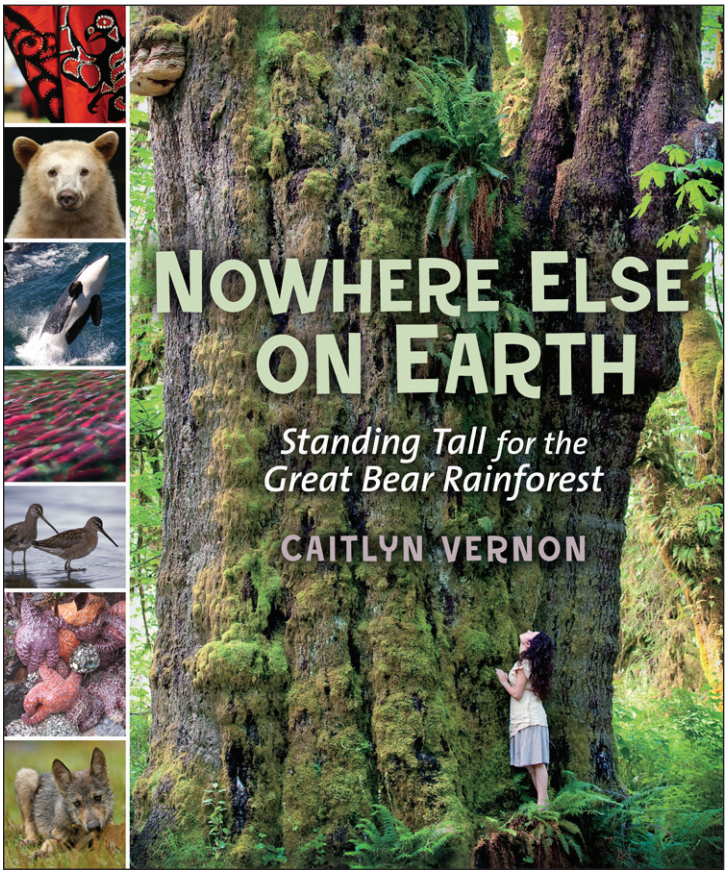
Teachers' Guide

by Alex Van Tol

Nowhere Else on Earth

Standing Tall for the Great Bear Rainforest



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Contents

Introduction: Bear Witness

A. Hibernation Station

Focus: habitats, communities and ecosystems; adaptation to environment; survival needs; exploring multimedia texts to construct meaning

Up for Discussion

Your students are probably familiar with the idea that bears hibernate. Have them imagine that they are bears preparing for winter. Discuss why bears might sleep over the winter months and how they are able to achieve this. Lead your class in a quick hibernation Q&A:

1. Why do bears enter a hibernation-like state? Perhaps to:
   - avoid the colder months;
   - rest while food sources are scarce.
2. How do bears survive the winter without eating, exercising, urinating or defecating? Bears:
   - are able to reduce their metabolism because they can reduce their body temperature and heart rate;
   - use the fats eaten and stored during the active months to provide for their nutritional needs during hibernation;
   - use *urea*, normally a toxic waste product, to create new proteins.

As a class, check out www.pbs.org/wgbh/nova/nature/bear-essentials-of-hibernation.html for more details about how and why bears hibernate.

B. Bear Aware!

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 visual texts to make meaning

Up for Discussion

In this section of *Nowhere Else on Earth*, students learn that many people don't understand how to be safe when in bear country. Ask students how many of them have seen a bear? Has anyone ever camped or spent a day in bear territory? What sorts of signs or warnings did they see? Invite students to share their bear safety knowledge.

Learning Activity

This is where students get to be teachers! Have students design a lesson that teaches others how to be bear aware.

1. Divide your class into groups of four or five, and explain that each group is going to prepare a simple 15-minute lesson in bear safety.

Consider having students create a podcast or video-cast of their lesson, so that it can be broadcast to a larger audience (if you have a class website, this is the perfect thing to upload!).

2. Have them research how to be bear smart using the following websites. Provide a simple graphic organizer so they can take notes.

   Bear smart (a Whistler-based Canadian charity that helps humans and bears coexist as peacefully as possible)
   www.bearsmart.com/becoming-bear-smart
   Bear Aware BC
   www.bearaware.bc.ca
   BC Ministry of Environment Smart Bear Program
   www.env.gov.bc.ca/cos/info/bearaware
   Get Bear Smart Society (protecting the wellbeing of bears by helping people and bears find a healthy way to coexist)
   www.env.gov.bc.ca/cos/info/bearaware

3. Assist students in creating a list of objectives they'd like to meet in teaching the material (these are the main points they would like to cover).
4. Each group should plan an activity, assignment or game that will help to teach the important concepts. Encourage them to think about how *they* like best to learn (i.e., by being active and engaged; using visual aids), and tell them to incorporate these into their lesson.
5. Have students design some sort of test or activity that assesses learning: did they actually teach people what they set out to?

C. Treading Lightly

Focus: describing potential environmental impacts of using BC's living and nonliving resources; 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 visual texts to make meaning; organizing information; asking questions

Up for Discussion

Your students are probably familiar with the term *ecological (or carbon) footprint*. Lead them in a discussion of what that means. Do they think their own footprint is large or small? What about their family's footprint? How about your school's? Invite them to brainstorm ways to lessen their ecological footprint.

Learning Activity

1. Visit this really cool site to take part in an animated quiz that helps students calculate their ecological footprint
   www.footprintnetwork.org/en/index.php/GFN/page/calculators
2. Have students fill in the K.W.L.Q. chart on the next page. (You may wish to help them with this as a group activity, assign them to work in pairs, or simply have them fill in the details on their own.)
3. Talk about your answers. What actions can students take now—at home and at school—to lessen their impact?

K.W.L.Q. Chart

Use the questions in the left-hand column to guide you in filling in the chart below. (Be sure to fill out the first two rows *before* you calculate your carbon footprint!)

Topic:	
What do I **know** about this topic already?	
What do I **want** to know more about?	
After doing my calculation, what have I **learned** about my ecological footprint?	
What **questions** do I still have about my ecological footprint?	

D. A Tree's Take

Focus: describing potential environmental impacts of using BC's living and nonliving resources; 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 visual texts to make meaning; creating imaginative writing

Up for Discussion *(you may wish to read the rest of the book before doing this activity)*

In the section called **Strength in Numbers**, Vernon reflects on a time when she traveled across Vancouver Island with her parents, through old-growth forests. Have several students take turns reading this section aloud. Invite students to discuss and ask questions about the logging of old-growth forests.

Learning Activity

Have students imagine they are a tree that's more than a thousand years old—and that's still standing. Discuss what kinds of things has this tree lived through? What has it witnessed? How has its world changed as time passes? What does it suspect the future holds?

1. Assign students to write a series of short journal entries as that tree, beginning about 500 years ago. They should write one entry for each century—so, one for the 1600s, one for the 1700s, one for the 1800s, one for the 1900s and one for the 2000s. Ensure students consider the above questions as they write their entries.

Note for differentiated instruction: some students may prefer to create a podcast, a timeline, or a series of sketches to accompany or enhance their entries.

E. Making Connections

Focus: responding to selections by explaining connections to self and world

Here are some passages from *Nowhere Else on Earth*. For each one, have students write a short explanation of how it connects to their own life or world.

1. *Young people have voices, too, and there is power in speaking out about things that bother or hurt you. Also, taking action can often make you feel better about yourself and about the world.*
2. *You might feel sad or angry or discouraged. Sometimes it seems easiest to deal with these feelings by turning away and pretending the problems don't exist.*

Chapter 1: The Great Bear Rainforest

A. Organizing Rainforest Organisms

Focus: organisms as parts of interconnected food webs, populations, communities and ecosystems; exploring informational texts to make meaning; building vocabulary; organizing information

Learning Activity

In chapter 1, students learn about various organisms that call the Great Bear Rainforest home.

1. Have them create an organized list of animals and plants that live in this special part of the world. Students may wish to illustrate their entries.
2. Add to this list as your class progresses through *Nowhere Else on Earth*.
3. As an extension or possible research project, have students select an organism for further study. They may do this in pairs or individually, as a report or as a presentation to the class.

B. The Web of Life

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

Up for Discussion

The Great Bear Rainforest teems with life. While all species are important to the entire ecosystem, some species are what's called *keystone* species, meaning that they play a vital role in the ecosystem—and without them, many other organisms would die. Salmon, cedar, plankton and even sea stars are some of the keystone species in the Great Bear Rainforest. What might happen if one of those species were to die out?

Learning Activity

Have students draw, sculpt, paint or otherwise depict a web of life. Note: this is different than a food chain; we're not just talking about animals that eat each other! We're talking about organisms that depend on each other in order to survive or flourish within their given ecosystem.

1. Starting with one species at the center of their web, have students show, in a radiating pattern, the other species that rely on that central organism.
2. Challenge them to further enrich their web by adding other plants and animals that rely on the ones that connect to the central organism. In this way, the web will be expanded—and strengthened.

C. Species at Risk

Focus: habitats, communities and ecosystems; organisms as parts of interconnected food webs; survival needs; interactions between organisms and the environment; human impact on ecosystems; sustaining healthy ecosystems; reading informational texts to construct meaning; exploring visual texts to make meaning; making inferences

Up for Discussion

Many animals and plants in the Great Bear Rainforest are at risk in one way or another—and mostly because of human activity. Talk about some of the human activities that are harming rainforest organisms.

Learning Activity

With students, visit the following Sierra Club webpage on threats to BC species. Read through the landing page, and engage students in a deeper discussion of how our activities are creating hardship for many BC species. Have students connect this discussion back to the earlier activity on ecological footprints.

www.sierraclub.bc.ca/endangered-species/threats

D. Investigating Estuaries

Focus: habitats, communities and ecosystems; sustaining healthy ecosystems; living and non-living resources; human impacts on local ecosystems; reading informational texts to construct meaning; organizing information; taking notes

Up for Discussion

Estuaries are incredible natural resources. Have students discuss their knowledge of estuaries, starting with the information in *Nowhere Else on Earth*.

Learning Activity

1. Broaden students' understanding of estuaries by investigating this brochure from the BC Ministry of Environment:
   www.env.gov.bc.ca/wld/documents/Estuaries06_20.pdf
2. Divide students into small groups to research estuaries, using the brochure as their reference. Assign each group one of the following questions:
   - What are estuaries?
   - How were estuaries formed?
   - What sorts of organisms live in estuaries (what is their ecology)?
   - What's unique about estuaries?
   - Why are they important?
   - Why are estuaries at risk?
   - How can estuaries be conserved and protected?
3. Gather as a class and use the jigsaw learning strategy to share students' findings with the rest of the group (for more info on jigsaw learning strategies, go to www.jigsaw.org/steps.htm).
4. Have each student record point-form notes on their copy of **Estuary Investigation** on the following page.

Estuary Investigation

Record your notes about estuaries in the following chart. Point form is fine!

Guiding question	Here's what I've learned about estuaries
1. What are estuaries?	
2. How were estuaries in BC formed?	
3. What sorts of organisms live in estuaries? (i.e., what is their ecology?)	
4. What is unique about estuaries?	
5. Why are estuaries important?	

6. Why are estuaries at risk?	
7. How can estuaries be conserved and protected?	

E. Making Connections

Focus: responding to selections by explaining connections to self and world

Here are some selections from Chapter 1 of *Nowhere Else on Earth*. For each one, have students write a short explanation of how it connects to their own life or world.

1. *Every morning I awake torn between a desire to save the world and an inclination to savor it. This makes it hard to plan the day. But if we forget to savor the world, what possible reason do we have for saving it? In a way, the savoring must come first.* (Quote by E.B. White)
2. *Over time I have come to realize that it's not the wildlife that we need to manage, it's ourselves.*

Chapter 2: Salmon in the Trees, Wolves on the Beach

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

Up for Discussion

In the Great Bear Rainforest, the salmon feed many species, from bears to eagles to microbes. Large animals catch the fish and drag them out of the rivers, where they're eaten—or left to decompose. Bears gobble the salmons' bodies (pregnant fish, with their bellies full of eggs, are a delicacy!). Wolves scarf down the heads, leaving the headless bodies to rot. Whatever the bears and wolves don't eat, the ravens will. And what the ravens leave behind is cleaned up by bacteria and other microorganisms called *decomposers*.

Learning Activity

Have students select one of the following activity options:

1. Invite them 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 decomposition. 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 Life Cycle

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

Learning Activity

Use books and Internet resources to study the salmon life cycle. Here are some great places to begin:

www.pac.dfo-mpo.gc.ca/fm-gp/rec/species-especes/salmon-saumon-eng.htm
www.earthlingenterprises.ca/earthlingenterprises/Salmon_Education.html

Working in pairs or individually, have students fill in the **Salmon Life Cycle** on the following page, using point form.

Salmon Life Cycle

Salmon species: _____
(e.g., chinook, coho, chum, sockeye, pink)

	egg	alevin	fry	parr	smolt	adult	spawning adult
physical description							
habitat							
time spent at this stage							
diet							
dangers/ threats							
sketch a picture of a salmon at this stage							

C. Keeping Track by Following the Tracks!

Focus: reading informational and visual texts to construct meaning; comparing the structures of animals living in different habitats and communities

Summer is a time of intense activity in the Great Bear Rainforest. In a forest, a keen observer can find many signs of the animals that inhabit the area, from bird calls to scat marks to, of course, footprints. In this activity, students will learn to recognize different tracks left by animals of the Great Bear Rainforest.

1. Borrow or purchase a copy of *Animal Tracks of British Columbia* (Lone Pine Publishing, 2007). Don't have one? Try Bear Tracker at: www.bear-tracker.com.
2. Investigate the tracks made by animals living on the west coast of British Columbia, in the area of the Great Bear Rainforest.

D. Making Connections

Focus: responding to selections by explaining connections to self and world

Read the following information from Chapter 2 of *Nowhere Else on Earth* and have students write a short explanation of how it connects to their own life or world.

1. Dr. Tom Reimchen is a biologist who researches rivers and streams on the north and central BC coast. He's very passionate about his research—to the point where he spends days on end investigating the ecology of salmon. Do you know someone who is similarly obsessed with learning about the things they love? Explain.
2. Rachel Lynne-Dell Hill, from the Gitga'at First Nation, loves to eat octopus, cockles and deer. These foods are important to her culture, and they've been eaten by generations of her ancestors. Think about some special traditional foods that you eat, and that your ancestors also enjoyed.

Chapter 3: People at the Edge of the Sea

A. From Houses to Poles

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

Up for Discussion

West Coast First Nations have lived on this land since time before memory. Beginning about 5,000 years ago, the cedar became an important part of the culture of these peoples. They called it the "tree of life," and created their homes, tools and art from its versatile wood. Invite students to skim through chapter 3 and create a list of ways First Nations used the cedar.

Learning Activity

Explore how First Nations used the cedar in building houses, poles and other items by visiting the Royal BC Museum's interactive Thunderbird Park website:

www.royalbcmuseum.bc.ca/exhibits/tbird-park/main.htm?lang=eng

Challenge students to learn more about one of the nations represented in Thunderbird Park.

B. Art and Culture on the Coast

Focus: historical and cultural contexts of images; demonstrating awareness of the Aboriginal concept of respect for the environment; human impacts on ecosystems; exploring print and multimedia informational texts to construct meaning

Up for Discussion

Coastal First Nations lived in a resource-rich land where the salmon arrived at their doorsteps, the beaches offered rich foods and the forest provided nourishment. This bounty left them time to develop and enrich unique art forms and cultural practices. The Pacific Coast Salish were one of these groups. Their art remains a vibrant way to pass along their culture and other ancient traditions.

Learning Activity

Invite students to explore First Nations art and culture via Seattle Art Museum's exhibition, *S'Abadeb: The Gifts—Pacific Coast Salish Art and Artists* at:

www.seattleartmuseum.org/exhibit/exhibitDetail.asp?eventID=13771

Have them choose an item that appeals to them. Ask them to sketch it and write a short paragraph about its use or function. Have them include an explanation of why that item appeals to them.

C. The Potlatch: A Cultural Icon

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

Up for Discussion

In chapter 3, we learn that First Nations held potlatches, sacred cultural ceremonies where they sang, gave gifts and danced with ceremonial masks. But soon after European settlers arrived in Canada, the government banned potlatches. Discuss with students whether this seems fair. Would they like it if their special traditions were suddenly forbidden?

Learning Activity

Find out more about the potlatch, an important First Nations tradition. Start with the sidebar on page 38 and continue here, at the BC Archives and the Kwagiulth Band websites. Be sure to look in the ***Resources*** section online at www.greatbearrainforest.ca.

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

Kwagiulth (Kwakiutl) Band
www.kwakiutl.bc.ca/culture/potlatch.htm

Potlatch Dances
www.youtube.com/watch?v=GKeMmIMlKBA&feature=related
www.youtube.com/watch?v=1zwbSOsqFh8

D. Tell a Story; Write a Letter

Focus: demonstrating awareness of the Aboriginal concept of respect for the environment; use speaking to explore, express, and present a range of ideas, information and feelings for different purposes and audiences; writing a variety of clear, focused personal writing for a range of purposes and audiences that demonstrates connections to personal experiences, ideas and opinions

Learning Activity

Have students choose one of the following activities:

1. ***Storyteller Corner***
   Think about how important oral traditions are to BC's First Nations. Traditions, stories of ancestors and important cultural beliefs are passed down in a rich oral tradition. These stories help younger community members understand and learn about their culture.

   a) Think about your own history and ancestry. Are there some special stories there?

   b) Choose one of these stories to retell.

   c) Create an outline or organized notes that will help you tell your story. You may prefer to write the whole thing out.

   d) Practice telling your story. Remember to make it interesting, with facial and hand gestures, different voices, and pauses to build suspense!

   e) Share your story with your class or another group.

2. ***Thanks for the Trees!***
   First Nations peoples relied on the cedar tree for much of their building material, for their tools, their clothes, their houses and their cultural traditions. It was a pretty important tree! And First Nations were the first to acknowledge this with their traditions surrounding gratitude. No resource was taken without giving thanks.
   - Read back through chapter 3 in *Nowhere Else on Earth*. Find examples of how the cedar tree was used.
   - Imagine that you're a child of First Nations descent living on the coast about 250 years ago. Write a letter to a cedar tree, thanking it for all the ways it helps you in your day-to-day life.

E. Making Connections

Focus: responding to selections by explaining connections to self and world

Read the following information and short passage from chapter 3 of *Nowhere Else on Earth*, have students write a short explanation of how it connects to their own life or world.

1. Many people moved to Canada from Europe and other parts of the world because of war, famine or other problems. If you haven't been here since the time before memory (as have First Nations), explain how your people arrived in Canada. Don't know? Now's a good time to ask your relatives!
2. *It's important to have our elders teach the young to keep our culture going.*

Chapter 4: From Pseudoscorpions to Grizzly Bears

A. Picturing the Great Bear Rainforest

Focus: habitats, communities and ecosystems; interactions between organisms and the environment; sustaining healthy ecosystems; listen purposefully to understand and analyze information

Learning Activity

Have students close their eyes. Read to them the opening section of Chapter 4, where the author describes what it's like to be inside the Great Bear Rainforest. Then invite them to draw or paint themselves in the rainforest, using all of their senses as they imagine what it would be like to visit such a place.

B. Rainforest Food Chain

Focus: habitats, communities and ecosystems; interactions between organisms and the environment; sustaining healthy ecosystems; structures and behaviors of animals in different habitats and communities; exploring visual, multimedia and information texts to make meaning; organizing information

Up for Discussion

In *Nowhere Else on Earth*, we learn that the parts of salmon not eaten by bears feed the streams, the insects, the birds, the trees and the wildlife. Evidence of marine nutrients has been found in the treetops, and even in the feathers of birds!

1. Brainstorm with students some organisms to add to the chart below. What other primary consumers live in the Great Bear Rainforest? Who else might be a tertiary consumer? Use information from *Nowhere Else on Earth* to fill in the chart.

Learning Activity

Have students draw a food chain that might occur in the Great Bear Rainforest.

Who's Who in the Great Bear Rainforest

Producers	Primary Consumers	Secondary Consumers	Tertiary Consumers	Decomposers
Phytoplankton (organisms that photosynthesize, like diatoms and algae) Plants	Black-Tailed Deer Fish Insects Mountain Goats Porcupines Rodents Zooplankton (animal-like forms of plankton, such as the larval and adult forms of some animal species and certain protozoans)	Bats Pacific Herring River Otter Saw-Whet Owl Salmon Western Screech Owl Wolf Wolverine	Marbled Murrelet Wolf	Bacteria Flies Fungi Wasps Worms

C. The Lungs of the Earth

Focus: habitats, communities and ecosystems; interactions between organisms and the environment; sustaining healthy ecosystems; exploring visual, multimedia and information texts to make meaning; creating a variety of effective informational writing for a range of purposes and audiences that communicates ideas to inform or persuade

Up for Discussion

In chapter 4, we learn about how plants absorb carbon dioxide with their leaves and then return oxygen to the atmosphere. Part of what makes the Great Bear Rainforest so magical is that it's a very important *carbon sink*—the abundance of plant life in this part of the world helps to absorb atmospheric carbon and clean our air. Discuss with students: how might the Earth change if wide-scale logging were to be practiced in the Great Bear Rainforest? Why is it important to protect these trees and plants from the damage done by logging? Can they think of any other forests of the world that act as carbon sinks? (The Amazon)

Learning Activity

1. On a screen or SMART Board, share with students the simplified carbon cycle as seen in this lesson:
   www.talkabouttrees.org/docs/51-53.pdf
2. Discuss the various aspects of the carbon cycle and explore the vocabulary associated with it. As students look at the graphic of the carbon cycle, can they see which aspect is associated with the most carbon release (fossil fuels).
3. Use this to segue into a conversation where students share information on how to minimize fossil fuel use. Encourage them to think back to their exploration of their carbon footprint: what changes can they make to reduce their carbon emissions?
4. Have students write a short persuasive paragraph about why it's important to protect the Great Bear Rainforest as one of the Earth's most important carbon sinks.

D. Legends and Stories of Creation

Focus: listening to comprehend and interpret; making connections with prior experience; characteristics of First Nations cultures; exploring traditional texts from Aboriginal cultures

Up for Discussion

The white spirit bear (also known as the Kermode bear) is actually a black bear that lives in the Great Bear Rainforest. A special gene gives it white fur. Some black bears carry the gene, while others don't—so you can't predict which black bears might have a white-furred baby. While spirit bears are protected from hunting because they are so rare, it's open season on black bears in the Great Bear Rainforest. But…if you can't tell which black bears might produce a white baby, how can you safely know which black bear to hunt?

Learning Activity

Many First Nations stories have evolved to explain the spirit bear. One such story is shared in chapter 4, where Wee'get the Raven makes every tenth bear white as a reminder of the ice age. And there are many other stories about all kinds of bears. Visit your school or local library to locate myths and legends that involve bears. Better yet, invite a First Nations speaker or storyteller in to share these historically significant stories.

E. Making Connections

Focus: responding to selections by explaining connections to self and world

Read the following short passages from chapter 4 of *Nowhere Else on Earth* and have students write a short explanation of how it connects to their own life or world.

1. *It's not that we can make a difference. It's that we do make a difference.* (Quote from Julia Butterfly Hill)
2. On page 47, the author tells an Eco-Story about a fox and a deer playing a game of chase. Totally unexpected! She writes, *In this magical moment I was reminded that there are connections between species that we don't expect or understand.* How have students witnessed or heard of this for themselves?

Chapter 5: Fish and Fur

A. Fishing Through the Years

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; using a range of strategies to extend and confirm meaning, including asking questions

Up for Discussion

At the beginning of chapter 5, we read about how the First Nations fishers used to fish for salmon. How does their way of fishing differ from modern commercial fishing?

Learning Activity

Learn more about commercial fishing. For a teacher backgrounder that you can explore with your kids about problems with commercial fishing, head to:

www.sierraclub.bc.ca/seafood-and-oceans/threats/over-exploitation-of-resources-pollution-1

For a complete one-hour lesson in commercial fishing and its impact on the oceans, try:

http://marinediscovery.arizona.edu/lessons/gobies/Templates/index.html

B. How to Sustain Ecosystems

Focus: 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; organizing information

Up for Discussion

If we are to preserve unique and important natural resources like the Great Bear Rainforest, then we've got a bit of work to do in terms of figuring out how to use resources in a *sustainable* way. Discuss with students: what do you know about sustainability? Invite them to put forth suggestions of what kinds of actions are/are not sustainable, both in regard to the Great Bear Rainforest and the larger world outside BC's borders.

Learning Activity

The following activity is taken from Sierra Club's *Go Wild!* guide for educators. For more excellent activities based on British Columbia's natural areas, visit:

www.sierraclub.bc.ca/education/ed_educators/downloadable-resources-1/NTFP_Guidebook.pdf

Learning Objectives:

- Explain the concepts of ecosystem and sustainable harvesting practices
- Use art skills to present ideas of ecosystem sustainability

Vocabulary:
ecosystem; sustainable; harvesting; overharvesting; natural resources

Timeline:
1.5 hours

Materials:
- large pieces of paper, writing and drawing implements
- copies of **How to Sustain Ecosystems**
- copies of **Mini-Article 1: Harvesting Pacific Yew**
- copies of **Mini-Article 2: Harvesting Huckleberries**
- copies of **Student Handout**

Before you start:
If your students are not accustomed to working independently in small groups, you may decide to go over the group roles with them. Decide how you will structure the work. Will you assign both mini-articles to each group? Or will half the groups work on *Mini-Article 1: Harvesting Pacific Yew*, and the other half *Mini-Article 2: Harvesting Huckleberries?*

Process:
1. On the board, write the words *ecosystem* and *sustainable harvest*. Briefly brainstorm what the students already know about each of these terms.
2. Distribute copies of **How to Sustain Ecosystems**.
3. Ask a student to read aloud the section: *What is an ecosystem?* At the conclusion, ask if there are other words you should write in your brainstorm list on ecosystems.
4. Repeat this process with *What is sustainable harvesting?*
5. Go over the rest of the handout. (Leave the mini-articles to be read by the students in their small groups.) Make sure everyone understands the task.
6. Ask the students to form groups of 3 or 4, and give each of them a large sheet of paper and art materials. Clarify the mini-articles you would like them to read and discuss, and the timeline.
7. Create a gallery of the completed posters, and walk around as a class. Invite each group to explain their posters and answer questions.

Evaluation:
Use the completed posters, and each group's explanation of them, to make sure that students understand the concepts of ecosystem and sustainable harvesting.

Extension Suggestion:
Ask the groups of students to create a skit that shows the importance of sustainable harvesting, both for the continuation of the plant species and for the well-being of the other species who are part of the ecosystem. You can either ask the groups to choose whether they will base their skit on the Pacific yew or huckleberry harvest, or you can assign these topics. Give the groups twenty minutes to plan their skits, then sit back and enjoy the presentations!

How to Sustain Ecosystems

What is an Ecosystem?

An **ecosystem** can be as small as a puddle or as large as the coastal temperate rainforest. Any group of living and nonliving things interacting with each other can be considered an ecosystem. So you can think of an ecosystem as a community of animals (fish, birds, insects, humans and everyone else), plants, water, soil and other resources in an area. Everything that lives in an ecosystem depends on the other species and elements that are part of their community. If one part of an ecosystem is damaged or disappears, it has an impact on everything else. Because nature is always changing (living things grow and die, temperatures go up and down, weather changes, etc.), ecosystems are always balancing.

What is Sustainable Harvesting?

Sustainable harvesting means not taking too much of any one species. You harvest in a way that does not disrupt the balance in an ecosystem. If too much of one species is harvested too quickly, it may not be able to grow back, and the ecosystem may not be able to recover.

The opposite of sustainable harvesting is overharvesting, when too much is taken for the ecosystem to adapt and be healthy. To avoid overharvesting, it is important to take note of what you are picking. Are there many plants? Do you need to take the entire plant, or would one branch or a few leaves be enough? Are you leaving enough berries for the birds and animals?

Think About Harvesting: Before you start, choose a facilitator, a reader, a recorder and a timekeeper. Your teacher will tell you which article or articles you should work on. Listen as the reader reads aloud. As you listen, think about sustainable harvest. *What happens when a species is overharvested? How can this be avoided?*

Mini-Article 1: Harvesting Pacific Yew

Pacific yew has been used by First Nations for thousands of years because it is a very hard wood with a nice polish and is useful for building tools and decorations. In the 1960s, western scientists discovered that a chemical compound in yew bark, palictaxel, had potential for treating cancer. The bark, needles and twigs of Pacific yew contain taxanes. These taxanes could be made into palictaxel, a very strong anti-cancer drug.

Suddenly, Pacific yew was in great demand. In the 1990s, people could make lots of money by harvesting it and selling it to drug companies. During the next ten years, there was so much harvesting of Pacific yew that it became very hard to find on the west coast of BC. **So much yew had been taken that it would take a long time to grow back.**

What could the drug companies do, now that the Pacific yew was becoming harder to find? Scientists explored the forest some more and found another plant that contained taxanes. Now, ground hemlock (*Taxus canadensis*) from eastern Canada is the main source of palictaxel.

Here's the question:

How can communities make sure that this plant is harvested sustainably, so that it can re-grow and keep producing this important drug? (Image credit: virtualmuseum.ca)

Mini-Article 2: Harvesting Huckleberries

Fred Sampson heads out in his truck from his home on the Siska reserve, near Lytton, to the Coquihalla high country, where he's going to collect some huckleberries. Sampson, chief of the Siska First Nation, remembers making this journey when he was a small child. His family went to Merritt by truck, where they met his grandparents, and they completed the last leg of the trip by horse and buggy along a dirt road, years before the Coquihalla Highway existed. It was two weeks of family time; the men hunted deer, which was smoked and dried in the camp, while Sampson picked the tasty huckleberries by hand with his aunts, uncles and older brother, putting them into cedar-root baskets.

When Sampson returned to the site of his traditional camp last July, he saw a large van parked by the side of the road and a dozen people in the bushes. Commercial huckleberry pickers were using rakes to scoop the berries off the bushes and into plastic buckets.

"We got there and there were no berries," Sampson says. "They cleaned the area out. They use rakes that take the leaves off the plant while it's still in photosynthesis. When I saw this, at first, I felt anger, then just plain sadness…"

Nowadays, the Siska First Nation has started a company called Siska Traditions, to collect huckleberries. They use the traditional method of sustainable harvesting: they only take 30 percent of the berries in order to leave some for the birds and bears and to nourish the huckleberry plants. They also collect arnica flowers, wild mint, dandelion, yarrow, plantain, devil's club, wild ginger, juniper and stinging nettle for use in teas, soaps, jams and jellies, and herbal medicines.

(Adapted from Efron, S., "Marketing of Forest Floor Has Consequences," *Georgia Straight*, Dec. 9, 2004)

Student Handout

Discuss:

When you have finished reading the article, discuss these questions. Your recorder should take very brief notes on your main ideas.

1. What types of wild products or other natural resources are harvested from your territory?
2. What are some of the other animal and plant members of the ecosystem that are affected by the harvest?
3. Is the harvest sustainable? How could the harvest be improved to help sustain the ecosystem?

Think About What You Have Learned:

- Why is it so important to sustain ecosystems?
- What can you do to help sustain ecosystems in your territory?

Make a Poster: Create a poster that shows the main things you have discussed. You may decide to make two posters: one showing overharvesting of an ecosystem, and the effects this has on other members of the ecosystem, and one showing sustainable harvesting. You may decide to use only pictures, or you may want to include words. It's up to you! Note: Make sure you can explain your poster (or posters) to others in your class.

C. Where Did the Eulachon Go?

Focus: survival needs; interactions between organisms and the environment; human impact on ecosystems; analyzing how BC's living resources are used; analyzing how the Aboriginal concept of interconnectedness of the environment is reflected in responsibility for and caretaking of resources

Learning Activity

On pages 56–57 of *Nowhere Else on Earth*, we learn that the eulachon have not returned to coastal rivers in southern BC. Have students create an organized list of possible causes for this oily little fish's sudden disappearance.

D. A Whale of a Tale

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; listening purposefully to understand and analyze ideas and information

Learning Activity

Do your students know that whales can actually talk to each other underwater? Explore the following links to learn more about (and listen to) whale communication:

Vancouver Aquarium page on Orcas
www.vanaqua.org/education/aquafacts/killerwhales.html
Wild Whales
http://wildwhales.org/identifying-species
Mother humpback whale and calf
www.youtube.com/watch?v=WabT1L-nN-E
Female and male humpback
www.youtube.com/watch?v=Pt81MZeyDi0&feature=relmfu

Up for Discussion

Killer whales and other kinds of whales need to be able to hear in order to figure out where they are underwater. But fish farms and whale-watching boats are loud and disruptive to the echolocation process. What happens when whale communication is interrupted?

E. Making Connections

Focus: responding to selections by explaining connections to self and world

Have students write a short explanation of how the following info-bytes from chapter 5 of *Nowhere Else on Earth* connect to their own life or world.

1. When she was little, author Caitlyn Vernon had posters of sea otters on her wall. What were some of your favorite animals as a young child? Have they changed?
2. William Housty of the Heiltsuk First Nation used to love listening to stories from his grandparents. But he worried, because his friends didn't think it was cool to listen to old people just talking. Have you ever experienced this kind of feeling—where you love doing something, but your friends think it's dumb? How do you deal with it?

Chapter 6: Timber and Toilet Paper

A. BC's Logging History

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

Up for Discussion

Explore BC's early logging history in *Nowhere Else on Earth* and at:

The BC Archives website
www.bcarchives.gov.bc.ca/exhibits/timemach/galler09/frames/index.htm
British Columbia Forest Service timeline
www.bcfs100.ca/bscripts/timeline.asp

Lead your class in a discussion of how forestry and logging technologies have changed over time. What other industries experienced a similar sort of change, toward the *more-is-more* philosophy? What drives this kind of expansion?

B. Forest Regions of Canada

Focus: habitats, communities and ecosystems; interacting and collaborating in groups to explore ideas and information; listening to understand and analyze ideas and information; exploring multimedia texts to make meaning

Learning Activity

1. Project the following map onto a whiteboard or screen:
   http://ecosys.cfl.scf.rncan.gc.ca/images/classif/forest-reg2_e.pdf
2. Challenge students to work with a partner to create a chart that organizes the information shown on the map. There are at least three aspects that need to be considered: the type of forest; the type of trees growing in each forest; and the provinces in which that particular type of forest can be found. Can students figure out a way to present the information in an organized fashion?

C. What's Your Beef?

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 visual, informational and multimedia texts to make meaning; analyzing and synthesizing information; writing informational texts to teach, persuade or share an opinion

Up for Discussion

By this point in the book, your students' emotions have probably been stirred by one or more of the ecological problems that humans are causing. Record a list of issues on the board. Have students decide which issue is the most important to them. Which one would they most like to change, or have a positive impact on?

Learning Activity

Now it's time to get busy! We're going to write letters to our elected representatives.

1. Assign each student to make notes on their chosen issue, using information from the book and related websites from the **Resources** section online at:
   www.greatbearrainforest.ca
2. Review proper letter-writing format at Citizens for Public Justice:
   www.cpj.ca/en/content/how-write-letter-mp
3. Here's a great website where your students can enter your school's postal code and find the address for your Member of Parliament (MP) or Member of the Legislative Assembly (MLA):
   www.earthlingenterprises.ca/earthlingenterprises/Write_a_letter___petitions.html
4. Workshop the letters so students are able to receive and incorporate feedback. Any letters that are posted should be reviewed by the teacher.

D. 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

Learning Activity

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!

E. Making Connections

Focus: responding to selections by explaining connections to self and world

Have students write a short explanation of how the following quotes from chapter 6 of *Nowhere Else on Earth* connect to their own life or world.

1. *When I stand on a wide-open mountain top, look out over the ocean or stand under a big tree, I am reminded that we are all just small pieces of a bigger puzzle.*
2. *We are all characters in the Earth's story, and we can change the ending.*

Chapter 7: Salmon: A story of mystery, barbecues, food coloring and hope

A. Salmon Scavenger Hunt

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

Learning Activity

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

- 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**. (Credit: www.pbs.org/emptyoceans/educators/activities/salmon-scavenger-hunt.html)
- 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* any of the things that will help the salmon the most?

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:

B. My Changing Forest

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; writing informational texts to teach, persuade or share an opinion; making connections to self, world and texts

Up for Discussion

Ask students to imagine being a bear, an eagle or a wolf living in the Great Bear Rainforest. You depend on the salmon to survive, don't you? How does it feel when the salmon suddenly don't show up in your river? What do you have to do differently? How is this affecting your family? Your friends? Your ability to prepare for winter?

Learning Activity

Instruct students to write a letter, journal entry, email or blog post from the point of view of their imagined animal. (The letter's recipient will be the same kind of animal who lives a couple of estuaries away—they've got lots in common, these two!) In their letter, student/animals should explain the change they're noticing, express their feelings about it, hypothesize about what could be the cause (from an animal's perspective, remember!!).

(**Note:** This is a great opportunity to introduce your students to *Watership Down* by Richard Adams. In this story, the peaceful, predictable lifestyle of a warren of rabbits is disrupted by constant human development.)

C. The Facts on Salmon Farming

Learning Activity

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; writing information texts that express ideas and information

In chapter 7, we learn a little bit about salmon farms. Have students extend the learning by reading **Salmon Farming**, on the following pages. Then ask them to complete **Salmon Farming: Q&A**.

D. Making Connections

Read and reflect on the following information and short passage from chapter 7 of *Nowhere Else on Earth* and have students write a short explanation of how it connects to their own life or world.

1. Molina Dawson walked more than 400 km over sixteen days because she believes in raising awareness about the negative impacts of fish farming. What do you feel so strongly about that you would be willing to take such a stand? Do you know anyone personally who has done such a thing, or who has raised significant funds in support of a cause they believe in?
2. *If we do not change our direction, we are likely to end up where we are headed.* (Chinese proverb)

Salmon Farming

A History of Salmon Farming in BC

Salmon farming in BC began in the early 1970s, mostly by small operators in coastal areas around Vancouver Island. But because the tidal flow wasn't ideal, waste products from the salmon built up quickly. The netcages had to be relocated, but this cost a lot of money for the fish farmers. Many of them had to sell their farms. Large multinational corporations purchased a number of these farms.

By the middle of the 1980s, people were starting to worry about the environmental consequences of the rising number of salmon farms. First Nations people worried: were their traditional lands and fishing grounds at risk? Fishermen worried: were they going to lose their jobs because everyone would start eating farmed salmon? Environmentalists worried: were the salmon farms polluting the water and destroying wild fish?

In 2008, in response to these concerns, the Canadian and BC governments decided to place a moratorium on the growth of fish farms. That meant no more farms could be created. The moratorium remains today, but there are still problems. Even though there aren't any new fish farms, the farms that were in operation before the moratorium are producing almost double what they were before. And big companies that stand to make a lot of money are pressuring the province to lift the moratorium. This would allow major expansion of netcages along BC's pristine northern coast.

The Risks of Salmon Farming

Expanding the salmon farms will provide people with more fish to eat. But it will also make some problems worse. Farmed salmon often catch diseases since they live in such crowded conditions. These diseases, such as wild lice, can be passed along to nearby wild fish. Sometimes they're bad enough to kill other species. Often the farmed fish require antibiotics and other drugs to prevent them from getting sick—but traces of these drugs are then passed along to the people who eat the fish.

Problems also happen when the netcages break open. This happens through accidents, during ocean storms, or when a large seal or whale goes after the fish inside. When the farmed fish get out, they can transfer diseases to wild fish, or even compete with them for food and habitat.

Waste from fish farms passes through the netcages, and it suffocates life on the ocean floor. These wastes also drift through the marine environment, possibly contaminating shellfish beds and other habitats. Disease spreads along the food chain.

Salmon farmers use loud devices and guns to keep predators like seals and whales away—but these make it hard for marine mammals to communicate with each other. Salmon farmers have killed seals, whales, sea lions and seabirds, and animals can also get injured when they get entangled in nets. Orcas that used certain areas for decades moved away when the fish farms moved in.

Is There a Better Way?

Fish farming causes a lot of problems. One really good solution is for fish farms to start using closed containment systems. If the salmon are raised inside closed pens, there's no risk of them escaping. No risk of passing diseases along to wild fish. No more concentrated fish poop wrecking the ocean floor. No more farmed fish entering the ecosystem and competing with wild fish for food—or even worse, breeding with them and weakening wild fish stocks.

It's up to government to make laws forcing industry to change its ways. Will it happen?

(Source: The David Suzuki Foundation)

Salmon Farming: Q&A

Read **Salmon Farming**. Working on your own or with a partner, answer the following questions.

1. What problem did BC's first salmon farmers face?

_____
_____

2. Explain how the salmon farms fell into the hands of large corporations.

_____
_____

3. For what reasons were people initially concerned about salmon farming?

_____
_____
_____

4. What do you think will happen if the government lifts the moratorium on new fish farms?

_____
_____

5. List and explain three major problems with fish farming using netcages.

_____
_____
_____

6. How does fish farming negatively impact marine mammals?

_____
_____

7. Explain one proposed solution to netcage fish farming that will better protect other fish and mammals from the risks of salmon farming.

_____
_____
_____

8. As you see it, what risks do salmon farms pose to bears in the Great Bear Rainforest? Support your answer with evidence from the passage.

_____
_____
_____

Salmon Farming: Q&A

Answer Key

1. What problem did BC's first salmon farmers face?
   Waste products built up quickly due to inadequate flushing by the tides.
2. Explain how the salmon farms fell into the hands of large corporations.
   Small-scale salmon farmers couldn't afford to pay the costs to relocate their netcages, so they were forced to sell to large businesses.
3. For what reasons were people initially concerned about salmon farming?
   First Nations were concerned about the impact to their traditional land and fishing grounds. Traditional fishermen were concerned that the salmon farms would put them out of work. Environmentalists were concerned about the damage the fish farms were making to the environment.
4. What will happen if the government lifts the moratorium on new fish farms?
   More fish farms will sprout up and the damage to the environment will be much more pronounced. More farmed fish = more waste, more disease and more invasion of natural habitat in the event of cage breakdown.
5. List and explain three major problems with fish farming using netcages.
   Diseases such as sea lice are passed on to native stocks; fish farm waste suffocates organisms on the ocean floor; marine mammals get entangled in nets.
6. How does fish farming negatively impact marine mammals?
   Mammals get caught in the nets and drown; salmon farmers shoot off guns and other loud equipment to scare away the whales, but this in turn interferes with their ability to communicate underwater.
7. Explain one proposed solution to netcage fish farming that will better protect other fish and mammals from the risks of salmon farming.
   Closed containment systems prevent fish from escaping into the wild, trap waste products and reduce the risk of disease.
8. As you see it, what risks do salmon farms pose to bears in the Great Bear Rainforest? Support your answer with evidence from the passage.
   If farmed salmon escape, they can pass diseases to wild salmon stocks. This weakens the wild salmon. They might not survive to make it back to the estuaries for spawning, which would decrease the amount of food the bears have to survive. Also, cross-breeding between farmed and wild species could weaken existing wild stocks.

Chapter 8: Saving the Trees

A. 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

Up for Discussion

In chapter 8, students are introduced to the fact that clear-cut logging is practiced in the Great Bear Rainforest. Discuss with students the fact that 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.

Learning Activity

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

B. Wood Everywhere

Focus: human impact on ecosystems; sustaining healthy ecosystems; organizing, analyzing and synthesizing information; working with a group to listen and interact with others and to explore ideas

Up for Discussion

How many ways can students think of that they use wood or wood products? What about their family's use of these items?

Learning Activity

1. Provide small groups with chart paper and felt markers (or better yet, a small whiteboard or chalkboard so they're not using paper for this activity!).
2. Have each group make a two-column list: the first column is for where wood is used in their world (houses, railroad ties, etc.); the second is for wood products (Kleenex, guinea pig bedding, etc.).
3. Come together after ten minutes and have students share their lists. Have each group add to their list according to what other groups have listed.
4. As a class, discuss how reducing and reusing (as covered in the previous chapter) is preferable to recycling. How can you reuse paper and wood products in your classroom? At home?

C. Comparing Old-Growth to Second-Growth Forests

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 and multimedia texts to make meaning; organizing, analyzing and synthesizing information

Up for Discussion

Watch the following YouTube clip about old-growth forests as they compare to second-growth forests. While this clip focuses on the Tongass Forest in Alaska, the facts about old-growth vs. second-growth remain true in the Great Bear Rainforest.

www.youtube.com/watch?v=imzPR8iKIJ8

Learning Activity

1. Have students read the section titled "Walking into a Second-Growth Forest" in *Nowhere Else on Earth*. Discuss the information as a class.
2. Have students watch the YouTube clip and listen to the narration. When it's finished, discuss the information as a class.
3. Show the clip again. This time around, have students take notes that compare old-growth to second-growth forests. Have them include information about the species that are affected by clear-cutting, and how this forestry practice is dangerous for their survival. Invite them to add information that they learned while reading *Nowhere Else on Earth*.
4. Watch the clip once again, allowing students to add information to their notes that they may have missed the first time through.
5. Again, discuss the information as a class.

D. Biodiversity Blastoff

Focus: habitats, communities and ecosystems; interactions between organisms and the environment; human impact on ecosystems; sustaining healthy ecosystems; exploring visual, informational and multimedia texts to make meaning; analyzing and synthesizing information; writing informational texts to teach, persuade or share an opinion; asking questions

Learning Activity

The web is a treasure trove of resources about biodiversity!

1. Take a few minutes with your students to explore the World Wildlife Fund's page for kids:

   www.biodiversity911.org/default.html
2. Task students to create a quiz based on information gleaned from various pages on this website. (You may wish to limit students to using only one section, such as "Biodiversity Basics," "Forests" or "Fisheries.")

3. Quizzes should have a minimum of ten questions. Allow students about thirty minutes to compile their questions.
4. When students have finished exploring the site and drafting their quizzes, have them swap! See how many questions they can answer correctly on a classmate's quiz.

E. Making Connections

Focus: responding to selections by explaining connections to self and world

Read and reflect on the following information and short passage from chapter 8 of *Nowhere Else on Earth* and have students write a short explanation of how it connects to their own life or world.

1. *One of the most important things you can do is talk to the people who are doing something you don't agree with. Often this can seem like the hardest thing in the world! When our families or our friends are making choices that hurt other people, or hurt the Earth, it can be hard to talk to them about it. But if you try, they might learn something from you, and as a result they may make different choices.*
   Where have you found this to be true in your own life? Do you think you have the courage to speak up about something you disagree with?
2. *I find that whenever I feel sad, being outside helps put things into perspective.*

Chapter 9: Driving a Car Through the Rainforest

A. Climate Change and You

Focus: 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 visual, informational and multimedia texts to make meaning; analyzing and synthesizing information; writing informational texts to teach, persuade or share an opinion

Up for Discussion

Climate change is real, and it's happening all around us because of human activity.

1. Read "What is Climate Change?" with students and hold a class discussion where you address their questions. Don't have an answer? Model for students how you can flag a page with a sticky note so that you can come back to it later.
2. Read "What Can Be Done About Climate Change?" Again, discuss what students are learning.

Learning Activity

1. Have students visit "See the Impacts" on the US Environmental Protection Agency's website for kids. Task them to thoroughly read the content in this section of the website.
   http://epa.gov/climatechange/kids/impacts/index.html
2. Ask each student to choose one climate change impact to focus on.
3. Have students read through "Be Part of the Solution," at:
   http://epa.gov/climatechange/kids/solutions/index.html
4. Have students write a paragraph to summarize their chosen climate change impact.
5. Then, ask them to write three actions that they can take to prepare for this impact.
6. Create a *Taking Action Against Climate Change* bulletin board, and post students' responses.

B. Oil Spills: How they Work

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

Up for Discussion

- In 1989, the Exxon Valdez ran aground and spilled huge amounts of oil off the coast of Alaska. Read about it at the Encyclopedia of Earth:
  www.eoearth.org/article/Exxon_Valdez_oil_spill?topic=58075

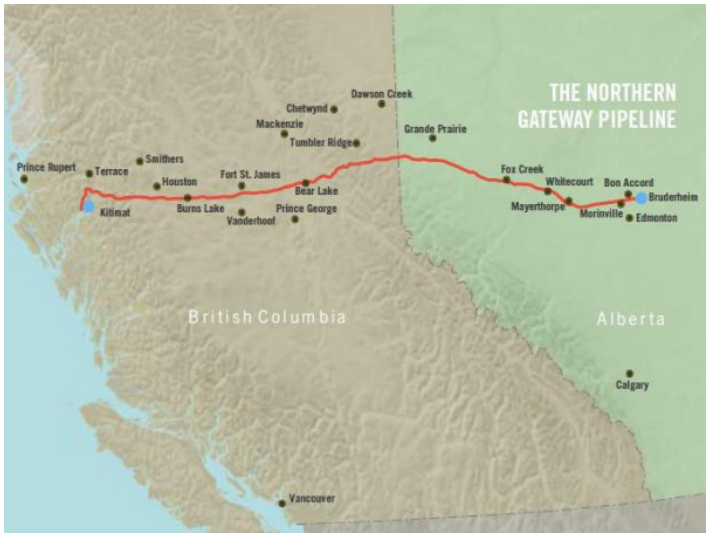
- In April of 2010, an oil rig in the Gulf of Mexico exploded, releasing 4.9 million barrels of crude oil into the waters. The oil couldn't be stopped from flowing out of the ocean floor for three whole months. Link to photos of the disaster here: www.reuters.com/news/pictures/slideshow?articleId=USRTR2D98W#a=46
- A model of what could happen with an oil spill in the GBR can be found here: www.livingoceans.org/initiatives/tankers/oil-spill-model

Talk about it with your class. What do they think? Should tankers be allowed to travel in the fragile waters off BC's Great Bear Rainforest?

C. Wilderness Politics

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 visual, informational and multimedia texts to make meaning; analyzing and synthesizing information; writing informational texts to teach, persuade or share an opinion

Let's dig into one of the hot political and environmental issues surrounding this pristine piece of wilderness.



Up for Discussion

Calgary-based oil and gas company Enbridge Inc. is proposing to build a 1,170-km-long pipeline through the Great Bear Rainforest. The purpose of the pipeline is to transport oil from the Alberta tar sands to a new port in Kitimat, on British Columbia's west coast. From there, the crude oil would be loaded onto tankers for export to international markets. If the project gets the go-ahead from government, more than 225 oil tankers would travel BC's northern inside coastal waters per year. (Currently there is no bulk crude oil tanker traffic on BC's north coast.) Here's the problem: for better or for worse, our economy still needs oil to function. But what happens if one of those tankers has an accident and spills oil in the waters of the Great Bear Rainforest? How would the ecosystems be damaged? And could they ever be repaired?

The August 2011 issue of *National Geographic* showcases the Great Bear Rainforest, and includes articles about the spirit bear—and the implications of oil expansion into this precious habitat. Go to www.pacificwild.org to access this issue.

Learning Activity

1. Watch *Oil in Eden: The Battle to Protect Canada's Pacific Coast* on the Pacific Wild website (17 minutes):
   http://vimeo.com/15295815
2. In small groups or in pairs, have students research this issue further. For more information about the proposed Enbridge pipeline:
   - www.pacificwild.org/site/our-work/no-tankers-no-pipeline.html
   - www.pacificwild.org/site/our-work/no-tankers-no-pipeline/first_nations_and_enbridge.html
   - www.cbc.ca/bc/features/soundslides/pipe-dreams (radio slide show)
   - www.cbc.ca/news/business/story/2010/05/27/enbridge-files-nortern-gateway-application.html
   - http://pipeupagainstenbridge.ca/news/enbridge_oil_spill_in_n.w.t._could_top_1500_barrels_read_more_http_www.calg
     (news story about an oil leak in the Northwest Territories)
   - http://pipeupagainstenbridge.ca/join/partners
3. Assign students to respond to their research in one of the following ways:
   - Write an opinion piece (a letter to the editor) for a local newspaper stating your opinion of the issue.
   - Write a summary of the issue. Include evidence and details from your research that outlines both sides of the issue. (Students may choose whether to "pick a side" and argue for it toward the end of their summary).
   - Create a web page that informs people of the issue, lays out the threats and risks of pipeline development and offers alternatives and/or courses of action for people who want to make a difference.

D. The Sinking of an Icon

Focus: assessing the requirements of sustaining healthy ecosystems; human impact on ecosystems; exploring multimedia resources to construct meaning; creating imaginative writing; making connections to self and world; revising writing; reflecting on and assessing their writing and representing by setting goals and creating a plan for improvement

Up for Discussion

In March 2006, BC Ferries' fifth-largest passenger ship, the *Queen of the North*, sank off the coast near Prince Rupert. Read the following article to students (your more advanced readers may wish to read it themselves). It's a very dramatic and exciting piece of information.

www.popularmechanics.com/science/4263605?page=2

Learning Activity

1. Have students create an outline for a short story based on events that occurred on the night of the sinking of the *Queen of the North*. They may choose to tell the story in first or third person, from the point of view of a crew member, a passenger, a rescuer or even the ship itself.
2. Have students draft the story and work with their peers to make revisions. Compile the final drafts into a classroom anthology.

E. Making Connections

Focus: responding to selections by explaining connections to self and world

Read and reflect on the following information and short passage from chapter 9 of *Nowhere Else on Earth* and have students write a short explanation of how it connects to their own life or world.

1. What does climate change mean to you?
2. *We are all a part of this. The more time we spend driving in cars and the more plastic stuff we buy, the more pressure there is on the Alberta tar sands to produce oil, and the more likely it is that we will see oil tankers and oil spills in the rainforest.*
   How much plastic "stuff" do you buy?

Chapter 10: A Time for Action

A. The Food System

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

Up for Discussion

Engage your students in a discussion about the food they eat every day, and you're likely to get a whole range of responses. But how many of them know—really *know*—where the food they eat comes from? How many of your students understand how the food system actually works?

The food system refers to all processes that are involved in feeding a given population. That means growing, harvesting, processing, packaging, transporting and marketing the food items. And don't forget the final stages of consumption and disposal.

Back in the day—when humans operated a largely agrarian economy—individual families grew much of the food they ate. But as societies developed and as our economies became more sophisticated, the emergent division of labor meant that the task of growing food was increasingly handed off to specialists (in this case, farmers).

Fast forward a few hundred years, and pretty much every step of the food procurement process is handled by…well, by someone else. Nowadays, most of us buy our packages of perfectly shaped snap peas in the grocery store without so much as a thought about who planted the crop, how the peas were fertilized, or who loaded them onto the shipping container that brought them across to North America.

Consumers are largely dependent upon food manufacturers to meet our nutritional needs. Even if we don't eat every meal out of a box and actually make the effort to base our diet upon whole grains and fruits and vegetables, we're still largely reliant upon mass market processes to procure and deliver those fruits and grains. That means buying our food primarily from large corporations that engage in wide-scale commercial farming. That means putting an awful lot of trust in people you'll never even meet.

Learning Activity

1. Put students into small groups. Have them brainstorm everything they know about the food system, including diagrams, information, questions and even things they're not sure of.
2. Watch *What's On Your Plate* (2009), a documentary produced just for kids about food politics, food miles, farms and food activism.
3. After watching the documentary, have students revisit their brainstorms and add information that they learned while watching.
4. Working independently, have each student develop an action plan that includes five clear, achievable steps that they can take to make a positive change to the way they fit into the food chain.

B. Making a Difference

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

Learning Activity

Brainstorm and create an action plan with students to help protect the Great Bear Rainforest—or another issue that's important in your own community. 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 to gather information and ideas for how you can make a positive change for the Great Bear Rainforest. (If you decide to find an issue that's based in your own community, run a quick Google search to select appropriate links for your students to do their research.)

Pacific Wild
www.pacificwild.org/site/take_action.html
www.pacificwild.org/site/our-work/no-tankers-no-pipeline/expeditions.html
Sierra Club BC
www.sierraclub.bc.ca/great-bear-rainforest/what-you-can-do
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

C. 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

Although scientists aren't exactly sure how, glaciation and the movement of ice has shaped much of BC's geography and the distribution of species over time. 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)

D. 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

1. Ask students 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 their surroundings, thus avoiding predators.)
2. 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 *Nowhere Else on Earth* 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

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

E. Making Connections

Focus: responding to selections by explaining connections to self and world

Here are some phrases from chapter 10 of *Nowhere Else on Earth*. For each one, have students write a short explanation of how it connects to their own life or world.

1. *Through your actions, you can inspire others around you to follow your lead.*
2. *Tell me, what is it you plan to do with your one wild and precious life?* (Quote from poet Mary Oliver)