

GREAT BEAR **RAINFOREST** EDUCATOR GUIDE

Science K–3 Outreach Kit



Sponsored by



THE
**GREAT BEAR
RAINFOREST**
EDUCATION & AWARENESS TRUST



ROYAL **BC** MUSEUM

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This resource is sponsored by The Great Bear Rainforest Education and Awareness Trust



BC CURRICULUM LINKS

SCIENCE K

Big Idea: Plants and animals have observable features

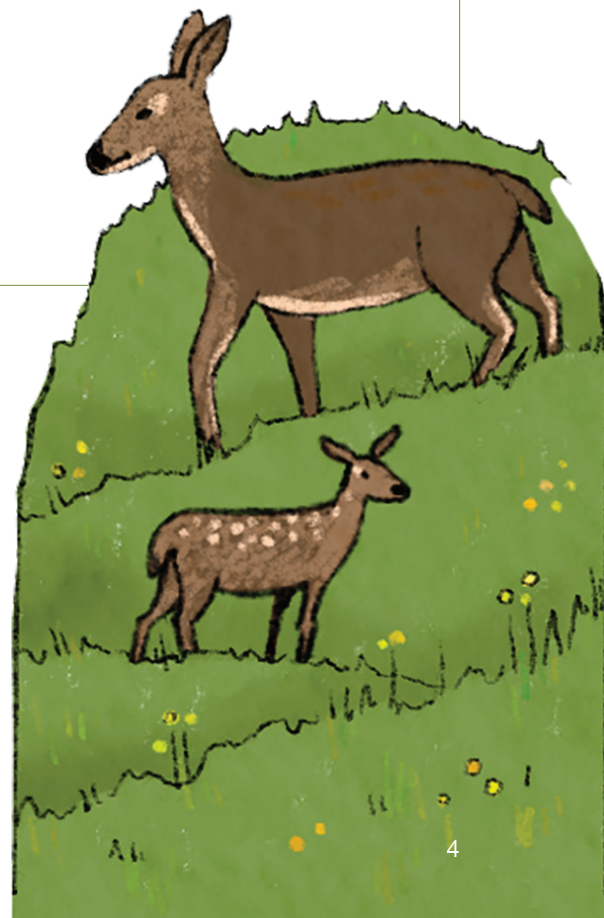
| CURRICULAR COMPETENCIES | CONTENT |
|---|---|
| <p>Questioning and predicting</p> <ul style="list-style-type: none">• Demonstrate curiosity and a sense of wonder about the world• Observe objects and events in familiar contexts• Ask simple questions about familiar objects and events <p>Planning and conducting</p> <ul style="list-style-type: none">• Make exploratory observations using their senses <p>Processing and analyzing data and information</p> <ul style="list-style-type: none">• Experience and interpret the local environment• Recognize First Peoples stories (including oral and written narratives), songs and art as ways to share knowledge• Discuss observations• Represent observations and ideas by drawing charts and simple pictographs <p>Applying and innovating</p> <ul style="list-style-type: none">• Transfer and apply learning to new situations <p>Communicating</p> <ul style="list-style-type: none">• Share observations and ideas orally• Express and reflect on personal experiences of place | <ul style="list-style-type: none">• Basic needs of plants and animals• Adaptations of local plants and animals• Weather changes |



SCIENCE 1

Big idea: Living things have features and behaviours that help them survive in their environment

| CURRICULAR COMPETENCIES | CONTENT |
|--|--|
| <p>Questioning and predicting</p> <ul style="list-style-type: none">• Demonstrate curiosity and a sense of wonder about the world• Observe objects and events in familiar contexts• Ask questions about familiar objects and events• Make simple predictions about familiar objects and events <p>Planning and conducting</p> <ul style="list-style-type: none">• Make and record observations <p>Processing and analyzing data and information</p> <ul style="list-style-type: none">• Experience and interpret the local environment• Recognize First Peoples stories (including oral and written narratives), songs, and art, as ways to share knowledge• Sort and classify data and information using drawings, pictographs and provided tables• Compare observations with predictions through discussion• Identify simple patterns and connections <p>Evaluating</p> <ul style="list-style-type: none">• Compare observations with those of others <p>Applying and innovating</p> <ul style="list-style-type: none">• Transfer and apply learning to new situations <p>Communicating</p> <ul style="list-style-type: none">• Communicate observations and ideas using oral or written language, drawing, or role-play• Express and reflect on personal experiences of place | <ul style="list-style-type: none">• Classification of living and non-living things• Names of local plants and animals• Structural features of living things in the local environment• Behavioural adaptations of animals in the local environment• Local patterns that occur on Earth and in the sky |



SCIENCE 2


Big idea: Living things have life cycles adapted to their environment; Water is essential to all living things, and it cycles through the environment

| CURRICULAR COMPETENCIES | CONTENT |
|--|--|
| <p>Questioning and predicting</p> <ul style="list-style-type: none"> • Demonstrate curiosity and a sense of wonder about the world • Observe objects and events in familiar contexts • Ask questions about familiar objects and events • Make simple predictions about familiar objects and events <p>Planning and conducting</p> <ul style="list-style-type: none"> • Make and record observations <p>Processing and analyzing data and information</p> <ul style="list-style-type: none"> • Experience and interpret the local environment • Recognize First Peoples stories (including oral and written narratives), songs, and art, as ways to share knowledge • Sort and classify data and information using drawings, pictographs and provided tables • Compare observations with predictions through discussion • Identify simple patterns and connections <p>Evaluating</p> <ul style="list-style-type: none"> • Compare observations with those of others <p>Applying and innovating</p> <ul style="list-style-type: none"> • Transfer and apply learning to new situations <p>Communicating</p> <ul style="list-style-type: none"> • Communicate observations and ideas using oral or written language, drawing, or role-play • Express and reflect on personal experiences of place | <ul style="list-style-type: none"> • Metamorphic and non-metamorphic life cycles of different organisms • Water sources • Water conservation • The water cycle |



SCIENCE 3

Big idea: Living things are diverse, can be grouped and interact in their ecosystems

| CURRICULAR COMPETENCIES | CONTENT |
|--|--|
| <p>Questioning and predicting</p> <ul style="list-style-type: none">• Demonstrate curiosity about the natural world• Observe objects and events in familiar contexts• Identify questions about familiar objects and events that can be investigated scientifically• Make predictions based on prior knowledge <p>Planning and conducting</p> <ul style="list-style-type: none">• Make observations about living and non-living things in the local environment• Collect simple data <p>Processing and analyzing data and information</p> <ul style="list-style-type: none">• Experience and interpret the local environment• Identify First Peoples perspectives and knowledge as sources of information• Sort and classify data and information using drawings or provided tables• Use tables, simple bar graphs, or other formats to represent data and show simple patterns and trends• Compare results with predictions, suggesting possible reasons for findings <p>Evaluating</p> <ul style="list-style-type: none">• Make simple inferences based on their results and prior knowledge• Demonstrate an understanding and appreciation of evidence <p>Applying and innovating</p> <ul style="list-style-type: none">• Transfer and apply learning to new situations <p>Communicating</p> <ul style="list-style-type: none">• Represent and communicate ideas and findings in a variety of ways, such as diagrams and simple reports, using digital technologies as appropriate• Express and reflect on personal or shared experiences of place | <ul style="list-style-type: none">• Biodiversity in the local environment• The knowledge of local First Peoples of ecosystems• Energy is needed for life  |

LESSON 1: WHAT IS A RAINFOREST?

OBJECTIVES

Students will explore the differences between tropical and temperate rainforests. They will then participate in a rainforest station activity by observing samples of plants and fungi from the Great Bear Rainforest (GBR). Finally, students learn about how rain contributes to the rich diversity of flora and fauna in the GBR.

MATERIALS

Included in the kit

- Tropical and temperate rainforest diorama
- Plant station: Samples of Western redcedar, Yellow-cedar, Sitka spruce, Western hemlock, Douglas-fir
- Fungi station (reproductions)
- Scents of the forest: cedar oil, pine oil, petrichor (smell of rain)
- 2 plastic jars (medium and large)
- 100 blue marbles

Not included in the kit

- World map
- Computer access
- Coloured pencils and markers

LESSON PLAN

Tropical vs Temperate Rainforest (K-3, 30 min)

1. Brainstorm what students know about rainforests. Encourage them to come up with any words related to “rain” (wet, water, puddle, drops, etc.) and “forest” (trees, moss, green, bark, etc.).
2. Explain that rainforests are characterized by a large amount of rainfall and are one of the most biodiverse places on the planet. A quarter of medicinal ingredients come from rainforests! There are two types of rainforests: tropical and temperate. In general, tropical rainforests are located near the equator and temperate rainforests are found in the midlatitudes away from the equator. Show on a world map if available in the class.
3. Set up a rainforest diorama with a tropical rainforest background. Can students predict which plants and animals live in the tropical rainforest (frog, jaguar, capybara, lemur, monkey, sloth, songbird, toucan)? Switch the background and see if students can identify what species live in the temperate rainforest (bear, cougar, deer, eagle, racoon, raven, wolf).
4. Review the differences between tropical and temperate rainforests below. Watch this [video](#) by Sci Show Kids to summarize the differences.

| Tropical rainforest | Temperate rainforest |
|--|--|
| <ul style="list-style-type: none"> • Found in warm and high humidity areas near the equator. • Found in Central and South America, Africa, India, Southeast Asia, New Guinea and Australia. • Temperature range: 21-30°C • Rainfall: 200-1000 cm/year • Sample plants: Brazil nut trees, rubber trees, cacao trees • Sample animals: monkeys, jaguars, sloths, snakes, frogs, toucans, songbirds | <ul style="list-style-type: none"> • Found in cooler areas away from the equator, near the coast or mountains. • Found in North America (Pacific Northwest), Chile, UK, Norway, Japan, New Zealand and Australia. • Temperature range: 10-21°C • Rainfall: 150-500 cm/year • Sample plants: Western redcedar, Sitka spruce, sword fern, salal • Sample animals: black bears, cougars, deer, eagles, wolves |

Rainforest Station Walk (K-1 & 3, 45 min)

1. Prior to the class, set up the Plant, Fungi and Scents Stations using the samples provided in the kit.
2. Show an introductory [video](#) of the Great Bear Rainforest in British Columbia. Explain to students that they will explore some plants and fungi that live in the rainforest (animals will be explored in Lesson 3). Explain that scientists make observations about the world by using their senses. Can students identify what the five senses are?
3. Explain that students will now go for a rainforest walk in the classroom. Dim the lights and [play rain sounds](#) on a computer. Distribute the [worksheet titled “Rainforest Walk.”](#) Ask students to record their observations using words (I see..., I feel..., I smell..., I hear...) and pictures (1 to 2 images of specimens that they like). Use coloured pencils and markers to draw pictures.
4. At the end of the activity, ask students to share their observations. What did they see, feel, smell or hear? Based on the evidence collected on the rainforest walk, can they identify whether the Great Bear Rainforest is a tropical or temperate rainforest? Probe them to explain their reasoning by asking, “What makes you say that?”
5. Extension for Science 3:
 - Discuss how living things can be grouped according to similar characteristics. What makes a plant a plant, or a fungus a fungus?
 - Plants use sunlight to grow (a process called photosynthesis) and are usually rooted to one place. Some plants have true roots, stems and leaves, such as cedar trees, but other plants like mosses do not. Most plants reproduce using seeds or spores.
 - Fungi are neither plants nor animals. We often recognize fungi by looking at their fleshy fruiting body (with a stalk and cap). However, most of the fungi is made up of mycelium, which are thin, threadlike strands that are found in the soil.

Rain, rain and rain! (K-2, 30 min)

1. The Great Bear Rainforest is one of the wettest temperate rainforests in the world! Gather the class in a circle and play an introductory [body percussion game](#) to simulate different rain sounds from light to heavy rain.
2. The amount of liquid or solid water particles (e.g., rain, snow, ice crystals or hail) that falls to the ground is called precipitation. Explain that the GBR receives approximately 665 cm of precipitation per year, mostly in the wintertime. Research the [annual precipitation in your local area](#) for comparison.

3. Use two jars and marbles to compare the amount of rainfall between the GBR and your area. If one marble equals 10 cm of rain, how many marbles do we need to put in each jar? Place 67 marbles in the large GBR jar and the appropriate number of marbles for your city/town in the small jar.
4. Discuss why rain is important for life in the GBR. Explain that all animals and plants need food, water, shelter and space to live. Rain provides fresh drinking water for animals and shelter/space for aquatic or semi-aquatic animals (e.g., salmon, frogs, salamanders). Water is also important for plant growth; in fact, the GBR is home to many old growth trees including 1000-year-old Western redcedars.
5. A person who studies the weather is called a meteorologist. Explain that weather can be described in terms of temperature, cloud cover, precipitation and wind. Distribute the worksheet titled “Weather Graph” to keep track of the number of sunny, cloudy, rainy, snowy or windy days over one to two weeks in your local area.
6. Extension for Science 2:
 - Go on a water walk and record sources of water in your school (e.g., sinks, water fountains, bathrooms) or your local community (e.g., puddles, water in plants/animals, ponds, rivers, oceans, lakes). Explain that most of the freshwater is stored underground or in glaciers.
 - Learn about the water cycle! Rain is created when water evaporates from the earth, condenses to form clouds and falls back to the earth. Coastal areas such as BC receive a lot of rain due to evaporation of water from the ocean. Try this [water cycle in a bag experiment](#).



LESSON 2: WHERE IS THE GREAT BEAR RAINFOREST?

OBJECTIVES

Students will explore different types of maps from the Royal BC Museum archival collection. They then construct their own map of the classroom or school to understand how maps can be used for wayfinding. Finally, they study three types of maps of the Great Bear Rainforest (major communities, Indigenous territories and languages) to understand the different stories that maps reveal.

MATERIALS

Included in the kit

- Collection of maps from the Royal BC Museum Archives
- 1 topographical map of the Great Bear Rainforest
- 3 political/cultural maps of the Great Bear Rainforest
- Colour blocks that show the area of Vancouver and Victoria
- [First Peoples principles of learning](#) poster

Not included in the kit

- Computer access
- Letter-sized printer paper
- Construction paper
- Scissors
- Glue
- Coloured pencils
- Small treasures (e.g., lego or candy)

LESSON PLAN

What are maps? (K-3, 45 min)

1. Display a collection of archival maps from the Royal BC Museum. Explain how physical maps show geographic features like mountains, hills, oceans and rivers. Political maps show streets and boundaries like cities, provinces or territories. For older students, explore thematic maps on [National Geographic's map maker](#) by adding layers such as precipitation, water risk level, terrestrial biodiversity or biomes to the map.
2. Invite students draw a map of the class (K-1) or school (2-3) on a letter-sized paper. Ask students to imagine flying above the class or school to identify major features such as desks, chairs, doors and bookshelves, or hallways, lockers and classrooms. Students can draw these features or use construction paper to cut and glue items on their map. Instruct them to make a legend on the side.
3. Optional: Play a treasure hunt map game. Hide small treasures (e.g., Lego figures or candies) around the class/school. Label students' maps with the locations of these treasures and encourage them to read their maps to find the goodies!

4. Explain that Indigenous people often name places according to stories that relate to a place. Look at [examples](#) of Indigenous place names in your local area. Invite students to think about special memories that they have in a place of meaning and how they might name a place from that story.
5. Explain how Indigenous place names were often changed when settlers arrived. In the spirit of truth and reconciliation, some Indigenous names have recently been reinstated in some communities. For example, Mount Douglas in Victoria (named after Governor James Douglas) was renamed to PKOLS in 2022 (meaning “white rock” in the SENĆOŦEN language, named after the story of a Creator who threw white rocks to mark the borders of the W̱SÁNEĆ people). If you could (re)name areas of your community around stories that matter, what would they be?

Maps of the GBR (K-3, 45 min)

1. Show a topographical map of the Great Bear Rainforest and have students sit around it on the floor. Explain that the GBR is a special protection area that spans the north and central coast of BC. In February 2016, the Government of BC, First Nation groups, environmental groups and forest industries reached an agreement to protect this special area.
2. What do students notice looking at the maps? Point out that the GBR is made up of many mountains and island communities along the coast. Students may be surprised to learn that the ocean is also a protected area of the GBR.
3. The GBR is a large area equivalent to 6.4 million hectares. To visualize, use the colour blocks that represent a large city (Vancouver) and a small city (Victoria). Show each block and ask students to predict how many blocks of each they would need to fill the space of the GBR. (ANSWER: 22 Vancouver sized blocks or 92 Victoria sized blocks). For older students, repeat this exercise with their city/town. Go to [Google Earth](#) and use the measuring tool (ruler icon) to determine the size of their community. Invite students to predict how much larger GBR is compared to their city/town.
4. Show three maps of the Great Bear Rainforest: major communities, Indigenous territories and Indigenous languages. Invite students to complete the [“See-Think-Wonder” worksheet](#) as they study the maps. Ask students to study the individual maps first, then overlay the three maps on top of one another.
5. Invite students to share their observations with the class. In the follow-up class discussion, highlight the following key points:
 - There are 15 [major communities](#) and 26 [First Nations](#) in the Great Bear Rainforest. The First Peoples have lived in this area for over 10,000 years since the last Ice Age.
 - Community boundaries are usually distinct and fixed political boundaries, whereas territorial and language boundaries are fluid and show areas of overlap. This is because Indigenous territories depend on ancestral connections and kinship ties to the land.
 - Explain that different maps show different worldviews and that there is no one “correct” map. As Polish-American scholar Alfred Korzybski said, “The map is not the territory”; that is, the way that we see the world is not the world itself.
 - From an Indigenous perspective, the land is a sacred place. A flat 2D map does not accurately portray the relationship that people have with a place. Refer to the First Peoples principles of learning poster to emphasize that “learning is holistic, reflexive, reflective, experiential and relational” and that “learning is embedded in memory, history and story.”
 - Listen to the land acknowledgement in [Sm’algyax](#) (also known as Tsimshian), which is one of the largest language groups in the Great Bear Rainforest. Compare this with the land acknowledgement of First Nations group(s) in your local area.

LESSON 3: WHAT ANIMALS LIVE IN THE GREAT BEAR RAINFOREST?

OBJECTIVES

Students will participate in an animal station walk activity with samples of land animals, marine animals and birds from the Great Bear Rainforest. They will then learn more about spirit bears (also known as Kermode bears or moksgm'ol in Tsimshian). Through colouring exercises, students explore why spirit bears are white and determine whether the white fur colour is an advantage or disadvantage to survival.

MATERIALS

Included in the kit

- Land animal station samples (wolf track, grizzly fur, cougar skat)
- Marine animal station samples (abalone shell, salmon model, orca tooth)
- Bird station samples (feathers, eagle talon, raven skull)
- 6 magnifying glasses
- Cards with names of animals
- [Spirit Bear](#) by Jennifer Harrington

Not included in the kit

- Coloured pencils
- Bear colouring sheets (forest and river versions). Print from the [Royal BC Museum Learning Portal](#).

LESSON PLAN

Animal Station Walk (K-3, 45 min)

1. Prior to the class, set up the land animal, marine animal and bird stations using the samples provided in the kit. Place two magnifying glasses at each station.
2. Show the [Great Bear Rainforest](#) video. Ask students to record what animals they see and recognize in the video.
3. Invite groups of students to visit each station and complete the [“Animal Station Walk” worksheet](#). Students should pick one sample that they would like to study and record it on the worksheet. Explain that they will only see parts of the animal (e.g., skulls, feathers or bones) and their task is to make a prediction about what animal it is. This mirrors what often happens in field work: like detectives, scientists must piece together incomplete pieces of evidence to determine what they see. Explain that the purpose of the activity is not to get the right answer, but for students to explain their reasoning.
4. After students have completed the activity, review the samples in the class. Hold each item and invite students to share their predictions and explanations. Display cards with the name of each animal in both English and Tsimshian. Extension for Science 2-3:
 - Identify which animals are metamorphic (e.g., salmon) or non-metamorphic (e.g., black bear). Explore the [life cycle of salmon](#) with an emphasis on body structure changes.
 - Explain that animals in the Great Bear Rainforest interact with one another to form a food web. Stick the animal cards on a magnetic whiteboard and invite students to identify predator-prey connections between organisms. Create a food chain first and see if that could be expanded to form a food web.

- Emphasize the interconnections between the [land and the sea](#). For example, herring eggs that wash onto the shore give nutrients to land animals like black bears or wolves; when salmon return to their spawning sites, they provide a rich source of nutrients for terrestrial life to flourish.

Species Spotlight: Spirit Bears (K-3, 45 min)

1. Spirit bears (also known as Kermode bear or moksgm'ol in the Tsimshian language) are provincial mammals of British Columbia. They were first thought to be a unique species but are in fact colour variations of black bears (*Ursus americanus*). Share some fun facts about spirit bears:
 - Spirit bears are commonly found on Princess Royal Island and Gribbell Island in the Great Bear Rainforest. See if students can find these islands on the maps from Lesson 2.
 - In 1905, American zoologist William Hornaday identified the Kermode bear and named it after his colleague Frank Kermode, director of the British Columbia Provincial Museum (now the Royal BC Museum) in the early 1900s.
 - A spirit bear cub lived in a cage at Beacon Hill Park in Victoria until 1948. Learn more about this story on [Royal BC Museum's Learning Portal](#).
 - The spirit bear is called moksgm'ol (meaning white bear) in the Tsimshian language. Although the scientific community named the bear after Frank Kermode, the First Peoples had in fact known about moksgm'ol for thousands of years.
 - A Tsimshian story suggests that the Creator made every tenth bear a white bear to remind people about the time of the Ice Age. Watch this [video](#) to learn about the relationship that the Gitga'at First Nations people have with spirit bears.
 - Why are spirit bears white? Briefly explain that there is a genetic explanation for their white coat (caused by a recessive gene). However, scientists are still trying to understand if the white colour is a beneficial, harmful or neutral adaptation for survival in the Great Bear Rainforest.
2. Divide the class into two groups. Distribute the [bear colouring sheet](#) (forest version) to one group and the bear colouring sheet (river version) to the other. Instruct half of the students in each group to colour their bear black, and the other to colour their bear white. Encourage students to colour the forest green and the river blue, as this activity works best when the original colours are used.
3. Display students' colouring sheets in the class and invite them to study what they see. Probe their thinking with the following questions:
 - Which bear is better at hiding in the forest? Answer: The black bear is better camouflaged in the forest.
 - Which bear is better at catching salmon? Answer: The spirit bear is better camouflaged in the water, so they are more successful hunters in the daytime. In fact, salmon avoid the black feet of black bears in the water. [Watch](#) these spirit bears successfully catch salmon in a stream.
 - Is having a white fur coat an adaptation? Answer: Scientists are unsure whether the white colouration is beneficial, harmful or neutral adaptation. Emphasize that science is a quest to find out the unknown.
4. Read the children's book *Spirit Bear* by Jennifer Harrington to summarize what students learned above.
5. Extension for Science 2-3:
 - Explain that salmon are a keystone species in the Great Bear Rainforest. When salmon return to their spawning sites, they are eaten by predators such as bears, eagles and wolves. Their nutrient-rich carcasses return to streams, rivers and forests, providing a critical link between the land and the sea.
 - Look at the decline of sockeye, pink and coho [salmon populations](#) in the Great Bear Rainforest. Some major causes of their decline include: warming ocean temperatures due to climate change, infrastructure expansions like dams and open net salmon farms that spread diseases to wild populations.
 - As a class, brainstorm what you can do to protect salmon populations in your local area. For example, how can students help to maintain clean watersheds or eat sustainable seafood?

LESSON 1: WHAT IS A RAINFOREST?

Let's explore the rainforest using your senses!

Name: _____

What do you see?



What do you feel?



What do you smell?



What do you hear?



PLANT STATION

| WORDS | PICTURE |
|-------|---------|
| | |

FUNGI STATION

| WORDS | PICTURE |
|-------|---------|
| | |

FUNGI STATION

| WORDS | PICTURE |
|-------|---------|
| | |

SCENT STATION

| WORDS | PICTURE |
|-------|---------|
| | |

Is the Great Bear Rainforest a tropical or temperate rainforest?

How do you know?

LESSON 2: EXPLORING MAPS

Name: _____

| | |
|---------------|--|
| See | |
| Think | |
| Wonder | |

LESSON 3: ANIMAL STATION WALK

Name: _____

LAND ANIMALS

| PICTURE | PREDICT & EXPLAIN |
|---------|-------------------|
| | |

MARINE ANIMALS

| PICTURE | PREDICT & EXPLAIN |
|---------|-------------------|
| | |

BIRDS

| PICTURE | PREDICT & EXPLAIN |
|---------|-------------------|
| | |

ADDITIONAL RESOURCES

- Learn more about the biodiversity, geography and stewardship of the Great Bear Rainforest on the [Great Bear Rainforest Education and Awareness Trust](#) website. Find more [K-3 activity plans](#) and [maps](#) of the Great Bear Rainforest.
- Explore images, articles and videos about the Great Bear Rainforest on the [Royal BC Museum's Learning Portal](#).
- Look at the species identification guide for plants, fungi, seaweed, land animals, marine animals and birds from the [Biodiversity of the Central Coast](#).
- Learn about the alliance of nine [coastal First Nations](#) groups to protect the Great Bear Rainforest.
- Find more K-3 salmon activities and lessons through Fisheries and Ocean Canada's comprehensive educator guide, [Salmonids in the Classroom](#).
- Read [Hakai magazine's](#) article on how the spirit bear's white coat provides an advantage for catching salmon.
- Explore [Pacific Wild's](#) interactive story map to learn more about the ancient forest, coastal First Nations and animals of the Great Bear Rainforest.

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