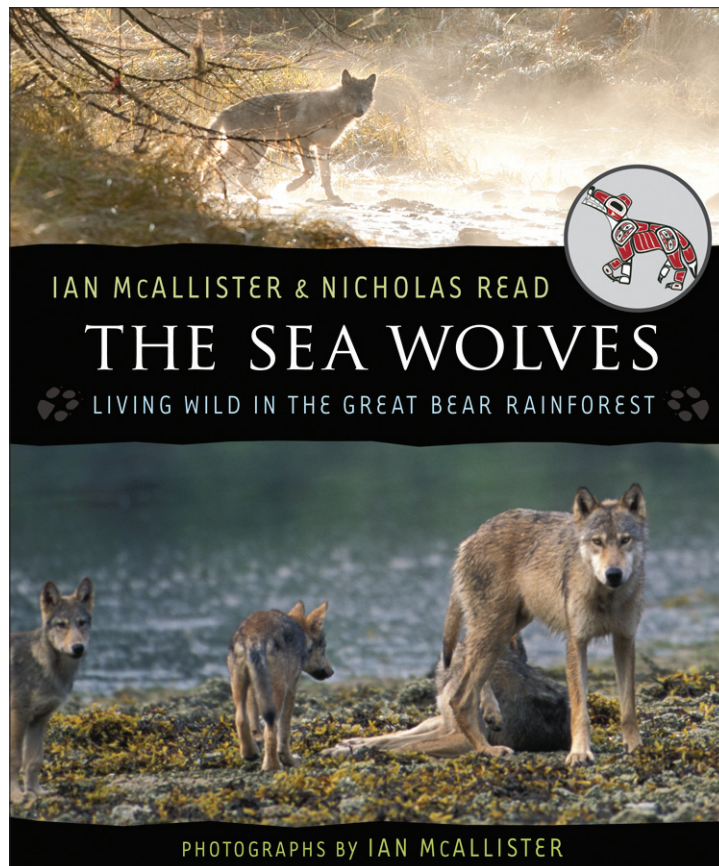


Learning Guide

IAN McALLISTER & NICHOLAS READ

THE SEA WOLVES

LIVING WILD IN THE GREAT BEAR RAINFOREST



9781554692064 PB with flaps • ages 8+

More resources at www.seawolves.ca and www.pacificwild.org



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CONTRIBUTING WRITERS: Alex Van Tol, Lauren Hudson, Diana Chan, Johanna Gordon-Walker and Karen McAllister

PACIFIC WILD is a non-profit wildlife conservation organization that is committed to protecting the wolves in the Great Bear Rainforest by developing and implementing solution-based strategies that protect wildlife and their habitat Pacific Wild has been at the forefront of large carnivore conservation on the British Columbia coast by supporting innovative research, public education, community outreach and awareness to achieve the goal of lasting wildlife protection.

For more information on Pacific Wild’s conservation work or to learn more about the wolves of the Great Bear Rainforest please contact:

Pacific Wild
PO Box 26, Denny Island, BC V0T 1B0
Canada
website: www.pacificwild.org • email: info@pacificwild.org



The Sea Wolves

Living Wild in the Great Bear Rainforest

Ian McAllister and Nicholas Read

Subjects: Life Science, Earth and Space Science, English Language Arts, Math, Social Studies and Art

Grades: 4–7

The Book:

The Sea Wolves sets out to disprove the notion of “the Big Bad Wolf,” especially as it is applied to coastal wolves—a unique strain of wolf that lives in the rainforest along the Pacific coast of Canada. Genetically distinct from their inland cousins and from wolves in any other part of the world, coastal wolves can swim like otters and fish like the bears with whom they share the rainforest. Smaller than the gray wolves that live on the other side of the Coast Mountains, these wolves are highly social and fiercely intelligent creatures.

Living in the remote wilds of the Great Bear Rainforest, coastal wolves have also enjoyed a unique relationship with man. The First Nations peoples, who have shared their territory for thousands of years, do not see them as a nuisance species but instead have long offered the wolf a place of respect and admiration within their culture.

Illustrated with almost one hundred of Ian McAllister’s magnificent photographs, *The Sea Wolves* presents a strong case for the importance of preserving the Great Bear Rainforest for the wolves, the bears and the other unique creatures that live there.

The Authors:

Ian McAllister is a founding director of Pacific Wild, a Canadian non-profit wildlife conservation group. An award-winning author and photographer, he has spent more than twenty years working to protect the West Coast’s temperate rainforest. Ian lives with his family on an island in the heart of the Great Bear Rainforest.

Nicholas Read, a lifelong lover of animals, works as a journalism instructor at Langara College in Vancouver, British Columbia. He has written for the *Vancouver Sun*, *The Globe and Mail*, *Toronto Star* and other publications, and has authored two prize-winning children’s books.

The Learning Guide:

We’ve designed this learning guide to be used alongside *The Sea Wolves*. Here, you’ll find thought-provoking discussion questions as well as ready-to-go lessons and extension activities centering on BC’s coastal wolves and other animals inhabiting the Great Bear Rainforest ecosystem. Paired with *The Sea Wolves*, this learning guide addresses a number of the Prescribed Learning Outcomes established by the BC Ministry of Education. We’ve linked each activity with science themes and outcomes for grades four to seven—and where applicable, we’ve made connections with social studies, math, art and Language Arts outcomes too.

Chapter I: A Bad Rap

Reach back thousands of years into history and you will find a mixed review of references to wolves, from salvation-bearing protectors to bloodthirsty sinners. Modern science has uncovered the link between your domestic pooch pal and the wolf, a genetic distinction born 12,000 to 14,000 years ago. Even cooler? Scientists have recently determined that the rainforest wolves that thrive in the temperate, ocean-bound environment of British Columbia's Great Bear Rainforest are genetically unique.

Discussion Questions Before Reading

- What do you know about the Great Bear Rainforest?
- What do you know about wolves, where they live and what they do?
- What is the difference between a wild and a domestic organism?

Discussion Questions After Reading

- What ideas and beliefs do you have about wolves from listening to fables and stories about them?
- What are some of the challenges in protecting the wolves of the Great Bear Rainforest?
- What is the historical range of the North American grey wolf compared to the current range?

Science In Action

Main Activity

Amazing Mammals

Focus: comparing the structures and behaviors of local animals in different habitats and communities; analyzing how different organisms adapt to their environment; collaborating with other students to explore information; organizing information; reading print and multimedia resources to create meaning; synthesizing to create new information; creating images using a range of visual elements, processes and materials

Mammals exist on every continent of the world. What makes mammals so special?

1. On the board, write a list of animals including insects, birds, mammals, reptiles, amphibians and fish. Adapt the number and variety of animals to your class. For example:

dog	whale	dragonfly	salmon	wolf
eagle	newt	heron	butterfly	herring
goldfish	cat	horse	snake	turtle

2. Ask your students to work with a partner to find a way to organize this list. Leaving your instructions very open-ended. This is up to the students to figure out!
3. Invite each pair to share their categorization. If the groups didn't pick up on mammals, ask them what a whale and wolf have in common, eventually drawing out a mammalian grouping.
4. Have the groups explore what it means to be a mammal. A good place for students to start their mammal research is at:

www.earthlife.net/mammals/welcome.html

Here's another site with easy reading content about all animal classes, including mammals:

www.kidzone.ws/animals/animal_classes.htm

Here's a short video/audio clip from the American Museum of Natural History:

www.youtube.com/watch?v=0jw74pfWfxA

And one from the Discovery Channel:

www.youtube.com/watch?v=_YSCLSFm2eA&feature=related

5. Invite students to use the Frayer model (**What It Takes to Be a Mammal**) on page 35 of the *Appendix* to demonstrate their understanding.
6. Most everything it seems has a purpose in nature; nature does nothing in vain. Challenge your students to create their own mammal species. They can do this with PowerPoint, on paper or with a designing program such as Microsoft Paint. Ensure students include or can explain details about how each of their creature's features serves a purpose.

Extension Activities

A. Word Work

Focus: reading informational texts to construct meaning; vocabulary building

As you read the book, have students keep track of the new "wolf words" as they learn them (see *Appendix*, page 36–37). Some students may wish to create an illustrated glossary.

B. Big Bad Wolves?

Focus: human impacts on ecosystems; behaviors of animals; exploring multimedia texts to construct meaning; viewing and listening to traditional stories/legends; comparing and contrasting; classifying data; creating lists

Using **A Wolf in Sheep's Clothing** (*Appendix*, see page 38), create a list of stereotypes about wolves. Compare this list to what you know or find out about wolves. The following websites are a good place to start your research:

The Sea Wolves Learning Guide

Northern Lights Wildlife Center

www.northernlightswildlife.com/wolf_info.html

Haliburton Forest and Wildlife Reserve

www.haliburtonforest.com/wolf.html

Disney animation of “Who’s Afraid of the Big Bad Wolf?”

www.youtube.com/watch?v=ShE27Hst_NM

Pacific Wild video vault

<http://pacificwild.org/site/our-work/resources/learning-resources-the-sea-wolves.html>

C. Bringing the Wolves Back

Focus: habitats, communities and ecosystems; human impacts on ecosystems; sustainability; exploring informational texts to construct meaning; developing arguments; evaluating possible courses of action; assessing the value of information sources; explaining and supporting personal responses to texts

Wolves have been hunted to *extirpation* in some areas, meaning that they have been wiped out of an area where they naturally once lived. Scientists have since discovered what a huge, negative impact this had on entire ecosystems. Re-introducing wolves back into their natural habitats is a current practice in conservation biology.

Here’s a Nova page where a US Fish and Wildlife Officer reflects on the challenges of re-introducing wolves to Yellowstone National Park:

www.pbs.org/wgbh/nova/nature/wolves-yellowstone.html

1. Explore this issue further. The Nova Teachers site offers an engaging lesson (and reproducibles) that will get your students thinking critically:
www.pbs.org/wgbh/nova/teachers/activities/2415_wolves.html
2. In their science or Language Arts journal, ask students to write a paragraph reflecting on the activity they’ve just completed. What was the most challenging aspect? What did they learn? How might they change their strategies if they knew they were making these decisions for real?

Chapter 2: Babes in the Woods

Wolves live in a highly structured, complex family grouping called a pack. Pups are born in dens that have often been used for generations—and that’s where they spend their first few weeks. Like many mammals, young wolves spend their first months nursing, learning from mom and playing with their siblings. The entire pack plays a role in the pups’ development, from gathering food to babysitting. Early in pup development is the only time wolves have natural predators besides humans. Cougars and bears are known to snatch up wolf pups. Watch out!

Discussion Questions Before Reading

- What do you think would make an ideal wolf home?
- How do you think wolves communicate and for what purpose?

Discussion Questions After Reading

- Describe wolf dens. How is a wolf den similar to and different from a bear’s den? Your home?
- How does wolf pup development compare to other mammals?

Science In Action

Main Activity

Family Matters

Focus: habitats, communities and ecosystems; animal behavior; connecting to experience; organizing information; note-taking

As your students get older, they may be finding that they have an increasing amount of responsibilities, from homework to cleaning their room. Wolves do too.

Discuss the idea of dominance and hierarchy using the metaphor of their own family. On **Wolf Family Structure** (*Appendix*, page 39), have students add information to create a mind map showing what *The Sea Wolves* reveals about the family structure of coastal wolves. Details may include but are not limited to:

alpha female	-the most dominant female of the pack -the wolf that births the pups of a pack
alpha male	-the most dominant male of the pack -he can be challenged by subordinate or younger males
subordinate male	-he might try to challenge the dominance of the alpha male -he might leave the pack to search for a new one to join or a territory to begin his own pack
subordinate female	-generally stay with their birth pack to help rear the pups
pups/juveniles	-grow and develop the skills they need for survival with the help of the pack members

The Sea Wolves Learning Guide

Here are a couple of websites to help students deepen their research into pack hierarchies:

ThinkQuest

<http://library.thinkquest.org/CR0212280/intelligence.htm>

Wolf Country

www.wolfcountry.net/information/WolfPack.html

Wolf Worlds

www.wolfworlds.com/wolf-social-structure.html

Extension Activities

A. Dog or Wolf?

Focus: comparing the structure and behavior of animals in different habitats and communities; connecting to experience; reading informational texts to construct meaning; comparing and contrasting; note-taking

Using **Man’s Best Friend or Wilderness Wolf** (*Appendix*, page 40), have students compare and contrast dogs and wolves. They can pull information from *The Sea Wolves*, their own experience and readings, and the following site:

<http://wolfdog.ws/html/differences.html>

B. Ice Age Exploration

Focus: explaining how the Earth’s surface changes over time; exploring multimedia resources to create meaning; analyzing impacts of weather on living and non-living things; assessing survival needs and interactions between organisms and the environment

Scientists aren’t sure how coastal wolves first came to the Great Bear Rainforest area, but the last ice age is thought to have affected their distribution. Have students investigate how our earth has changed and developed over time as a result of the ice ages. Start here, with a time-lapse clip that shows the advance and retreat of ice sheets across North America, beginning 120,000 years ago:

www.youtube.com/watch?v=USIAcXfv39k&feature=related

Keep the learning going at these informative sites:

<http://library.thinkquest.org/3876/iceage.html>

www.pbs.org/wgbh/nova/earth/cause-ice-age.html (upper grades)

And for a bit on ice age wolves (whoa, *crazy* big!):

<http://news.nationalgeographic.com/news/2007/06/070621-giant-wolves.html>

C. Gettin’ Artsy!

Focus: exploring informational and visual texts to construct meaning; responding to text; creating images using a range of visual elements, processes and materials

Draw or paint a picture of the wolves at night sleeping in or around the den, as it’s described at the beginning of chapter 2 in *The Sea Wolves*.

D. Just for Fun

Focus: exploring multimedia resources to create meaning; connecting to experience

Take an online quiz about wolves and dogs:

www.pbs.org/wgbh/nova/wolves/wolfdog.html

The Sea Wolves



Photo credit: Ian McAllister

Chapter 3: Summertime and the Livin' Is Easier

In the summer, there's an abundance of food fresh for the picking (or hunting, in the wolves' case). Wolves have an easier time in summer of finding the food they need to survive. Wolves still need to forage though. They will travel to the far outer reaches of their home range, which is at least 60 square kilometers.

Discussion Questions Before Reading

- What animals do wolves prey upon? Are there any animals that you think coastal wolves might prey upon that other wolves do not?

Discussion Questions After Reading

- How is the wolves' diet affected by the summer season?
- How are wolves adapted to their coastal environment?

Science In Action

Main Activity

Diet on a Chain

Focus: habitats, communities and ecosystems; organisms as parts of interconnected food webs; food chains; survival needs; interactions between organisms and the environment; interacting with others to explore ideas and information

In the summertime, a wolf diet is never boring! Can you pick out how many different food sources wolves have?

Materials

colored construction paper strips, approximately 4 cm by 22 cm

felt markers

glue stick

1. After reading chapter 3, review all of the different foods that wolves eat in the summer.
2. Using the following chart, review the difference between producers, primary consumers, secondary consumers and decomposers; these are referred to as *trophic* levels.

producers	organisms that get their energy from the sun; these organisms form the basis of the food chain (e.g., plants and phytoplankton)
primary consumers	organisms that eat producers (e.g., deer)
secondary consumers	organisms that eat the secondary consumers (e.g., wolves)
decomposers	organisms that break down (decompose) dead (e.g., bacteria)

3. Provide the students with four strips of paper. Have students record an organism from each trophic level on each strip of paper. For example, a bear is a secondary consumer; a bacterium is a decomposer.
4. Have them glue the strips to form a chain: producer → primary consumer → secondary consumer → decomposer.
5. Have the students compare their food chains with those of other students. They should notice that there are some common producers and decomposers, but that the primary consumers—as there are so many—may be quite varied.

Extension Activities

A. One People, One Tribe, One Earth

Focus: comparing the structure and behavior of animals in different habitats and communities; connecting to experience; listening to comprehend, interpret and evaluate ideas and information; using and experimenting with elements of style in writing and representing, including visual/artistic devices; writing effective imaginative texts to explore ideas and information, and to experiment with language and style

Explore songs about habitat and environmental themes.

- “What’s That? Habitat!” by Remy Rodden
www.we7.com/#/song/Remy-Rodden/Whats-That-Habitat
- “I Am the Future” by Holly Arntezn and Kevin Wright
www.youtube.com/watch?v=nGKv_UByTZs
- “If a Tree Falls in the Forest” by Bruce Cockburn
www.youtube.com/watch?v=W8CibAuvZM4
- “Reduce, Reuse, Recycle” by Jack Johnson
www.youtube.com/watch?v=uSM2riAEX4U
- “The Habitat Song” by Bill Oliver
www.songsforteaching.com/jeffschroeder/habitat.htm

Assign students to work with a partner and write a song that teaches younger children to be responsible for the Earth. They may choose to go with a tune they already know (such as “Row, Row, Row Your Boat” or “Happy Birthday”), but they must create their own lyrics. Record these songs on video and upload them to your classroom website or blog!

B. Wolf Watchers

Focus: viewing and listening to make meaning; analyzing the roles of organisms as part of interconnected food webs, populations, communities and ecosystems; evaluating human impacts on ecosystems; assessing the requirements for sustaining healthy ecosystems

Relax into a short video (27 minutes) about the wolves of the Great Bear Rainforest, then complete Activities C and D, below.

<http://vimeo.com/4420635>

C. Apex Predators

Focus: comparing structures and behaviors of local animals in different habitats and communities; analyzing simple food chains; reading informational text to construct meaning; writing purposeful information texts to express ideas and information, and to record and describe

If you watched the film clip from Activity B, you'll have heard the term *apex predator*. Wolves, eagles and orcas are some other apex predators in the Great Bear Rainforest. Use Wikipedia to look up *apex predator*. In their science notebooks, have students complete the following:

1. Write the definition of *apex predator*.
2. Choose one of the apex predators of the Great Bear Rainforest. Describe your chosen animal: what does it look like? What noises does it make? Where does it live (i.e., in the trees; in a den)?
3. Draw your apex predator's food chain, starting with producers (plants), then going through primary (small organisms that eat plants) and secondary consumers (predators that eat primary consumers—that's where your apex predator will be on your food chain), and finally ending with the decomposers (the things that eat dead animals). Use *The Sea Wolves* or *The Salmon Bears* to help you find information about what your animal eats.

D. Idiom Addicts

Focus: interacting and collaborating in groups to explore ideas and information; listening to comprehend, interpret and evaluate ideas and information, considering message, tone and bias

Write the following on the board: *Mankind has the habit of burning the library before reading the books*. Explain to students that this is an *idiom*—an expression that, while not literally true, still makes a point. As a class, figure out what this expression means. Organize students into small groups. Provide each group with chart paper and colored markers. Task them to divide their chart in half; on one half, record a list of idioms that they've heard. On the other half, they should write what those expressions mean. How many environmentally related idioms can they think of? Share these with the class.

E. Investigating Clear-Cut Logging

Focus: habitats, communities and ecosystems; human impacts on ecosystems; examining requirements for sustaining healthy local ecosystems; interactions between organisms and the environment; determining how personal choices and actions have environmental consequences; interacting with others to explore ideas and information; testing a hypothesis by conducting an experiment that controls for two or more variables; creating models that help to explain scientific concepts and hypotheses

In chapter 2, students are introduced to the fact that clear-cut logging is practiced in the Great Bear Rainforest. Discuss with students how clear-cut logging damages streams and hillsides by increasing the rate of soil erosion, and explain to them that they're going to take part in a scientific experiment that demonstrates the negative impacts of clear-cutting.

Head to this site for an excellent, 1.25-hour lesson/experiment. Developed for a Vancouver elementary school, this engaging experiment gets students thinking about clear-cutting:

www.scientistinresidence.ca/pdf/life-science/Temperate%20Forest/SRP_Temperate%20Forest_Lesson%206%20WF.pdf



Photo credit: Ian McAllister

Chapter 4: By the Beautiful Sea

Coastal wolves are quite distinct from their inland cousins. This is likely due to their unique oceanfront habitat. Swimming is a surprisingly common activity undertaken by wolves of the Great Bear Rainforest. Where deer are, wolves are guaranteed to follow, even if it means swimming long distances.

Discussion Questions Before Reading

- Scan through the pictures in this chapter. How do you think coastal wolves are different from other wolves around the world? What evidence do you have for this?

Discussion Questions After Reading

- How would wolves be affected by a population change in deer?
- Read the Wolf Bites on pages 58 and 61. How and why do wolves communicate?

Science In Action

Main Activity

Oh, Deer!

This activity is based on the game “Oh, Deer” from www.projectwild.org.

Focus: habitats, communities and ecosystems; organisms as parts of interconnected food webs; food chains; survival needs; interactions between organisms and the environment; making predictions; connecting to experience; writing to interpret, analyze and synthesize ideas and information

Because wolves are active in all seasons, they never stop hunting. Wolves must constantly be interacting with their habitat, which comprises their prey; areas to drink, rest and rear young; and territory in which to hunt and live. In short, wolves have the same physical needs as all other organisms: food, shelter, water and space.

Materials

large, open space

1. Discuss what all organisms need in order to survive in their habitat. Guide the conversation toward the idea that food, shelter, water and space are life’s necessities. Have the students develop simple, easily distinguished hand gestures to represent these four pillars of habitat.
2. Divide the class roughly in half. Have them stand at opposite ends of a field or gym with each “team” facing the other. Instruct the class that half of them will be habitat pillars, and the other half will be deer.
3. Explain the game to the students: The deer will turn away while each member of the habitat group secretly chooses which pillar of the habitat they’re going to represent (food, shelter, water or space). Habitat team members don’t get to discuss this. At the same time, each deer must secretly decide which pillar of the habitat he/she is going to seek out during the game. When the teacher calls “Oh, Deer!”, two things will happen: 1) each member of the habitat team and

each member of the deer team will show their chosen hand symbol, and 2) the deer will turn around and run toward the part of the habitat they're looking for. (The catch? Each member of the habitat team can only accommodate one deer.)

4. Before the game gets underway, ask students to hypothesize what will happen. Will every deer find what he or she needs in the habitat?
5. Play out round one! Record the results. Any deer that could not find the habitat pillar it needs “dies” and joins the habitat team for the next round. Any deer that finds the habitat pillar he or she needs takes that person from the habitat line to join the deer line for the next round. Elicit from the students how this is a reasonable representation of what happens in nature: when an animal has everything it needs, it will thrive and reproduce; but when an animal can't find everything it needs, it dies (and then its body is decomposed and the nutrients return to the habitat).
6. Continue in this fashion for three more rounds, remembering to record the number of deer and habitat pillars at the start of each round. Be sure those on the habitat team choose a different habitat pillar for each round—you don't want the same kid to represent water every time!
7. In round six, introduce one or two wolves to stand in between the lines. When the deer run towards the habitat, the wolves try to tag the deer, thus representing hunting. The wolves need to tag, or “eat,” two deer between them in order to reproduce. Keep one of the tagged deer as a wolf. Be sure to record the number of deer, habitats and wolves.
8. Continue in this fashion for three more rounds, recording the number of deer, habitats and wolves. Your class will play eight rounds in total.
9. Back in the classroom, have the students copy the data from the class record sheet onto their own **Oh, Deer!** blackline masters (see *Appendix*, page 41–42). A series of questions guides students in a reflection on the activity.

For another great predator-prey simulation that involves loads of learning (and running around!), head to this site:

<http://4h.uwex.edu/uphamwoods/programs/documents/predatorprey.pdf>

Extension Activities

A. Wolf Communication

Focus: habitats, communities and ecosystems; survival needs; interactions between organisms and the environment; listening to comprehend, interpret and make meaning; interacting in groups to explore experiences, ideas and information

Listen to wolves howl, and read about how they communicate. Discuss the various ways in which wolves communicate, both vocally and physically. How is their communication similar to humans? How is it different?

International Wolf Center—wolf communication

www.wolf.org/wolves/learn/basic/biology/communication.asp

Audio clips of lone and group howls (plus a growl!)

www.searchingwolf.com/howls.htm

Audio and video clips of wolf howls and behaviors

www.wolfcountry.net/information/WolfPack.html

B. Coastal Wolves vs. Inland Wolves

Focus: habitats, communities and ecosystems; survival needs and interactions between organisms and the environment; reading informational text to construct meaning; creating thoughtful representations that communicate ideas and information

Using the information from *The Sea Wolves*, have students compare and contrast coastal wolves to inland wolves. Have your students create a visual display of their findings on paper or using a computer program, such as Inspiration®.

C. Fins, Flippers and Fast Feet

Focus: habitats, communities and ecosystems; survival needs; interactions between organisms and the environment; comparing structures and behaviors of animals and plants in different habitats and communities; reading informational and multimedia texts to create meaning; organizing information into a chart

Ask a student to explain what an *adaptation* is. (A characteristic or set of characteristics that helps an organism survive or reproduce in its given environment. For example, chameleons possess the adaptive characteristic of being able to change color to blend in with the object they're sitting on, thus avoiding their predator.)

Discuss with students that in order to survive, animals must be suitably adapted to the environments they live in. Have students examine a variety of animal adaptations, with a special focus on animals of the Great Bear Rainforest. Using *The Sea Wolves*, *The Salmon Bears* (also by McAllister & Read) and the websites listed below, have students create an organized chart that lists the special adaptations of the following animals to their environment:

- sea wolves
- spirit bears
- deer
- eagles
- salmon
- beavers
- killer whales (orca)
- sea otters
- sunflower sea stars
- an animal of student's choice

Look for additional information about animal adaptations on the following websites:

Salmon

www.sierraclub.bc.ca/seafood-and-oceans/pacific-salmon-amazing-long-distance-travellers

Beavers

www.digitalsportsman.com/wetlands/anim.htm

Pacific Water Shrew

www.sierraclub.bc.ca/endangered-species/a-special-place/some-special-species/walking-on-water-pacific-water-shrew

Orcas

www.k12.nf.ca/stannesacademy/AnimalAdaptations/Orca.htm

Sunflower sea star

www.sierraclub.bc.ca/endangered-species/a-special-place/some-special-species/sunflower-sea-star-not-just-a-pretty-pretty

Wolverines

www.sierraclub.bc.ca/flathead-river-valley/wolverine-not-a-cuddly-teddy-bear-substitute

For a more complete listing of BC's endangered species and their adaptations to different environments, head to:

www.sierraclub.bc.ca/endangered-species/a-special-place/some-special-species

D. The Wolf's Diet

Focus: habitats, communities and ecosystems; survival needs; creating an organized list

Have students read chapter 4 and make a list of organisms that are part of the coastal wolf's diet (*students' lists could include deer, beaver, black bear, river otter, mink, cranes, geese, herons, seals, salmon, crabs, clams, mussels, barnacles*). Discuss with students the fact that—while it's not nutritionally adequate or desirable—human garbage is an increasingly common food source for wolves. What do they think of this?



Photo credit: Ian McAllister

Chapter 5: The Salmon Wolves

Coastal wolves, like bears, love a good feast of salmon in the fall. Despite not having long claws for hooking fish, like a bear, wolves have still managed to develop successful fishing techniques. A wolf pack can eat more than two hundred salmon in a single fishing event! But that’s not even the most amazing part: wolves preferentially eat only the salmon’s head.

Discussion Questions Before Reading

- What do you know about the life cycle of salmon?
- What do you know about fish farming or other threats to salmon? How do you think fish farms affect the habitat near the Great Bear Rainforest?

Discussion Questions After Reading

- What are some of the reasons scientists have to explain why wolves only eat salmon heads?
- How do salmon contribute to the functioning of the rainforest ecosystem?

Science In Action

Main Activity

The Journey of 365 Days

Focus: habitats, communities and ecosystems; survival needs; interactions between organisms and the environment; organizing information; using a range of strategies to prepare oral communications, including considering audience, making connections among relevant knowledge and experiences, and planning and rehearsing presentations

Wolves have a fascinating life cycle. Gray wolves are known to have a life span of thirteen years on average, whereas coastal wolves live for about ten years.

1. Have the students complete **Wolf Life Cycle** (see *Appendix*, page 43) to record events that occur over the course of a year in a wolf’s life.
Information may include but is not limited to:

Season	What the Wolves Are Up To
Spring	-pups are born after a two month gestation period (the time the alpha mother wolf is pregnant) -pups stay in the den with their mother for three weeks -wolf packs tend not to howl for communication in order to avoid bringing attention to the pups
Summer	-wolf pups explore more extensively outside their den -wolves enjoy the bounty of food readily available to them -wolf pups forage for food in the intertidal zone -members of the pack help take care of the pups as they grow and develop

Fall	-wolves enjoy feasting on salmon
Winter	-wolf pups are now eight to ten months old and they have an increasing amount of responsibilities to help the pack find food -pups are conceived near the end of winter -wolves hunt carefully so that they don't overspend their energy reserves
Facts	-coastal wolves have a life span of about ten years -wolves are fully grown at one year -wolves are at least two years old when they first mate -generally, only the alpha pair mates

2. Divide students into small groups and assign them a spot in the Great Bear Rainforest (e.g., by the sea; on the hunt; near the den).
3. Have students script a short skit to reflect the wolf lifestyle. (Let them know that it's perfectly okay for them to read from their script, Readers Theater-style, when it's time to present!) Each student should play a specific "role" of one member of the pack, and consider carefully the way this wolf would show its place in the pack hierarchy by the way it communicates with the others. For example, a subordinate female might say to a pup, "Okay, pups! You've got a few minutes to play, but don't go too far away! I need to be able to see you all the time."

* With older grades, pair students up so that each pair acts as the same member of the pack. Split the pair so that one person will act how this pack member acts in the summer and the other person will act how this pack member acts in the winter.

Extension Activities

A. The Decomposers' Grand Feast

Focus: requirements for sustaining healthy ecosystems; analyzing simple food chains; habitats, communities and ecosystems; reading informational text to construct meaning; responding to text; creating thoughtful representations or imaginative texts that explore and communicate ideas and information

Have students read the following passage from *The Sea Wolves*:

...all those headless salmon bodies have a big impact on the rainforest. When the wolves move on and leave them lying there stinking to high heaven, all kinds of scavengers get busy breaking them down. Birds peck at the skin and flesh. Insects invade the guts and eat them from the inside out. Then different kinds of bacteria get busy breaking apart every last bit of them so that when all is said and done, you won't see a shred of salmon skin or flesh anywhere on the ground.

Headless salmon? Bird-pecked flesh? Insects eating guts? Sounds...captivating. Okay, so let's get yucky! Have students select one of the following activity options:

1. Invite your students to draw, paint, sculpt or otherwise depict this gruesome scene of decomposition as vividly as they like.
2. Have students write a poem or short passage that depicts this grisly scene. Focus on sensory language and vivid description.
3. Have students write a short guidebook called *How To Break Down a Salmon From Start to Finish: A guidebook for decomposers*. The guidebook should be written for the Great Bear Rainforest's (varied) audience of decomposers, and should consist of clear instructions and simple illustrations.

B. Salmon Scavenger Hunt

This activity is based on the scavenger hunt from www.pbs.org/emptyoceans/educators/activities/salmon-scavenger-hunt.html.

Focus: survival needs; interactions between organisms and the environment; sustaining healthy ecosystems; making inferences; reading informational and multimedia texts to construct meaning; reflecting on learning; organizing information; taking notes

Are your students ready to explore the Internet to learn more about salmon?

1. Initiate a conversation by asking students what they already know about the status of salmon. Are the fish as abundant as they once were? Why not? As salmon progress through different stages of their life cycle, what risks do they encounter? How are humans trying to help the salmon now?

Explain to students that they are going to embark on a web-based scavenger hunt about salmon. Put students in groups of four or five and hand out copies of the **Salmon Scavenger Hunt** (see *Appendix*, page 44–45).

2. As students work, have them consult websites such as the following to help them find the answers to their scavenger hunt:

www.sd91.bc.ca/webquests/salmon

When students have finished their scavenger hunt, gather together as a class and discuss what they discovered. What questions remain? What did students learn that they didn't know before? Do they think they can actually *do* the things that will help the salmon the most?

C. Not Quite a Subspecies...but Definitely Distinct

Focus: habitats, communities and ecosystems; survival needs and interactions between organisms and the environment; critically examining digital information to assess usefulness and completeness; exploring informational texts to make meaning; writing information texts that express ideas and information

By now, your students possess a degree of expertise in the coastal wolf, right? With students, log on to www.wolfquest.org/wolf_info.php and have a look around.

Have students preview the Arctic Wolf, Eastern Timber Wolf, Great Plains Wolf, Mexican Wolf and Northwestern Gray Wolf pages on this site. Discuss with students: while the coastal wolf isn't yet designated a separate subspecies (scientists are still debating the idea), it's definitely a genetically distinct population. Assign students to work with a partner or in a small group to create an entry about the coastal wolf. Have them use **Introducing the Coastal Wolf** (see *Appendix*, page 46) to organize their writing.

D. Keystone Comprehension

Focus: habitats, communities and ecosystems; organisms as parts of interconnected food webs, populations, communities and ecosystems; interactions between organisms and the environment; human impact on ecosystems; sustaining healthy ecosystems; exploring informational texts to make meaning; organizing information; writing purposeful information texts that express ideas and information

What's a *keystone species*? As the following website explains, a keystone species is one that plays an important role in keeping an entire ecosystem functioning normally. <http://animals.about.com/od/animalswildlife101/f/keystonespecies.htm>

1. Have students select and conduct online research into a *keystone* species of the Great Bear Rainforest. Some possibilities include sea otters, salmon, the coastal tailed frog, the northern goshawk or the marbled murrelet. Here are a few links to get students started:

Sea otters:

www.exploringnature.org/db/detail.php?dbID=7&detID=77

Salmon:

www.wildsalmoncenter.org/about/whySalmon.php

Coastal tailed frog:

www.greenpeace.org/canada/en/campaigns/greatbear/Resources/Fact-sheets/The-Coastal-Tailed-Frog--a-key-species-in-the-Great-Bear-Rainforest

Marbled murrelet:

www.greenpeace.org/canada/en/campaigns/greatbear/Resources/Fact-sheets/The-marbled-murrelet--a-key-species-in-the-Great-Bear-Rainforest

Northern goshawk:

www.greenpeace.org/canada/en/campaigns/greatbear/Resources/Fact-sheets/The-Northern-Goshawk--A-Key-Species-in-the-Great-Bear-Rainforest

2. As they research, students should take notes about their species' habitat, appearance, diet, predators, its role in the ecosystem, etc.
3. Assign students to write an organized paragraph explaining why their chosen organism is known as a keystone species, and why it is important to protect.

Chapter 6: Winter Wandering

During the winter, wolves must continue to travel and hunt for food.

Discussion Questions Before Reading

- What is the winter like in your town?
- How do animals survive the winter? Think of as many different kinds of organisms as you can.

Discussion Questions After Reading

- How does a wolf's daily life change as a result of the winter season?

Science In Action

Main Activity

Wolf Metrics

Focus: habitats, communities and ecosystems; survival needs and interactions between organisms and the environment; calculating and converting units; determining percentage; exploring informational texts to make meaning; writing information texts that express ideas and information

Wolves usually run at a pace of about 8 km/hr but are capable of bursts up to 40 km/hr! In one day, a wolf may travel up to 80 kilometers in its hunt for food. In order to do all of this exercise, wolves require a lot of nutrients. Wolves are capable of eating large amounts of food at one time. In this activity, students use **Wolf Metrics** (see *Appendix*, page 47) to compare their daily life to a wolf's.

Materials

calculator
meter stick
free weights

1. Have students brainstorm all of the things a wolf does in a day. They may wish to draw on additional sources such as:

Wolf Web

http://wolfweb.com/?page_id=69

Wolf Country

www.wolfcountry.net/information/WolfHunting.html

Defenders of Wildlife

www.defenders.org/programs_and_policy/wildlife_conservation/imperiled_species/wolves/wolf_facts/biology.php

2. Ask the students to complete the following mathematical conversions (students may need teacher or peer assistance):

- ♦ Wolves can eat up to 23 percent of their body weight in a day. Have each student calculate 23 percent of his or her own body weight. Convert this to metric, if your students aren't already in the habit of using metric for weight.
 - ♦ Convert this extra weight into how much they would actually have to eat. Help students get their heads around these numbers by providing familiar referents, such as: a 2 L bottle of Coke (2 kg); an apple (150 g); a pudding snack (100 g); a chocolate bar (50 g); a Babybel cheese round (21 g).
3. Wolves can detect scents from up to 2 km away. Walk with the students 2 km away from the school. Note where you arrive. This is how far your students would be able to smell if they were wolves!
 4. Wolves typically run 8 km/hr, but can sustain quick bursts of up to 40 km/hr.
 - ♦ Time the students as they run 1 km.
 - ♦ Using this information, have students calculate how far they could run in one hour.
 - ♦ Using Google Maps or MapMyRun.com, map this distance. Point out 40 km from the same starting point on the same map. This is how fast your students would travel if they were wolves!
 - ♦ Have students team up and create two or three math problems comparing wolf and human speeds, or even combining a wolf's typical travel speed and its quick bursts of speed. For example: *How long would it take a wolf to run 70 km if it bursts into a 40 km/hr pace every five minutes?*
 - ♦ Invite students to switch problems with another group. Who's got the trickiest brain teaser?
 5. A small wolf territory is 60 square kilometers. Use a meter stick to calculate the area of your gymnasium or outdoor field. Multiply this area until you reach approximately 60 km² (keeping in mind that it's okay to go over because 60 km² represents that smallest area a wolf pack can inhabit). This is how large your home would be if you were a wolf!
 6. Compare the students' weight to that of a coastal wolf at 36 kg (80 lbs). Take free weights, books or other items that amount to the weight difference so students can feel how much lighter or heavier they are than wolves.
 7. Have your students partner up (preferably with someone of the same sex, or someone they're not going to giggle with). With one partner on all fours, have the other partner measure the distance from the top of their partner's head to their tailbone. Have each pair record their numbers, and compare their trunk length to that of a coastal wolf (130 cm or 4.4 feet). This is how long you would be if you were a wolf!

*Extension Activities***A. Dynamite Diamante!**

Focus: habitats, communities and ecosystems; exploring multimedia and visual texts to create meaning; using sensory description in creative writing

Have students visit the wolf gallery on Pacific Wild’s “Gallery” page:

www.pacificwild.org/site/gallery.html

As a class, use the SMART Board or whiteboard to create a “sensory list” of the sights, sounds, smells and textures they might find in the rainforest. Add to this list with some words that students associate with wolves. Then have them use **Dynamite Diamante** (see *Appendix*, page 48) to create a diamante poem that describes one of the wolves they saw in the photographs.

B. Climate Comparison

Focus: habitats, communities and ecosystems; climate and precipitation; impacts of weather on organisms; mapping; measurement; interpreting data; organizing data in a chart

1. Using Google Maps, have students locate your community and the Great Bear Rainforest. As a class, orally compare and contrast the two areas.
2. Have students look up data from www.theweathernetwork.com to gather information about the differences and similarities between the climate in their community and that of the Great Bear Rainforest. (You can extend this activity to examine historical weather patterns and climate change over time.)
3. Review the concept of mean (average). Create a chart to record mean annual precipitation, mean annual temperature and any other information students feel is important to include (perhaps hours of sunlight).
4. Select a number of other BC communities with varying climates (e.g., Osoyoos, Fernie, Prince George, Victoria). Add these to the chart.
5. Investigate the fact that British Columbia is unique in that it has nine distinct ecoprovinces. Project this map onto a whiteboard or SMART Board:
www.sierraclub.bc.ca/education/ed_students/elementary-students/ecoprovince-map/ecoprovince-map/?searchterm=ecoprovince%20map

Click on any of the nine ecological regions inside BC’s borders. Invite a student to read the information about that region. Which animals are found there? Which region is your community in? How does it differ from the Great Bear Rainforest (Pacific Maritime ecozone)?

C. Hibernation Station

Focus: habitats, communities and ecosystems; assessing survival needs and interactions between organisms and the environment; impacts of weather on organisms; collaborating and discussing with others to explore ideas and information; reading informational texts to construct meaning; using a chart to organize data

While the coastal wolves venture out from their dens to hunt all winter long, the grizzlies, black and spirit bears in the Great Bear Rainforest simply curl up and go to sleep. But hibernation isn't just for the bears. This discussion-based lesson from Exploring Nature teaches students more about hibernation. As a culminating activity, students get to apply what they've learned in a "hibernation check-chart."

www.exploringnature.org/graphics/teaching_aids/Hibernation_activity.pdf

D. Flocks, Packs, Gaggles and...Murders?

Focus: interacting and collaborating in pairs to explore ideas and information; connecting to experience; selecting a range of strategies for interacting with others in pairs, including contributing ideas and recognizing the ideas of others; classifying and determining uses of words based on context

No matter the season, wolves generally travel in packs. Humans have created different names to describe animal groupings. Working with a partner, have students complete **In A Pack** (see *Appendix*, page 49). Can you guess what a gaggle is?



Photo credit: Ian McAllister

Chapter 7: Friends in High Places

Wolves, bears, salmon and deer are not the only organisms to live in the Great Bear Rainforest. For thousands of years, First Nations people lived and thrived in this area—and they still do.

Discussion Questions Before Reading

- What do you know about First Nations cultures?

Discussion Questions After Reading

- Why do you think First Nations people viewed the wolf as an intelligent, social provider and protector?
- Why do you think wolves avoid hunting ravens?

Science In Action

Main Activity

To Protect or Not to Protect

Focus: the roles of organisms as part of interconnected food webs, populations and ecosystems; survival needs and interactions between organisms and the environment; requirements for sustaining healthy local ecosystems; human impacts on ecosystems; demonstrating awareness of the Aboriginal concept of respect for the environment; exploring multimedia texts to construct meaning; interacting and collaborating in groups to understand the perspectives of others, explore ideas and information and comprehend and respond to a variety of texts; expressing ideas and information to persuade; connecting with prior knowledge; considering audience when presenting oral communications; listening to comprehend and evaluate ideas and information

Not much remains of the world's temperate rainforests. The Great Bear Rainforest is a precious piece of the planet's lungs. Thirty percent of all the land in the Great Bear Rainforest is now protected. But most of this 30 percent is made up of rocks and ice—and that's not where most of the Great Bear Rainforest's life exists. Scientists say that governments should protect more of the Great Bear Rainforest—70 percent more.

Materials

Internet access and/or access to resource materials, such as books and newspapers

1. Pose a debate topic, such as:

- ♦ BC has no Endangered Species Act. Consider the implications for species that are vulnerable, endangered or extirpated. Should humans be permitted to hunt species like bears or wolves?
- ♦ Oil companies are keen to construct a pipeline from Alberta to Kitimat, thus transecting the Great Bear Rainforest. Should this project go ahead?
- ♦ Humans can make a lot of things from the wood of old-growth trees—and the Great Bear Rainforest has a lot of them. But they're ancient, and beautiful—and, along with the vegetation in other world rainforests, they act as an effective carbon sink. Should logging of old-growth trees in the Great Bear Rainforest be allowed to continue?

- ◆ Conduct research about conservation and development in the Great Bear Rainforest as it pertains to the debate issue your class has chosen. Here are some websites to help you start your research:

Endangered Species

David Suzuki Foundation

www.davidsuzuki.org/blogs/panther-lounge/2010/09/animals-shouldnt-need-passports-to-get-protection

Wilderness Committee

http://wildernesscommittee.org/what_we_do/safeguarding_wildlife

Sierra Club of BC

www.sierraclub.bc.ca/endangered-species

Government of Canada Species at Risk Public Registry

www.sararegistry.gc.ca/default_e.cfm

Oil Tanker Traffic

Pacific Wild—No Tankers, No Pipeline

www.pacificwild.org/site/our-work/no-tankers-no-pipeline.html

www.pacificwild.org/site/headlines/pacific-wild-news.html

Pipe Up Against Enbridge

<http://pipeupagainstenbridge.ca>

Dogwood Initiative

www.dogwoodinitiative.org/notankers

Enbridge

www.enbridge.com/NorthernGatewayProject.aspx

Friends of Wild Salmon

http://friendsofwildsalmon.ca/index.php/campaigns/detail/enbridge_pipelines

Forestry

Sierra Club of BC

www.sierraclub.bc.ca/forests-and-wilderness

Wilderness Committee

http://wildernesscommittee.org/what_we_do/protecting_wild_land

Coastal First Nations

<http://coastalfirstnations.ca>

Greenpeace

www.greenpeace.org/international/en/campaigns/forests/threats

BC Ministry of Forests

www.gov.bc.ca/for

The Nature Conservancy

www.nature.org

2. Host a debate in your classroom. Split the class into teams (two to four students per team is ideal). Assign each team one of the following interest groups: Provincial/Federal Government, First Nations, Hunting/Oil/Logging Company, Community Members, and Environmental Groups. Each team is to represent and become a member of this interest group as it relates to the debate topic.
3. Using various resources, ask each team to prepare the following (see **Debate Preparation** in the *Appendix*, page 50):
 - ◆ An opening statement, which:
 - should be three to five minutes long;
 - must include their thoughts and feelings about the topic;
 - must defend an opinion and offer possible solutions; and
 - can include costumes and acting to add a creative spark to their work.
 - ◆ At least two questions that can be asked of each of the other groups.
 - ◆ Some answers for the questions that they think the other interest groups might ask.
 - ◆ A concluding argument/statement, which should be about three or four minutes long.

Remind the students to take notes during the debate so they can talk about what has been debated and present their views about these points.

Invite students to assess their own work in preparing and conducting the debate. Share the scoring rubric on page 51 of the *Appendix* with students before they begin their research.

Extension Activities

A. Side by Side in the Great Bear Rainforest

Focus: demonstrating awareness of the Aboriginal concept of respect for the environment; human impacts on ecosystems; exploring print and multimedia informational texts to construct meaning; interacting and collaborating in groups to explore ideas and information; listening to comprehend and evaluate ideas and information; using a range of strategies to extend and confirm meaning, including asking questions

First Nations Peoples have lived side by side with wolves for millennia. They understood that the land was theirs to share with the wolves, bears, otters, eagles and other creatures of the Great Bear Rainforest. Wolves were important figures for First Nations—and they turn up frequently on totem poles and in other works of art. Poles are one example of how First Nations people showed their connection to the land they lived in. And they're still made today!

In small groups or with partners, have students take turns reading **Totem Poles** (see *Appendix*, page 52). Then:

1. Using a word processing program or pencil and paper, have each group create a series of reading comprehension questions about the information in the piece. (You may find it useful to practice asking good questions with students.) Swap questions with another group and gather feedback.

2. Invite students to browse images of totem poles at the Simon Fraser University Museum of Archaeology and Ethnology, here:
www.sfu.ca/archaeology/museum/totempoles/totem_home.htm
3. Find out more about the potlatch, an important First Nations tradition. Start here, at the BC Archives and the Kwagiulth Band websites, and be sure to look in the *Resources* section online at www.seawolves.ca.

BC Archives

www.bcarchives.gov.bc.ca/exhibits/timemach/galler07/frames/potlatch.htm.

Kwagiulth (Kwakiutl) Band

www.kwakiutl.bc.ca/culture/potlatch.htm

B. Time Machine

Focus: demonstrating awareness of the Aboriginal concept of respect for the environment; human impacts on ecosystems; exploring print and multimedia informational texts to construct meaning; listening to comprehend and evaluate ideas and information

Invite students to hang out at the BC Archives' Time Machine web page, here:

www.bcarchives.gov.bc.ca/exhibits/timemach/galler07/frames/index.htm

Your students will be able to read about the traditional ways of the First Peoples on the northwest coast, and can follow a link to read more about totem poles. On the sidebar, check out “The West Coast Moving Image Gallery” and “European Contact” to get a better feel for these groups’ lifestyles—and the way they changed when explorers arrived.

C. Cedar, Prime Resource of the Great Bear Rainforest

Focus: demonstrating awareness of the Aboriginal concept of respect for the environment; exploring print and multimedia informational texts to construct meaning; listening to comprehend and evaluate ideas and information; using strategies to prepare oral communications, including considering the audience, making connections among relevant knowledge and experience, and planning and rehearsing presentations; selecting strategies to express ideas and information in oral communications, including vocal techniques, style and tone, organizational and memory aids, and nonverbal techniques

Cedar trees—both red and yellow—were some of the most important resources for early peoples living on the northwest coast. From the cedar, First Nations people made rope, baskets, masks, spears, houses, poles, boats, fishing nets and even clothing.

1. Read the following information to your students (excerpted from the web page of the First Nations Studies Program at UBC):

The Sea Wolves

Coast Salish peoples have a creation story that explains the origins of Cedar. According to the story, there once lived a good man who always gave away his belongings and food to others. The Creator recognized the man's kindness, and declared that once the man dies, a Red Cedar tree will grow where he is buried, and the tree will continue to help the people. The Nuu-chah-nulth of Vancouver Island have a similar origin story for Yellow Cedar. According to their stories, Yellow Cedar trees were transformed from three young women running up a mountain. Therefore, Yellow Cedar trees are found on the slopes of subalpine mountains, and contain soft inner bark, like that of woman's hair.

2. Let students know that there are distinct ownership rights associated with many traditional stories, dances and songs. Not just anyone can pass them along! If possible, find a local resource person to come in and discuss how oral and other traditions are passed on and shared by coastal First Nations.
3. Have students write a short creation story of their own. Maybe they could explain how one of the animals in the Great Bear Rainforest came to be? Or a story about one of their favorite plants from your own community? Have students learn and rehearse their stories so they can tell them to younger students, following the oral traditions of First Nations.
4. Learn more about how cedar has been a part of this landscape since the beginning of time...and how people have used it as a resource:

First Nations artist Bill Reid talks about the giant red cedars of the northwest coast

www3.onf.ca/enclasse/doclens/visau/index.php?mode=theme&theme=30660&language=english

The Virtual Village Project

www.sfu.ca/brc/virtualvillage

Links to websites for various First Nations communities in the Great Bear Rainforest

<http://coastalfirstnations.ca/links>



Photo credit: Ian McAllister

Chapter 8: Into the Future

Although parts of the Great Bear Rainforest are protected from logging, much of this protected area is not where the animals live. Wolves, bears, deer, birds and sea creatures live down along the fjords and estuaries near the coastline—not up on the rocky, icy mountainous areas that have been set aside for protection. Logging, oil pipelines, fish farms, climate change and trophy hunting are all serious threats to the Great Bear Rainforest.

Discussion Questions Before Reading

- What have you learned about the Great Bear Rainforest by reading this book?
- What has fascinated you the most?
- What questions do you still have about wolves or the Great Bear Rainforest?

Discussion Questions After Reading

- How would the Great Bear Rainforest be different if it were logged?
- How do your everyday decisions affect the Great Bear Rainforest?
- Is it important to protect wild spaces, such as the Great Bear Rainforest? Explain why or why not.

Science In Action

Main Activity

Carrying Capacity

This activity is based on a game from www.projectwild.org.

Focus: habitats, communities and ecosystems; organisms as parts of interconnected food webs, populations, communities and ecosystems; interactions between organisms and the environment; human impact on ecosystems; sustaining healthy ecosystems; making assessments based on observation; interacting with others to share ideas and information

We know relatively little about the complex lives and relationships of the unique coastal wolves. Allowing logging, oil pipelines and the continuation of sport hunting could have a devastating effect on this fascinating species.

Materials:

large blue tarp
large open space

1. Lay the tarp out on the ground and have all of your students stand on the tarp. Explain to them that the tarp represents the Great Bear Rainforest and they are coastal wolves.
2. Instruct the students to wander around the tarp, just as a wolf would wander in its territory in search of food, shelter, water and space.

The Sea Wolves

3. Call out “Stop!” Explain to the students that logging has been allowed in one tiny corner of the rainforest. Proceed to fold over a quarter of the tarp. This area is no longer accessible to them.
4. Instruct them to continue with their wolf business.
5. Call out “Stop!” Explain to the students that roads have been built in order to allow the oil companies to come survey the land for a potential oil pipeline. Proceed to fold over another quarter of what’s left of the tarp. Once again, this area is no longer accessible to them.
6. Instruct them to continue with their wolf business.
7. Call out “Stop!” Explain to the students that the salmon have not returned to the rivers because disease from a nearby fish farm has caused local salmon species to die. The wolves leave this area of the forest to forage somewhere else. Proceed to fold over another quarter of what’s left of the tarp. Once again, this area is no longer accessible to them. At this point, explain to them that if they fall off the tarp, they “die”—because they must live in their habitat in order to survive.
8. Instruct them to continue with their wolf business.
9. Call out “Stop!” Explain to the students that hunters have come for a wolf hunt. With humans encroaching on their territory, wolves have created slightly different home ranges. Proceed to fold over another quarter of what’s left of the tarp. Once again, this area is no longer accessible to them. Remember, if they fall off the tarp, they die! (This is where you’ll start to see some students hugging in order to stay together...or else there’ll be some not-so-gentle nudging!)
10. Instruct them to continue with the wolf business.
11. Call out “Stop!” Explain to the students that the winter was particularly harsh and as a result, very few deer survived. The wolves couldn’t find food, so they left to forage somewhere else. Proceed to fold over another quarter of the tarp. At this point, there shouldn’t be very much space left on the tarp.
12. Discuss what the students noticed and felt about this simulation. Introduce the term *carrying capacity*, defining it as the ability of a habitat to sustain the population of a given species. What are the students’ observations about how the “wolves” reacted to having their habitat reduced? How would real wild wolves respond to such a reduction? (*The wolves who “nudged” other wolves off the tarp are a fairly accurate representation of nature; in the wild, the remaining wolves would be forced to compete harder for fewer resources, resulting in an overall loss of wolves.*)

Extension Activities

A. Species at Risk

Focus: habitats, communities and ecosystems; organisms as parts of interconnected food webs, populations, communities and ecosystems; interactions between organisms and the environment; human impact on ecosystems; reading and viewing print and multimedia resources to construct meaning; using strategies to develop and organize ideas for writing, including considering audience and setting a purpose; writing informational texts to inform and persuade

Explore the topic of species at risk and the current demand for legislation (laws) that protect endangered species in British Columbia. Here's a great backgrounder for teachers:

David Suzuki

www.davidsuzuki.org/publications/downloads/2007/biodiversity_article-BC_species.pdf

For a primer on some of the species at risk in the Great Bear Rainforest, head to Species at Risk BC:

www.speciesatrisk.bc.ca/searchbyecosystem

Once the page has loaded, select “All Habitats” and “Skeena-Queen Charlotte Regional District (Mainland)” to view a list of threatened species. Here, you'll find orcas, gray whales, grizzly bears, Stellers sea lions, great blue herons, marbled murrelets and more. Have students select a species at risk from this list.

1. If you don't already have a class web page, this is the perfect time to set one up! Go to Google Sites at <http://sites.google.com> and follow the super-simple setup instructions. Here's a two-minute tutorial: www.youtube.com/watch?v=fD-4FRTzxlI. (A class webpage is a great place to upload blog posts from your students, as well as photos, video and audio from your class. It's also a great spot for parents to keep abreast of what's happening, and for students to check homework assignments.)
2. Have students imagine that they are one of these animals at risk. Have them write a blog post explaining the problem, and how they think humans should change their behavior to improve their species' chance of survival. Posts should be well organized, include examples to support the students' arguments, and include specific recommendations for how things could improve. Use the **Planning My Blog Post** sheet in the *Appendix* on page 53 to help students organize their thoughts before proceeding to write their post.
3. Add the posts to your classroom site—or post on the wall for others to see.

B. Opening Our Eyes to Environmental Degradation

Focus: habitats, communities and ecosystems; organisms as parts of interconnected food webs, populations, communities and ecosystems; interactions between organisms and the environment; assessing the requirements of sustaining healthy ecosystems; human impact on ecosystems; exploring multimedia resources to construct meaning; speaking and listening to make personal responses to texts, to analyze ideas and information from texts, and to synthesize and extend thinking

In 1989, a tanker named the *Exxon Valdez* ran aground off the coast of Alaska and spilled almost forty-two million liters (eleven million gallons) of crude oil into the sea, killing thousands of marine mammals (seals, whales, otters, sea lions) and birds in the process. Read about it here:

<http://library.thinkquest.org/10867/home.shtml>

In 2010, an oil rig in the Gulf of Mexico exploded, causing more than 750,000 liters (200,000 gallons) of oil to gush into the sea every day. It seeped into beaches and wetlands, where endangered birds were nesting, and closed fishing grounds—thereby throwing thousands of people out of work. Click here for a timeline:

www.treehugger.com/files/2010/05/bp-gulf-oil-spill-timeline.php

In *The Sea Wolves*, the author writes: “These dreadful incidents remind us graphically how oil and water don’t mix.” Do a simple oil-in-water demonstration with your students to kick-start a discussion of this enormous issue. Then check out *Oil and Water* at the Living Oceans Society:

www.livingoceans.org/maps/oil-water

To see how an oil spill could affect the BC coast, take it a step further and investigate the oil spill model by Living Oceans:

<http://www.livingoceans.org/initiatives/tankers/oil-spill-model>.

C. Creating Solutions

Focus: habitats, communities and ecosystems; organisms as parts of interconnected food webs, populations, communities and ecosystems; interactions between organisms and the environment; assessing the requirements of sustaining healthy ecosystems; human impact on ecosystems; reading and viewing print and multimedia resources to construct meaning; collaborating with others to explore ideas and information; listening to comprehend and evaluate ideas and information; speaking and listening to synthesize and extend thinking by explaining relationships among ideas and information

Brainstorm and create an action plan with students to help protect the Great Bear Rainforest. Use Inspiration or an online brainstorming application like Bubbl (<https://bubbl.us>). You could do this as a class, or in small groups. We’re leaving it open for you to develop your action plan as you see fit! Use the links below (and throughout this teacher guide) to gather information and ideas for how you can make a positive change for the Great Bear Rainforest.

Pacific Wild

www.pacificwild.org/site/take_action.html

www.pacificwild.org/site/our-work/no-tankers-no-pipeline/expeditions.html

Coastal First Nations

<http://coastalfirstnations.ca>

Salmon Are Sacred

<http://salmonaresacred.org>

Ta’Kaiya Blaney, 10-year-old Sliammon activist protesting oil tankers and pipelines in BC

www.takaiyablaney.com/takaiyablog

www.youtube.com/watch?v=LkjIkuC_eWM&feature=player_embedded

Appendix

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What It Takes to Be a Mammal

Frayer Model

Definition	Characteristics
Examples	Non-Examples

Word

Graphic Organizer—The Frayer Model: used for word analysis and vocabulary

Speaking Wolf

Chapter 1

a price paid as a reward

an animal that eats other animals

Chapter 2

an area of forest that has never been cut

evergreen trees; trees with cones and needles instead of leaves

trees with leaves that fall off with the changing of the seasons

shrubs and plants that grow beneath the canopy of larger, taller trees

the male and female of a pack that are most dominant; the breeding pair of the pack

Chapter 3

wolves that wander alone to either find a new pack to join or begin a pack of their own; 20 percent of rainforest wolves are described this way

a place near the ocean that packs move to once pups are old enough to begin foraging for food in the intertidal zone

the area of a beach between the low and high tide line

small, rocky islets along the coast; wolves will hunt seals here

organisms that are awake and most active during the night

adaptive features, such as fur coloring, that allows organisms to hide from predators or prey

Chapter 4

a hoofed mammal, such as deer and elk

Chapter 5

a species that is vital to the food web; all other organisms in a given ecosystem depend directly or indirectly on this species

an organism that lives in the ocean but travels to fresh water to spawn

Chapter 6

short-term hibernation when organisms decrease their activity

when all the trees in an area are cut down

Chapter 7

feces; excrement; poop

Speaking Wolf: Answer Key

<u>Chapter 1</u>	bounty	a price paid as a reward
	carnivore	an animal that eats other animals
<u>Chapter 2</u>	old-growth	an area of forest that has never been cut
	conifers	evergreen trees; trees with cones and needles instead of leaves
	deciduous	trees with leaves that fall off with the changing of the seasons
	understory	shrubs and plants that grow beneath the canopy of larger, taller trees
	alpha	the male and female of a pack that are most dominant; the breeding pair of the pack
<u>Chapter 3</u>	extra-territorials and/or dispersers	wolves that wander alone to either find a new pack to join or begin a pack of their own; 20 percent of rainforest wolves are described this way
	rendezvous site	a place near the ocean that packs move to once pups are old enough to begin foraging for food in the intertidal zone
	intertidal	the area of a beach between the low and high tide line
	haulout	small, rocky islets along the coast; wolves will hunt seals here
	nocturnal	organisms that are awake and most active during the night
	camouflage	adaptive features, such as fur coloring, that allows organisms to hide from predators or prey
	<u>Chapter 4</u>	ungulate
<u>Chapter 5</u>	keystone species	a species that is vital to the food web; all other organisms in a given ecosystem depend directly or indirectly on this species
	anadromous	an organism that lives in the ocean but travels to fresh water to spawn
<u>Chapter 6</u>	torpor	short-term hibernation when organisms decrease their activity
	clear cut	when all the trees in an area are cut down
<u>Chapter 7</u>	scat	feces; excrement; poop

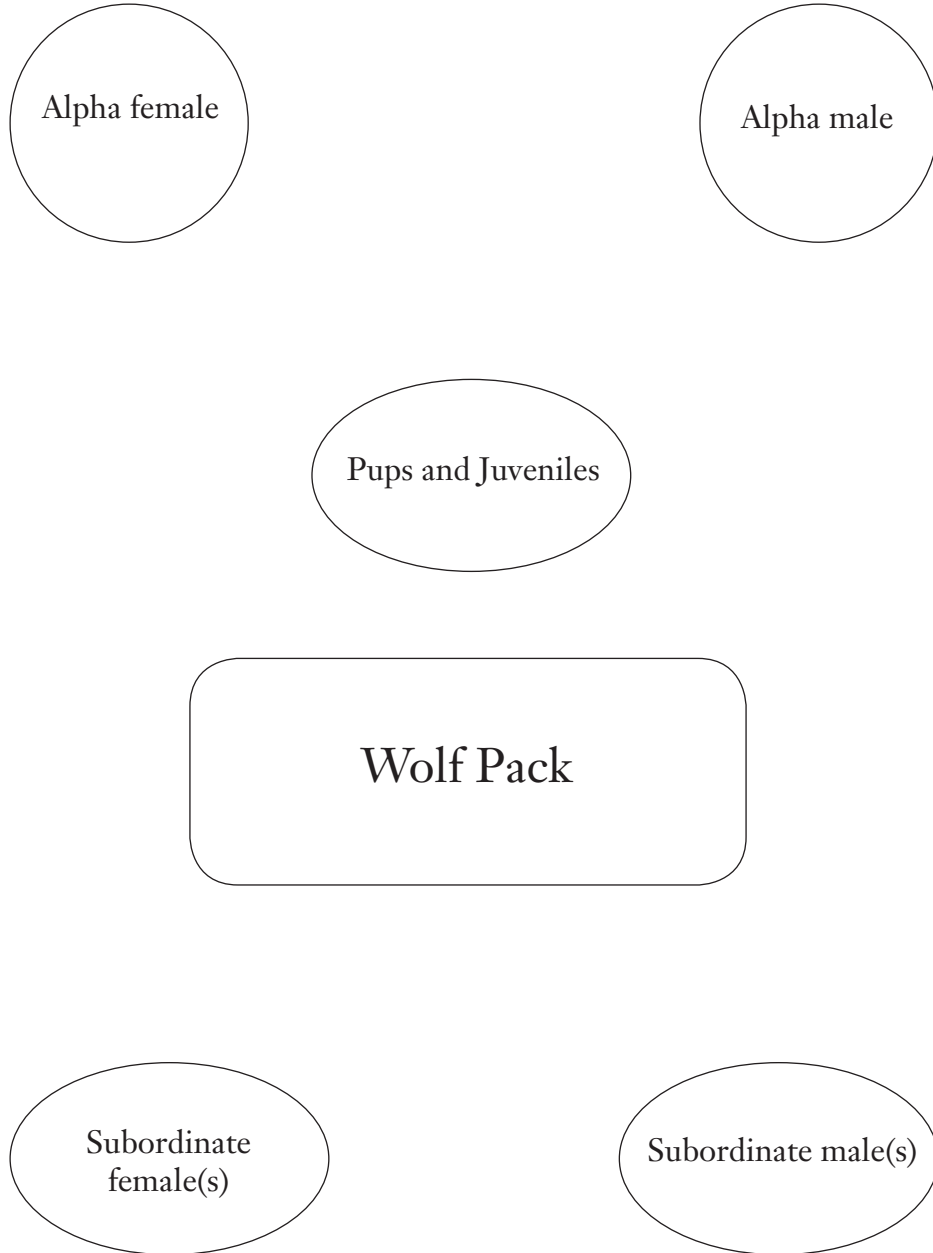
A Wolf in Sheep's Clothing

The Fact and Fiction of Wolf Stereotypes

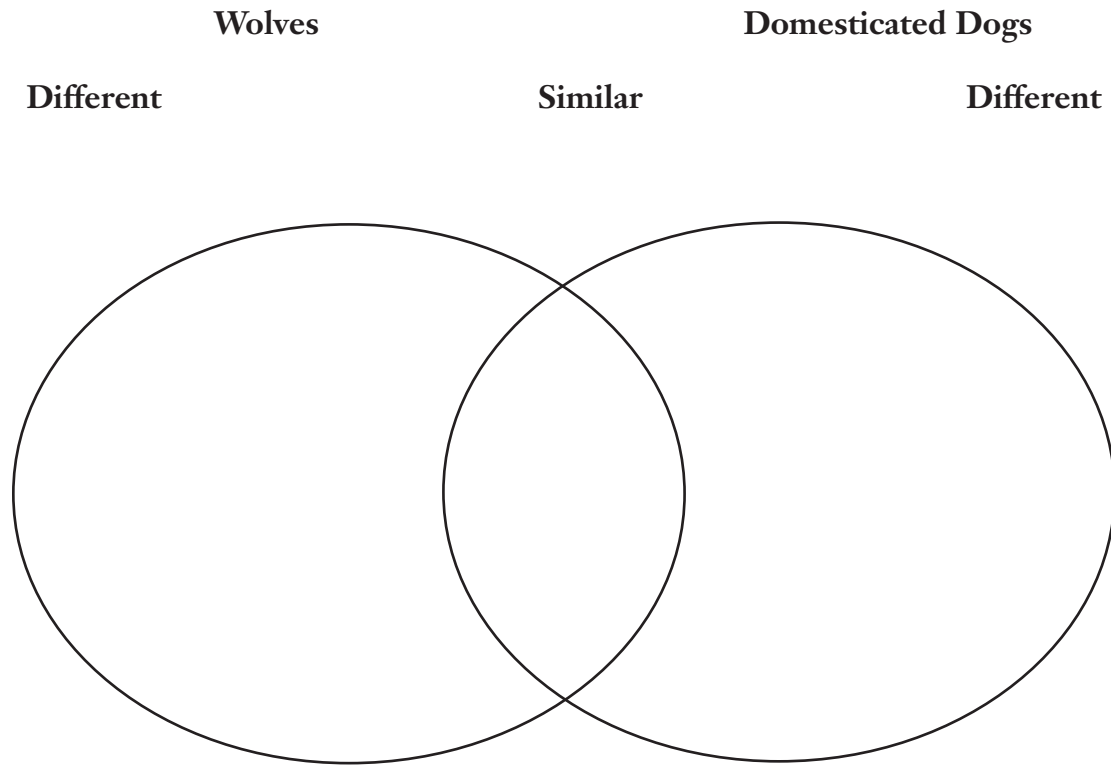
Stereotype	Fact?	Fiction?	Evidence
Wolves are big, bad and dangerous!			
What I learned:			
Questions I still have:			

The Sea Wolves

Wolf Family Structure



Man's Best Friend or Wilderness Wolf?



The Sea Wolves

Oh, Deer!

A Food Chain Game

Here is the data from our food chain activity, “Oh, Deer!”

ROUND	DEER	HABITAT	WOLVES
1			0
2			0
3			0
4			0
5			
6			
7			
8			
9 (my prediction)			

Use the data from our activity to answer the following questions *in full sentences*.
You must use data from the chart above to explain your answers.

1. What happened in Round 2? *Hint:* Think about the difference between what happened in Round 1 compared to what happened in Round 2.

2. When a deer couldn't find the habitat pillar (food, water, shelter, space) that it needed to survive, what happened? How does this correctly describe what happens in nature?

3. What happened to the number of deer when wolves were introduced to the habitat? Why do you think that is? *Hint:* Use vocabulary like *predator* and *prey*.

4. What do you predict would happen if we played the game for one more round? Write your prediction in the chart in the row labeled **Round 9 (my prediction)**. In the space below, explain your prediction.

5. This game is a simple model of a food chain. In your own words, describe what a food chain is.

Wolf Life Cycle

The Sea Wolves

SEASON	BIOLOGICAL STAGES	HABITS
Spring		
Summer		
Fall		
Winter		
Facts		

My role in the skit: _____

Drafting space for the skit:

Salmon Scavenger Hunt

1. List five things that can destroy salmon eggs. (2 points each)

1.	2.	3.	4.	5.
----	----	----	----	----

2. List four ways that urban development can harm wild salmon. (2 points each)

1.	2.	3.	4.
----	----	----	----

3. List two natural predators of wild salmon in each stage of development. (2 points each)

Egg	1.
	2.
Alevin	1.
	2.
Fry	1.
	2.
Smolt	1.
	2.
Adult	1.
	2.
Spawner	1.
	2.

4. List two ways each of the following can harm wild salmon. (3 points each)

Dams	1.
	2.
Forestry	1.
	2.
Farming/ranching	1.
	2.
Fish farms and hatcheries	1.
	2.

5. List two other potential threats to wild salmon. (3 points each)

1.	2.
----	----

6. What are three steps people are taking to help wild salmon? (4 points each)

1.	2.	3.
----	----	----

7. What are three things you can do to protect salmon? (4 points each)

1.	2.	3.
----	----	----

Points total:

Introducing the Coastal Wolf

Use the boxes below to record your knowledge about the coastal wolf. Then, on a sheet of paper or in a word processing program, organize your notes into well-written sections. Poof: You've created a whole new informative entry about the coastal wolf!

Description

Habitat and Range

The Coastal Wolf

Behavior & Communication

Diet

Breeding & Maturation

Wolf Metrics

Use this area to calculate how you would measure up if you were a wolf.

	Me	Wolf
Food		
Smell		
Travel -Speed		
-Distance		
Weight		
Length		

The Sea Wolves

Dynamite Diamante!

Write a diamante poem about one of the wolves you saw in the photo galleries. Not sure how a diamante works? Let us show you a few easy steps.

Line 1: give your wolf a one-word name

Line 2: write two adjectives to describe his or her personality

Line 3: three -ing verbs that describe his or her actions (think about hunting, playing, denning, howling...)

Line 4: four nouns that name places/things that are important to your wolf

Line 5: one -ing verb and two adverbs that describe your wolf's actions

Line 6: one adjective (ending in -ing) and one noun to describe one of your wolf's features

Line 7: your wolf's name

My Diamante:

A large diamond shape with seven horizontal lines inside, intended for writing a diamante poem. The lines are arranged in a diamond pattern, with one line at the top, two lines below it, three lines in the middle, two lines below that, and one line at the bottom.

Reflection:

What made the diamante poem easy to write? Was there anything that made it difficult to write?

In a Pack

Work with a partner. Match each animal name with the name of its group. Not sure? Use the process of elimination (do the easy ones first). Then: ask around!

1. wolves	a. herd
2. geese	b. drove
3. elephants	c. colony
4. kangaroos	d. murder
5. cattle	e. pack
6. lions	f. flock
7. leopards	g. pride
8. fish	h. school
9. goats	i. leap
10. sheep	j. gaggle
11. crows	k. mob
12. ants	l. trip

In the space below, write as many words as you can think of that we use to classify human groups. We've started you off with one.

_____ team _____	_____
_____	_____
_____	_____
_____	_____
_____	_____

(Answers: 1e, 2j, 3a, 4k, 5b, 6g, 7i, 8h, 9l, 10f, 11d, 12c)

Debate Preparation

	Questions to ask this group	Questions this group might ask us, and our answers
Provincial and Federal Government		
First Nations		
Trophy Hunters or Oil Company or Logging Company		
Community Members		
Environmental Group		

The Sea Wolves

Debate Scoring Rubric

Team members: _____

Debate topic: _____

	Underdeveloped 1	Competent 3	Expert 5
Offers plausible reasons for stance	Provides no plausible reasons for stance.	Provides at most two reasons, which seem plausible.	Provides several reasons, which seem very plausible.
Provides specific evidence	Makes no reference to specific evidence in backing arguments.	Refers in a few cases to specific evidence to back up arguments.	Refers extensively to specific evidence to back up arguments.
Relevant and effective rebuttal	Weak or no attempt at addressing opposing team's arguments.	May anticipate and ably addresses opposing team's arguments.	Clearly anticipates and vigorously addresses opposing team's arguments.
Organization and clarity of presentation	Data and arguments are not well organized and/or are presented in a manner that is unclear or difficult to understand.	Data and arguments are adequately organized and/or presented in a reasonably clear manner.	Data and arguments are well organized and presented clearly and persuasively.

Comments: _____

Students' self-assessment: _____

Teacher assessment: _____

Overall team score: _____

Totem Poles

A Way of Honoring The People and Their Land

When we think of the term *totem pole*, we usually think of totems. But they are more than just representations of a family or clan's animal totem. They're a way of showing the owner's family history and rights. The images on totem poles are called crest figures. Many of them represent supernatural beings (such as spirits). Some figures represent ancestors who encountered supernatural beings...and who received rights and privileges from those beings. What kind of rights? Rights to land, resources, house designs, names and ceremonies. Even the songs, masks, dances and outfits that are shown in ceremonies. Poles show a person's importance.

There are several different kinds of poles:

1. House posts stand inside the house and support the main beams of the roof.
2. House frontal poles stand against the face of the house. Traditionally, these have an arched opening at the base of the pole through which people enter the house.
3. Memorial poles and figures honor the dead.
4. Mortuary poles contained the remains of the dead in grave boxes that were placed inside the pole.
5. Potlatch figures show the wealth and power of the chief giving the potlatch.
6. Welcome figures greet people arriving in the community.

The carving traditions of the Northwest Coast First Nations vary. Each community has its own traditional stories and styles. Working within those strict traditions, each artist has his own style.

The First Peoples in the Great Bear Rainforest were carving poles long before the European explorers showed up. But very few of these early carvings survive. Why? Well, remember how First Nations believe that people should live in harmony with the land and not fight against nature? It's customary to let carvings deteriorate naturally in the forest. New ones are created to mark special events.

When European settlers introduced First Nations carvers to metal tools, they were able to create more poles more quickly. Most of the poles you see in old photos were created in the late 1800s. But of course, First Nations people had been carving poles long before the camera was invented.

Poles continue to be made in the traditional manner all along the Northwest Coast. Pole raising remains an important, prestigious and expensive event. There's always a ceremony and often a potlatch to mark the event. Nowadays, poles are carved for traditional purposes as well for fine art collections and museums.

Source: Black, Dr. Martha. "Totem Poles in the Royal BC Museum."
www.royalbcmuseum.bc.ca.

Planning My Blog Post

My chosen species	
A sketch of what I look like:	
Habitat description:	
Why is my species at risk? What's happening in the Great Bear Rainforest to threaten us?	
Here are some actions I recommend humans take to improve the situation for my species:	

Glossary

anadromous	migrating from salt water to spawn in fresh water
biomass	the amount of living matter in a given habitat
bog	a type of wetland characterized by deposits of dead, decaying biomass
consumer	in a food web, the organism that eats the producer
ecosystem	a system formed by the interaction of a community of organisms with their environment
encroachment	the advancement (in this case, of human civilization) beyond proper or former limits
food chain	a series of organisms that are related by what they eat
hibernate	a period of inactivity for an organism during the winter season
mammal	animals that bear live young and raise their newborn babies on mother's milk
migrate	to pass from one region to another; occurs during certain seasons
organism	any living thing
precipitation	all forms of water falling from the atmosphere, including rain, snow, mist, hail and sleet
primary consumer	in a food chain, the organism that eats the producer
producer	any organism that makes its own food by using the sun's energy through photosynthesis
secondary consumer	in a food chain, the organism that eats the primary consumer
spawn	the mass of eggs deposited by some organisms, such as salmon
temperate rainforest	a coniferous or broadleaf forest with mild temperatures that receives 2500 mm or more precipitation annually
tertiary consumer	in a food chain, the organism that eats the secondary consumer

Suggested Further Reading

Fiction

- Anderson, Margaret and Nancy Field. *Ancient Forests: Discovering Nature*
Aesop's Fables
 Base, Graeme. *Uno's Garden*
 Behn, Harry. *Trees*
 Brett, Jan. *The First Dog*
 George, Jean Craighead. *Julie of the Wolves*.
 —*Julie*
 —*Julie's Wolfpack*
 Field, Nancy. *Discovering Marine Mammals*
 Hume, Stephen. *A Walk With the Rainy Sisters: In Praise of British Columbia's Places*
 Lasky, Kathryn. *Wolves of the Beyond* series
 London, Jack. *White Fang*
 Martin, Bill Jr. and John Archambault. *Listen to the Rain*
 Mowat, Farley. *Never Cry Wolf*
 Schilling, Vincent. *Environmentalists from our First Nations*
 Scieszka, John. *The True Story of the Three Little Pigs*
 Sept, Duane. *Common Seashore Creatures of the Pacific Northwest*
 Seuss, Dr. *The Lorax*
 Silverstein, Shel. *The Giving Tree*
 Swanson, Bruce. *Gray Wolf's Search*
 Taylor, Harriet Peck. *Brother Wolf: A Seneca Tale*
 Van Allsburg, Chris. *Just a Dream*
 Yolen, Jane. *Children of the Wolf*

Nonfiction

- Brenner, Barbara. *The Earth is Painted Green: A Garden of Poems About our Planet*
 Dekker, Dick. *Wolves of the Rocky Mountains from Jasper to Yellowstone*
 Fleming, Denise. *Where Once There was a Wood*
 Foster, Leila M. *The Story of Rachel Carson and the Environmental Movement* (teacher resource)
 Gunzi, Christiane. *The Best Book of Endangered and Extinct Animals*
 Hoyt-Goldsmith, Diane and Lawrence Migdale. *Potlatch: A Tsimshian Celebration* (teacher resource)
 Jonaitis, Aldona (ed.). *Chiefly Feasts: The Enduring Kwakiutl Potlatch* (teacher resource)
 Jones, Karen R. *Wolf Mountains: A History of Wolves Along the Great Divide*
 Mackay, Richard. *The Atlas of Endangered Species*
 McAllister, Ian. *The Last Wild Wolves: Ghosts of the Rain Forest*

The Sea Wolves Learning Guide

McKay, Kim and Jenny Bonnan. *True Green Kids: 100 Things You Can do to Save the Planet*

Morton, Alexandra. *In the Company of Whales*

Pfeffer, Wendy. *A Log's Life*

Vernon, Caitlyn. *Nowhere Else on Earth: Standing Tall for the Great Bear Rainforest*

Films & Documentaries

The Last Wild Wolves: Ghosts of the Rainforest (companion DVD to book, 2007)

Wolf Pack. National Geographic Television (2003)

Wild Wolves with David Attenborough. Nova (1997)

Wolves: A Legend Returns to Yellowstone. National Geographic (2007)

Wolves. IMAX (2008)

A Planet for the Taking. David Suzuki (1985)

Salmon: Running the Gauntlet. PBS (2011)

Salmon. Nature (2011)

Nature's Great Events: The Great Feast. BBC (2009)

The Sea Wolves