



Biodiversity

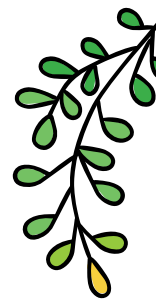
THE SPICE OF LIFE

Module 1



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Biodiversity: The Spice of Life

Biodiversity: the Spice of Life presents the heart and soul of biodiversity through the voices of people, poets, artists, musicians, scientists and your students. Use these activities to launch a unit or school theme on biodiversity; integrate biodiversity concepts, like interconnectedness; and, build empathy for life through shared experiences.

Ready

1. Have students go outside and explore the school yard, community garden or local green space. Have them look for examples of biodiversity and interrelationships*
2. Ask them to communicate their observations and findings in creative way like a drawing, video, body movement, poetry, first person narrative or monologue. Keep this part informal and quick rather than an extended assignment. This could be a sharing on a whiteboard, a limerick or cellphone video—no editing. Option for small group work.

** It will be instructive to see if students include themselves in these examples of interrelationships.*

Inquiry Ideas:

1. How is biodiversity represented through art and creativity?
2. In what ways am I dependent on biodiversity and its processes?
3. How does studying biodiversity help us understand our interrelationships?
4. Why is it important to protect biodiversity?

Introduce these inquiry questions to students and engage in pre-assessment activities by:

- Having students explain (possibly in small groups) what biodiversity means to them.
- Using a whiteboard or poster paper to have them write down words associated with biodiversity (do not write them in a column but scatter all over the surface).
- Then have them try to identify ways in which each word might connect to other words. If they can justify this connection, they can draw a line connecting the words—hopefully, a web design will emerge.
- Consider the ideas and connections drawn. Debrief the ideas but also point out how individual ideas are connected to multiple other ideas. Use this to illustrate the idea of interconnectivity or interrelationships, and that the environment is based on interrelationships between systems of relationships.

This might be a good time to introduce the inquiry questions, with a focus on understanding what the questions mean and referencing the idea of interrelationship (as in question 3).



Set

Setting the stage this way will:

- Familiarize students not simply to the questions, but to the language and underlying ideas of the questions. It is important for students to grasp the meaning behind the questions; not all students may fully understand concepts such as that of interrelationships.
- Explore what students know about these ideas and concepts. Even if it is very little knowledge, having students play with these concepts prior upcoming activities will help them make sense of the activities.
- Introduces representation in a non-threatening way that enables students to demonstrate what they observed and allows the teacher to see how predisposed students are towards artistic forms of representation. This should show whether students are able and willing to see art as a form of meaning making.

These activities may go smoothly or may need on the spot revision, depending on how students react. Whether students find these straightforward or difficult to do will reveal a lot about what they know and are able to do. This should inform future activities.

Background

British Columbia—with its amazing variety of climate and geography— is a home that is easy love with its unique ecosystems and the many animals, plants and micro-organisms that make up the biosphere. The biosphere unites the hydrosphere, geosphere and atmosphere through processes that provide essential supports like fertile soils, water, and oxygen. Like everything else, humans are co-dependent on biodiversity or biological diversity. This includes ideas related to the variety among different living things, their life processes, and the interrelationships with the places where they live.

In the end, we will conserve only what we love, we will love only what we understand, we will understand only what we are taught.

—Baba Dioum

Our health, spiritual values and survival are dependent on conserving the variety of life on Earth. Everything we eat, make, use is a gift from the Earth—the result of unique earth processes that involve millions of living things, large and small together. Without worms, most soils would grow nothing. Without bacteria, dead things would never decay to provide food for others like plants. Without bears and wolves, sick animals would survive to infect the healthy ones or use up limited resources.

Life on our earth is a balancing act that has been going on for more than three billion years. Humans have insulated ourselves from these relationships with conveniences of heated homes, supermarkets, running water and electricity. But relationships are everywhere, look around your home and school, everything we use, eat or makes involves materials that were formerly living or that involve processes which affect the lives and homes of other animals. Make a list of the things around you and explore all your relationships to the living world, or its processes. What connections exist between your life with the lives of plants and animals living or dead all around the earth.



Studying biodiversity explores these relationships. There is so much to learn and new meanings to explore from new knowledge we generate. We don't know whether a plant or insect carries a secret cure for a disease, or how certain plants may contribute to the health of other plants; or even how many different life forms exist on Earth! Often our understandings and love for the living things and the places where they live is expressed through art and creativity. We can learn a lot from how artists relate to life.

Key Points

1. Humans are connected to and dependent on biodiversity and its processes.
2. Biodiversity studies includes learning about and developing caring relationships with living things and the places (land) where they live.
3. Our survival depends on preserving the relationships we have to biodiversity and the biosphere, and its connections to the atmosphere, geosphere, and hydrosphere.
4. Understanding and cultivating good relationships with life will help us learn how protect our home by influencing the way we live and the choices we make.

Go!

Warm up to the Spice of Life

Throughout this document, reference is made to a notebook or journal. It would be useful for students to have the inquiry questions in their notebook as they are introduced to the activities and work through each one. In their notebook students could:

- Consider and identify which inquiry questions are implicated in a given activity and write or represent this in their notebooks. If students are making a plan for teacher approval as part of the activity, they could incorporate these questions into the plan
- Write out what knowledge they hope to take away from the activity they are about to do.
- Consider how each activity and what they learn from it is related to the inquiry question(s).

Encourage them to frame some of their post-activity reflections in terms of how they relate to the questions. Some ideas include:

- Do they have a better understanding of biodiversity, of their role in it, of its representation in artistic expression, etc.?
- Are they seeing or feeling differently?
- What is something they might change in their own lives?

Write post-activity reflections and represent their current thinking and feeling about the inquiry questions in their notebook.

It might be useful for students to have a working group with whom they can exchange ideas, share reflections from their notebook, and collaborate during the inquiry as well as during the synthesis phase.

Note: The more students get used to viewing information through the lens of their inquiry questions, the better they will become doing so and the more deeply they will be able to explore the questions.



Celebrate Learning

In synthesizing the information, insights and ideas gathered over this inquiry, students should create a work that responds to the inquiry questions but also describes their own experience, learning, and change they personally may have undergone. Included in this work should be reference to their initial pre-assessment work (e.g. their representation) to demonstrate what has changed since the beginning. This work can be in the form of a submission or presentation. It should have an artistic component that the author is able to connect to their learning and experience. This is intended not only as a communication of learning and experience but as a celebration as well.

The process described here can be done as a whole or in parts, depending on the situation. It is expected that students may need assistance and feedback on some of the steps suggested here. For example, students may not be accustomed to reflecting on experience in a meaningful way. They may need help in developing insights and translating them into something meaningful or purposeful.



Biodiversity Stories From the Family

Overview: To help you identify and discuss the changes which have occurred in your community over time and which may have affected its biodiversity.

Ready

Most B.C. communities have experienced many changes because of technology, the increasing numbers of people and the effects of human activity such as logging, industry, cars and housebuilding. Often these changes were made without considering the effects on the natural environment. The long-term residents in your community can tell you about these changes, some of which you might think about undoing, recreating or supporting.

Set

Prepare for an interview with two older people who have lived most of their lives in the community. Make the arrangements. Explain that you are doing a project on the human and natural history of your community.

For your interview you will need a pen or pencil, notebook, and recording device.

Note: make sure you have the person's permission to record them.

Go!

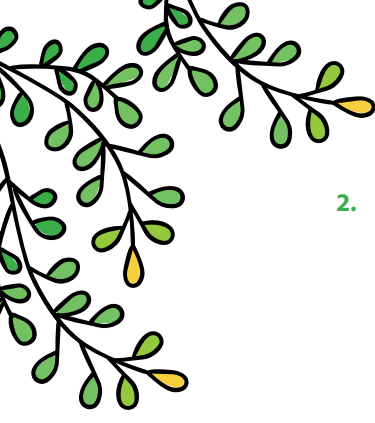
Make a plan in your notebook and then ask the people you are interviewing questions like:

1. What was the land in our community like when you were younger? What kind of trees grew? What kind of flowers do you remember? Can you tell me a special story about a wildlife encounter? What makes it special? How did this vary from season to season?
2. What has changed as our community got bigger? Why did it change?
3. What changes would you like to see in the future? What would you like to bring back from your youth? Why are these important changes to consider?
4. Add your own questions around the theme of biodiversity.

Record their answers carefully in your notebook. Even little details will be important for the projects you will do next. Take care not to unintentionally limit the answers given or their interpretation, instead ask a follow up 'why' questions about the answer given.

Follow-up

1. Now imagine that you have entered a time machine. Set the machine for a year when one of the people you interviewed was young. Draw a picture of what your community looked like back then. Draw a picture of what it looks like now. Next draw what you would like it to look like in the future. Pretend you live in either a past or future time; write about a day in your life for each time period.

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2. Create a Past, Present and Future poster of your community. Here's how!
 - Review and use the answers to your questions to create a document called 'The Past' and frame it in an interesting frame or border. Try to find some old photographs of your community and copy or draw these onto your poster.
 - Make sketches of the way things in your community look now. Mount these on your poster under the heading 'The Present'.
 - Next outline, draw and describe a feature of your community which you hope will be preserved, restored, or created in the future based on your research or something new, like a tree for climbing or a creek bed in the community park.
 - Mount your drawings or write-ups on the poster under the heading 'The Future'. Be sure to include the reasons why you chose these features.
 3. Present the results in a class fair, make a video or other presentation to show others in your class.



Biodiversity Stories From the First Nations

“Legend of the Sucker”

(as told by Mary Thomas Neskinlith)

Overview: In this Shuswap (Secwepemc) Nation story, you can explore the way First Nations’ storytellers connected lessons regarding life with information about the natural world.

Ready

First Nations stories are part of oral traditions – where stories are told and participants listen rather than be read or written down. Stories are passed down from generation to generation through the role of the storyteller. The wording for this story comes from a tape recording of Mary Thomas, an elder with the Secwepemc tribe, telling the story. Some of the wording has been changed with her permission to make it easier for you to read.

Set

Try reading the story out loud. Imagine a setting: perhaps people sitting in a circle around a fire or perhaps a moonlit summer night by the shores of Shuswap Lake after a feast on barbecued sucker, the fish in the story.

“Legend of the Sucker”

A long time ago when Mother Nature created all the different kinds of animals – the birds in the sky, the fish in the water – the Sucker was one of the most handsome fish that Mother Nature created. He was good in everything. When he went to swim, he could out-swim any kind of fish. He was so handsome and he knew it. He would dive and leap out and show off how high he could go and how well he could splash back in the water.

One day when he was doing this, he leaped out of the water and happened to look up. He saw the moon up in the sky and he said, “What is that thing doing up there? I thought I was higher than everything.” So he made up his mind, “I’m going to show them, I’m going to leap right over it.” So he went down, leapt out of the water, went soaring away, then splashed back in the water.

On the fourth try he went right down to the bottom of the lake and gathered all of the strength and energy he had and he came soaring up, leaping out of the water. He went

up, up, up ... didn’t make it and landed on a pile of rocks. And he was all broken; every bit of his body was broken. And Mother Nature said to him, “If you can put yourself together you can go back in the water.”

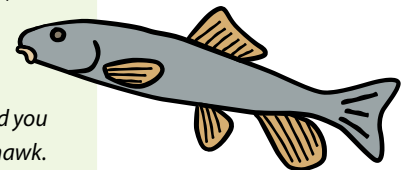
So he called on his animal friends for help.


He called on the moose. “Get in here,” he said. That’s why if you boil the head of a sucker you will find the image of moose horns right in the neck.

Next he called for the coyote. That is why you see a bone that sticks right in the top of the head that looks just like a coyote, bushy tail and all.

Then he called on a fish hawk, and he stuck the fish hawk in. Here in the head you can see the spitting image of the fish hawk.

Then somebody said, “There’s a mountain sheep.” On the sides of his face you’ll find pure white flat bones in the shape of a mountain sheep.





Everything in his body resembled something. And when he was completely finished somebody said, "There's a fish net down there." And the Sucker said, "Get it for me." He threw that fish net over himself, and then he was completely finished.

"All right," said Mother Nature, "You have managed to put yourself together; but from now on you will not be seen by humans in the fresh water. You will remain at the edge of lakes where there is moss and that's what you will live on for the rest of your days in that moss in the mud."

For the old people there was a lesson to this story: "If you know you're handsome, goodlooking, or very smart, don't show off. Because if you do, you will hurt yourself. You'll forget the good things and you will be the one to be hurt. Instead of showing off how smart you are, use it to help others." And that is the end of the story of the Sucker.

Go

1. Read aloud other stories from aboriginal cultures about nature and the relationships between all things. What is can be learned from these stories.
2. Pick a wild animal or plant that lives in your community. Observe it for a while. Note the way it moves, habits and special features, what its role is in this place. Now pretend you are that plant or animal and tell a story about it.
3. First Peoples do not categorize living and non-living things, but rather describe everything as relations (something related to them). Do these different ways help or hinder the protection of biodiversity?



Biodiversity Stories Through the Words of the Poet

Overview: Poets, artists, storytellers, and songwriters often express deep emotions about the natural world. Read and reflect on two poems about animals that may live in their backyards.

Of Snakes and Such

Snakes are interesting, often misunderstood animals that live in most parts of the world. They have a bad reputation in our culture, but special meanings in other cultures.

Read the poem here, and be prepared to discuss the following questions:

The author of *A Narrow Fellow in the Grass* is walking barefoot through the grass. What does she nearly step on? How does she react? Why do you think she has this reaction?

1. Trace the symbolism of the snake through time. Investigate local myths and stories about snakes and other creatures.
2. Find out about the fascinating structure and eating habits of snakes and their role.
3. Explore your own feelings (new and old) about snakes in a story or poetry.

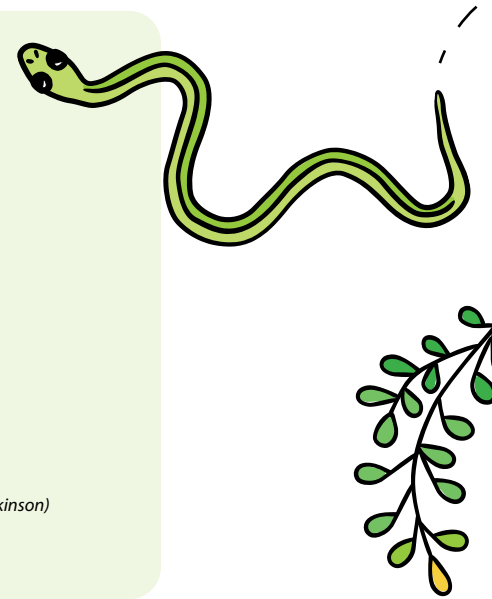
Reference: Gregory, P.T. et al., *Reptiles of B.C.*, 1987

A Narrow Fellow in the Grass Poem # 986

*A narrow fellow in the grass
Occasionally rides;
You may have met him,—did you not?
His notice sudden is.
The grass divides as with a comb,
A spotted shaft is seen;
And then it closes at your feet
And opens further on.
He likes a boggy acre,
A floor too cool for corn.
Yet when a child, and barefoot,
I more than once, at morn,
Have passed, I thought, a whip-lash
Unbraiding in the sun,—*

*When stooping to secure it,
It wrinkled, and was gone.
Several of nature's people
I know, and they know me;
I feel for them a transport
Of cordiality;
But never met this fellow,
Attended or alone,
Without a tighter breathing,
And zero at the bone.*

Emily Dickinson
(from *The Complete Poems of Emily Dickinson*)



Monster Fish!

Sturgeon live in the waters of the Fraser River and in a few of the lakes of B.C. They are huge—the largest fish found in the fresh waters of Canada. Their eggs are eaten by gourmets as caviar and their flesh like steaks. Mysterious and elusive, sturgeon are declining in our province for different reasons. Some people thought that sturgeon were monsters. Others worshiped them as special creatures of nature.

The author uses poetic language to portray the awesomeness of these monster fish.

Read the poem 'Sturgeon'. This is a free verse poem with ideas that flow like ripples in a river. Remember when you read to follow the punctuation marks so the meaning is clear. Can you guess what "antediluvian" might mean?

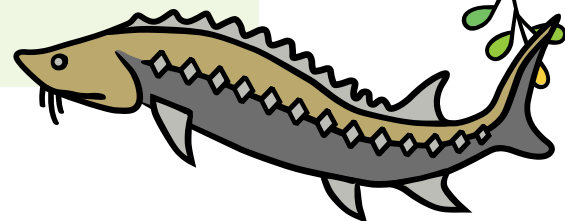
1. Imagine yourself swimming in the darkness of the deep river. You are an ancient species with instincts that go back for thousands of years. What food would you be looking for? What kind of hiding places would you like?
2. Answer the questions below to be sure you understand some of the important images in this poem.
 - Use the words of the poem to help you write a description of the sturgeon. Note what she says about its age, size, mouth, mating behaviour, habitat.
 - Why is the sturgeon so special? What feelings does the author share in her poem about the sturgeon?
 - What happens to the sturgeon in the last lines of the poem?
3. Complete an animal study on the sturgeon or some other interesting fish.

Sturgeon

*Bottom feeders, the sturgeon move
their long snouts through the darkest part
of water, unchanged, Antediluvian
they are older than the oldest man,
older than any spirits of the air
Grandmother, grandfather fish,
surely they are holy, worshipped
by the shamans when our world
was full of wonder. Too huge to hold
in the mind, they may be
what we have called Ogopogo, Loch Ness
fabulous, long-necked monsters
of the lakes, solitary, shy of man . . .
They are a heavy, bony fish
with thick sucking lips. They are
edible, their eggs consumed as caviar*

*black translucent pearls
the female lays after twenty years
without a mate.
Though they move
where light cannot reach them
as we move each night in dream,
unchanged, we pull them from
the bottoms of lake or river or sea
without awe or mercy,
thrust them into the sun
their old toothless mouths large as caves
their stunned eyes holding at the last
instant of their ancient lives
a human face.*

Lorna Crozier
(from *Inventing the Hawk*)



Biodiversity Through the Eyes of the Artist

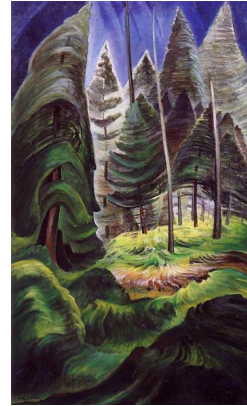
Overview: Meet two famous artists who portray their love and understanding of biodiversity in their art.

Ready

Emily Carr grew up in Victoria in the early 1900s. Even as a child she wanted to express in words and in art her love for the natural places near her home and in the nearby forests. She became one of Canada's greatest artists. As an artist, Carr tried to paint the "thousands of greens" in the coastal forest. In the following excerpt, she uses words to describe what she shows in colour and composition in her art. It's not easy to describe biodiversity through your senses, but Carr does it well here.

Set

Try reading this excerpt to each other with different background music. Notice how different music can change how you feel as you listen.



A Rushing Sea of Undergrowth

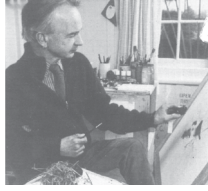
"Everything is green. Everything is waiting and still. Slowly things begin to move, to slip their places. Groups and masses and lines tie themselves together. Colors you had not noticed come out, timidly or boldly. In and out your eye passes. Nothing is crowded; there is living space for all. Air moves between each leaf. Sunlight plays and dances. Nothing is still now. Life is sweeping through the spaces. Everything is alive. The air is alive. The silence is full of sound. The green is full of color. Light and dark chase

each other. Here is a picture, a complete thought, and there another and there... There are themes everywhere, something sublime, something ridiculous, or joyous, or calm, or mysterious. Tender youthfulness laughing at gnarled oldness. Moss and ferns, and leaves and twigs, light and air, depth and color chattering... you must be still in order to hear and see."

Emily Carr

*(from Hundred and Thousands:
The Journals of Emily Carr)*

1. Take a walk to the forest or group of trees near where you live. Sit quietly for a while and watch the movement of colour and shape begin. For a different point of view lie on your back and look up at the trees and sky.
2. Use your notebook and write a paragraph that would help someone else see what you see.
3. Draw what you see.



Fenwick Lansdowne grew up in B.C. and began painting birds in his early teens. His bird paintings, now treasured all over the world, have been presented as gifts to Queen Elizabeth and Prince Philip, as well as to Prince Charles and Lady Diana. Lansdowne has spent his life painting the birds of his backyard, and the world has come to him.



Screech Owl: This is a young screech owl, still fluffy and just out of the nest. I drew it one afternoon as it teetered on a power line, blinking in the bright sunlight.

- *Fenwick Lansdowne*

Go!

1. Take a sketch book with you on a walk outside. Sketching some of the birds or animals in their habitats you see with a few different pencils between 4B to 4H. After you have finished write about the experience: how you felt, what you learned. Repeat this step using a photograph to compare the experiences.
2. Complete a study of the art work of other famous nature artists. What do they paint and how (from photo or from experience)? Where do they live and why?



Reach Out

Mostly Science

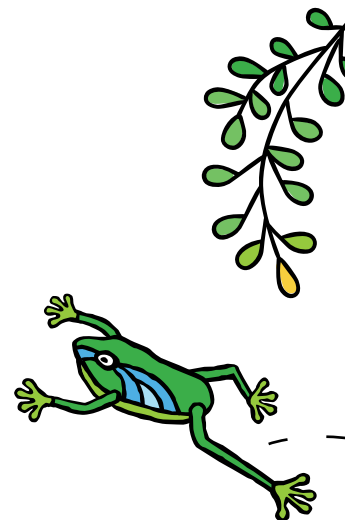
1. Find out if any of the animals that were in the animal/plant study are part of a citizen science program (Ladybug watch, bird counts, Invasive plant species spread, bloom times are a few examples) and help out by keeping track of biodiversity.
2. Observe one aspect of biodiversity in your community throughout the seasons. Keep a record of your observations and note all the connections to the biosphere, geosphere, atmosphere and hydrosphere. Map out these connections.
3. Take a walk through the supermarket. Pick the fish or vegetable section. Observe the diversity of food you find there. List the different kinds. Then research where they come from. Make lists of some of the common things we grow or raise on our farms or in backyard gardens. Research where they come from originally, e.g. potatoes, tomatoes, wheat, turkeys, corn, spices.
4. Help design and build a Naturescape project for your school to increase biodiversity. Start small and involve lots of partners - check out HCTF's project planning guides.

Mostly Language Arts

1. Write animal poetry or shape poems. See Project WILD, p. 85, "Animal Poetry" and Project Learning Tree, p. 31 "Poet-Tree".
2. Read about First Peoples relationship with land and their relations. How did they feel about the land? How did they feel about the wild animals with which they shared the land? Compare to European settlers' stories and their relationships.
3. Read novels with a biodiversity message: Watership Down, Incident at Hawk's Hill, My Side of the Mountain, Klee Wyck. What are the biodiversity messages in these novels?

Mostly Social Studies

1. In your study of aboriginal or ancient cultures, read their myths and study photographs of their art about nature. Compare the messages about nature from these stories with the messages about nature that you get from your favourite comics, movies and TV shows.
2. Make a collection of newspaper articles related to an environmental issue in your community. Try to get as many viewpoints as you can. Follow the inquiry or problem solving process to recommend alternative solutions for the issue. Identify some consequences of your suggested solutions.
3. Research the use of a plant that we use as a drug today.
4. Consider how learning about your relationships to biodiversity changes your relationship with biodiversity. Write compelling stories, reports and presentations about the importance of protecting biodiversity.



Mostly Fine Arts

1. Visit an art gallery. Compare the ways different artists present images from nature.
2. Invite a writer or an artist who features wildlife and landscape as part of his/her work to speak to your class. Ask them to talk about what inspired them to pursue art. Ask them to talk about the way they use language, colour, brush strokes, etc. to achieve the effects they wish.
3. Find musical lyrics which speak about the environment and biodiversity.
4. **Challenge:** Develop a Readers' Theatre presentation based on the poems and stories about biodiversity written by members of your class. Perform your show for the rest of the school. Perform for a senior citizens' home, a municipal council or another community group.

