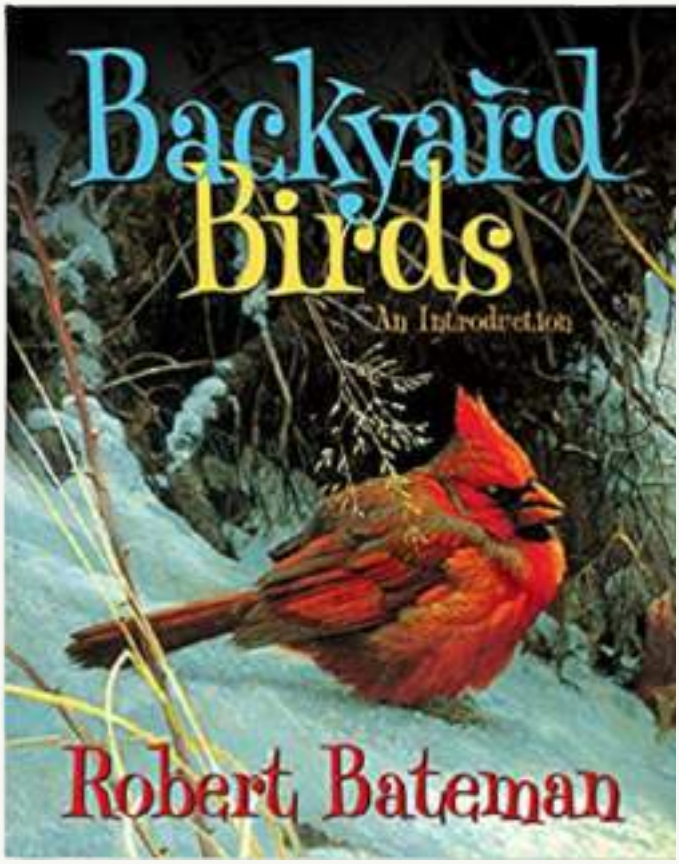


Robert Bateman's unique talents as an artist, naturalist and storyteller make him the ideal guide to the world of birding. His marvelous paintings and accessible text introduce children to the wonder of familiar birds.

Backyard Birds have beautifully crafted sections include special features on identifying, feeding and finding backyard birds. Key facts about the different species are conveyed in field guide style through special sketchbook sidebars.

This book is available at the FRDC Discovery Shop:
https://fraserriverdiscovery.org/product/bateman-backyard-birds/

BIRDING RESOURCES OFFERED AT THE FRDC

The Fraser River Discovery Centre offers many birding resources in our shop! You can check out our shop in person and online.

Outdoor School: Spot & Sticker Birds is a sticker book for the curious and the adventurous. Delivers the natural wonders of the world in gorgeous, scientifically-accurate stickers.

Peel and place each sticker on the pull-out poster once you've seen each bird–or simply decorate your surroundings to make a bird-spotter's paradise.

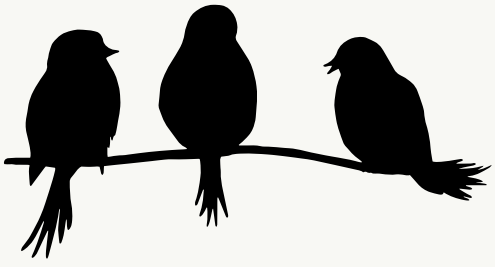
This book is available at the FRDC Discovery Shop: https://fraserriverdiscovery.org/product/outdoor-school-spot-sticker-birds/

CONCLUSION

The Fraser River Discovery Centre's birding resource offers a rich, engaging platform for students to explore the fascinating world of birds through observation, inquiry, and hands-on learning. By aligning with the BC curriculum's core competencies, this guide supports the development of critical thinking, personal and social responsibility, and strong communication skills.

Whether used as a full unit or integrated into existing lessons, this adaptable resource empowers educators to foster curiosity and environmental awareness in students from grades 2–6. We hope this guide inspires meaningful connections with nature and encourages young learners to become thoughtful stewards of the environment.

If you find yourself in the New West area, be sure to visit our Centre! We feature two floors of interactive exhibits that explore everything related to the Fraser River.



Have any questions, comments or suggestions? Email us at info@fraserriverdiscovery.org

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