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| Subject: | Birds | Grade: | 6 | Duration: | 2 hours  |

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| Big Ideas: | Summative Assessment: |
| * Multicellular organisms rely on internal systems to survive, reproduce, and interact with their environment. (Science, 6)
 | Students will use observation and reasoning to make explanations about form and function of bird physiology. |

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| Unit Understandings: |  | Content: |
| * All organisms are connected and interact with each other (competition, predatory-prey, symbiotic, parasitic relationships)
* Organisms also interact with the surrounding environment (abiotic factors) including: energy, water, air and soil.
* Living organisms have interdependent body systems that interact to sustain life
* How our actions impact an organism’s (positive and negative) ability to survive
 |  | The basic structures and functions of body systems: * Excretory
* Reproductive
* Hormonal
* Nervous
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| Transfer: |  | Essential Questions: |
| * Understand that a variety organisms rely on internal systems to survive, reproduce, and interact with their environment
* Understand the interconnectedness of all living things
* Connect to place and understand their role and responsibility as stewards of the environment
 |  | * How am I interacting with systems in my everyday life?
* How can changes in the environment affect a community of organisms?
* How do living organisms adapt to, and interact with, their environment?
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|  | Concepts: |  |  | Curricular Competencies: |
|  | * System
* Interdependence
* Environment
 |  |  | * Experience and interpret local environment
* Demonstrate curiosity about the natural world
* Make observations
* Make ethical judgements about events, decisions and actions that consider the conditions of a particular time and place and assess appropriate ways to respond (ethical judgement)
* Make questions to answer or problems to solve through scientific inquiry
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| First People’s Principles of Learning: |  |
| Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place). **Cheakamus Centre Principles:*** **Teaching in and learning about Place**: Students will explore and observe local and migratory birds found within the local ecosystem.
* **Engaging students with nature-based inquiry:** students will ask questions they can answer through observation.
* **Community:** students participate in citizen science by sharing data with other field study groups.
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| Core Competencies: |
| **Communication:** * I ask and respond to simple, direct questions
* I am an active listener; I support and encourage the person speaking
* I can recount simple experiences and activities and tell something I learned

**Thinking:*** I can ask open-ended questions and gather information
* I get ideas when I use my senses to explore

**Personal and Social Emotional Learning:*** I can participate in classroom schools, community, or natural world
* I can identify how my actions and the actions of others affect my community and the natural environmental and can work to make positive change
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**Field Study Planning:**

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| Pre-visit connections: | Resources: |
| **Possible leading questions/ideas to discuss with class prior to visit:** Ask students to think about their body systems. How do these help us to survive? Birds’ body systems are also adapted to help them survive.* What physical adaptations help a bird survive in its environment?
* How do birds interact with their environment?
* How do humans rely on birds?
* How do humans affect birds?

Explore the eagles of Brackendale. | **Websites**:* The Cornell lab of ornithology: <https://www.birds.cornell.edu/home/>
* Audubon Guide to North American Birds: <https://www.audubon.org/bird-guide>)
* Vancouver Urban Bird Program:

<https://www.bsc-eoc.org/education/urbanvan/index.jsp> |
|  **Please see ‘during visit connections’ below for more ideas to explore before your students’ visit ODS** |  |

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| During visit connections: | Resources: |
| **Introducing the Activity**1. “Step into the circle if”: Gather students in a circle and step into the circle if the statement applies to them, then step back out.
* *You can name three species (ask them to define term) of birds found in B.C.*
* *You can name three things birds eat and which birds eat them.*
* *You* have every used binoculars.
* *You have seen a live eagle (or hummingbird depending on the season)*
1. Explain that they will be discovering the amazing world of birds today.
2. Walk towards Fuzzy’s Foot Path. At the trail head, pose the following question to the students to begin a walk and talk:
* What do the terms “form” and “function” mean in relation to birds?
* Ask students to come up with two or three examples of form and function in birds or mammals. Discuss with students how the shape, “form”, of an animal, or part of an animal, determines what the animal can do “function” E.g., Giraffes’ long necks allow them to reach leaves that are not available to other animals. Birds have beaks and feet that are adapted to their life styles and food types.
* ID practice: Put students into pairs, have partners describe each other using hair colour, size, clothing type and colour, eye colour, footwear. Compare these characteristics to how field guides identify birds (colour, size, distinguishing features…). Would all features of their partners be the same in different seasons? Note birds change plumage sometimes with the seasons (or with age!).
 | **Legends:** * Keepers of the Earth – How Turtle Flew South for the Winter (p.157)
* People of the Land: Legends of the Four Host First Nations – Smekw’á7 – The Great Blue Heron (p.75)
* Squamish Legends: Seagull Raven and the Daylight Box
* How the Robin Got Its Red Breast: A Legend of the Sechelt People

**Exploration/discussion routines for when out in the field:*** [Beetles: I notice, I wonder, It reminds me of](http://beetlesproject.org/resources/for-field-instructors/notice-wonder-reminds/)
* [Beetles: Walk and Talk](http://beetlesproject.org/resources/for-field-instructors/walk-and-talk/)

**Apps to help identify birds. Includes birdcalls. Please download onto your phone prior to arrival:*** [Merlin Bird ID by Cornell Lab of Ornithology](https://itunes.apple.com/us/app/merlin-bird-id-by-cornell-lab/id773457673?mt=8)
* [Audubon Bird Guide: North America](https://www.audubon.org/app)

**Resources at Cheakamus Centre:*** Bird ID cards
* Binoculars
* Clip boards
* Taxidermy birds
* Bird nests (Crow, Robin...)
* Bird Guide Book
* Portable blue tooth speaker to play birdcalls from your phone.
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| **Forest Lab:** Prior to entering, ask students to have a good look at the taxidermy birds that have been set up, particularly as they relate to form and function. How are the anatomies of birds designed to interact with their environment? PLEASE DO NOT TOUCH the birds. Ask students to identify the birds using field guides. What features will help the students to identify the birds.**Forest Lab Birds**Left to Right:* **Great horned owl** – raptor – eats meat (has most diverse diet of all North American raptors – mammals, reptiles, birds, insects, …)
* **Barred owl** – raptor – eats meat (small mammals, birds, amphibians, reptiles)
* **Red breasted sap sucker** – woodpecker – eats sap, insects & fruit
* **Blue grouse** – ground feeder (like a chicken) pecks at ground - eats leaves, conifer needles, small invertebrates
* **Male mallard** – sieves food out of water, wide bill, strainer – dappler – eats aquatic plants, seeds, aquatic insect larvae, earthworms, shrimp
* **Crow (top) and Raven (bottom)** –raven beak sits at a shallow angle to head whereas crow has more of a definitive forehead. Raven also has a spade (wedge) shaped tail when flying, crows have squared off tails – eats everything!!
* **Belted Kingfisher** (male on top, female on bottom) – strong short beak for jabbing and grabbing food – eat mostly fish, will eat snails, amphibians, crayfish)
* **Male bufflehead** – note back of head is going bald from being touched – dive for food – aquatic invertebrates, snails, invertebrate larvae, clams…

This is a great opportunity to discuss the bald eagles and demonstrate that as they age there anatomy adapts. Can the students notice any changes between the 3 eagles? Eagles reach maturity at 4 to 5 years. Mature eagles have the white head and tail, with yellow eyes, beak and claws. Immature bald eagles look mottled; adult bodies are more uniformly brown. Explain to the students that this is one of the largest gathering places of bald eagles in North America in the winter. * Why do so many eagles migrate to overwinter in this place? There is a plentiful food supply in the carcasses of the spawned-out salmon, which provide one of the most abundant winter feasts in North America.
* How do the eagles interact within the ecosystem at Cheakamus? The Squamish watershed has supported a resident population of bald eagles since the last retreat of the glaciers. It has also supported an overwintering population. Here they find the large old trees they prefer for roosting and perching, a mild sea-tempered climate, and most important for migratory birds in the winter months is a plentiful food supply. What happens to the salmon carcasses that the eagles’ drop on the forest floor and beside the Cheakamus river?

**Bald Eagle Facts:** Bald eagles thrive wherever there is a large body of water, big trees and a plentiful supply of fish. The bald eagle’s foot has four grasping toes, three forward facing, one backward facing. Each toe has a razor sharp talon, made of the same material as our fingernails. Does anyone know what it is? Keratin. An eagle’s beak is also made of the same material. The skin on its feet has rough bumps, which help it grab and hold onto slippery fish. For tearing meat, the bald eagle’s beak is hooked. Powerful jaw muscles give it great biting strength, and the beak constantly sharpens itself through use. Like most flying birds, the eagle’s skeleton has hollow bones. Its bones are just half the weight of its feathers. An entire eagle skeleton weighs between 250-300 grams, a little more than half a pound. Its wingspan is between 6 – 7.5 feet wide. Eagles’ eyes face forward like human eyes. This gives them binocular, 3 dimensional vision, which enables them to judge distance and speed. Eagle vision is so acute that experts believe they can see a rabbit from 3 kilometres (2 miles) away. A special transparent eyelid slides across the eye, protecting it from dust and danger, while still allowing the eagle to see. **Characteristics of birds:*** **Swimming birds (ducks):** spoon-shaped bill for sieving water, nail on end for digging roots; webbed feet for swimming in water
* **Wading birds (herons):** long, spear-like bill for jabbing into water for fish, frogs, etc.; long legs with long-toed feet for standing in water
* **Shorebirds:** short or long bill, possibly curved for different types of probing in sand and mud; longish legs for feeding in, or near, the water
* **Birds of Prey:** strong, hooked beak for tearing meat; strong feet with sharp talons for gripping prey;
* **Chicken-like birds**: short, fairly heavy beaks, and strong feet for scratching the ground for food
* **Perching birds (warblers**): narrow, needle-like bill for picking up insects; feet with three toes forward and one toe back for perching
* **Finches:** strong, conical beak for cracking seeds; feet with three toes forward and one toe back for perching
* **Other small land birds:** any birds that do not fit into the above categories

**Bird Beak types:*** **Pliers**: strong short, for cracking seeds = finch
* **Tweezers/forceps**: more pointed, grippers on inside of forceps, for getting insects; also could be for grabbing slippery fish in the water (grippers) = chickadee, merganser, kingfisher
* **Chopsticks**: long, not too strong, for reaching into water and jabbing at food; ok for grabbing slippery fish if have rough ends (like forceps) - heron– note difference between chopsticks vs tweezers when picking up smarties
* **Scissors:** sharp, tearing; for tearing meat (raptors, birds of prey) = hawk, eagle, owl
* **Skewer in straw**: thin, not strong beak with long tongue = hummingbird
* Food types: smarties – seeds, fish eggs, slippery fish (although they are not that slippery really!); licorice – meat; leather bits – worms, insects (millipedes); string – small worms, insects

**Matching/Manipulatives activities:*** Using cards, match bird beak with food type and grouping of bird (wading, swimming, perching…); try out different beak simulators to see how they are used to get their food
* Using manipulatives – try picking up different types of food and see which simulated beak type would work best
* Review representations of beak types – what was good about the simulations, what did they not simulate?

**Heading into the field:** Explain to students that they are going to observe birds in the ecosystem and look for any adaptations (form) that suit what they do (eating, flight, walking…) Explain the proper use of binoculars and demonstrate how to focus the binoculars. You will find a binocular basics sheet in the lab. Leave all cases and lens covers at the lab. Head outside and follow the bird map to see what you can find! **Observations of birds:** Find a location along your walk with quite a few birds (use the chickens if you need to!)* Discuss with a partner what you observed. Was the bird’s activity what you expected? What was surprising? Why or why not? Have students share observations as they walk.

At the end of the study. Circle up for a group discussion about what they saw today:* What bird life did they see today? (You may want to record this information)
* What did you see that you had not observed before?
* What did you learn today about form and function?

If raining, leave the binoculars to dry at the end of the Field Study.  |  |

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| Post-visit connections: | Resources: |
| * Discuss ways to support bird health (bird decals on windows, birdhouse)
* Complete a bird count activity/schoolyard bird blitz
* Create a birdbath for your school/community
* Take part in Project Feeder Watch
* Get involved in the Vancouver Window Collision Project
 | **Books:**Project Wild: Adaptation Artistry p. 139**Websites:*** Bird count: [Gbbc.birdcount.org](http://Gbbc.birdcount.org)
* Schoolyard Birdblitz: <https://www.bsc-eoc.org/education/school/birdblitz/index.jsp>
* Project Feederwatch: <https://www.birdscanada.org/volunteer/pfw/teacher/index.html>
* Window Collision project: <https://www.birdscanada.org/volunteer/pfw/teacher/index.html>
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