

Patterns in Relationships

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EVERGREEN
LEARNING GROUNDS

ETHNOBOTANY

Patterns_{in} Relationships

Educational Activities for School Grounds

INTERMEDIATE GRADES 4 TO 7

written and compiled by Illéne Pevec, M.A.



EVERGREEN
BRITISH COLUMBIA EDITION



Ethnobotany: Patterns in Relationships

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Evergreen is a national non-profit environmental organization with a mandate to bring nature to our cities through naturalization projects. Evergreen motivates people to create and sustain healthy, natural outdoor spaces and gives them the practical tools to be successful through its three core programs: Learning Grounds (transforming school grounds), Common Grounds (working on publicly accessible land) and Home Grounds (for the home landscape). We believe that local stewardship creates vibrant neighbourhoods, a healthy natural environment and a sustainable society for all.

"Every part of this earth is sacred to my people.

Every shining pine needle, every sandy shore, every mist in the dark woods, every clearing and humming insect is holy in the memory and experience of my people...All things are connected. Whatever befalls the earth befalls the sons and daughters of the earth.

When the last Indian has vanished from the earth and the memory is only the shadow of a cloud moving across the prairie, these shores and forest will still hold the spirits of my people, for they love this earth as the newborn loves its mother's heartbeat. If we sell you our land, love it as we've loved it. Care for it, as we've cared for it. Hold in your mind the memory of the land, as it is when you take it. And with all your strength, with all your might, and with all your heart, preserve it for your children. This earth is precious."

CHIEF SEALTH of the Duwamish Tribe
of the State of Washington to
U.S. President Franklin Pierce, 1855

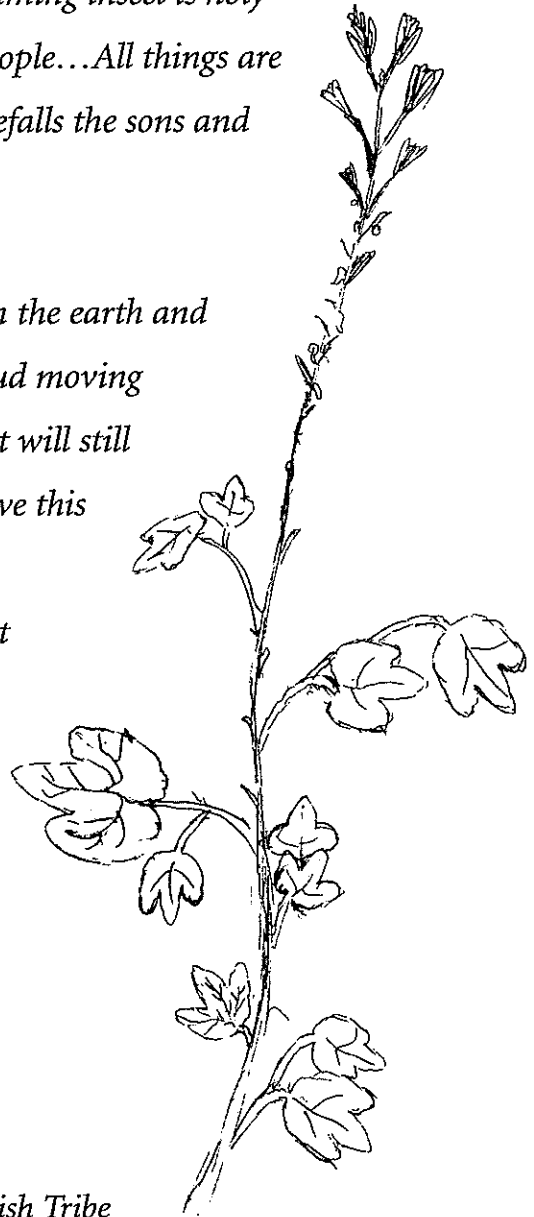




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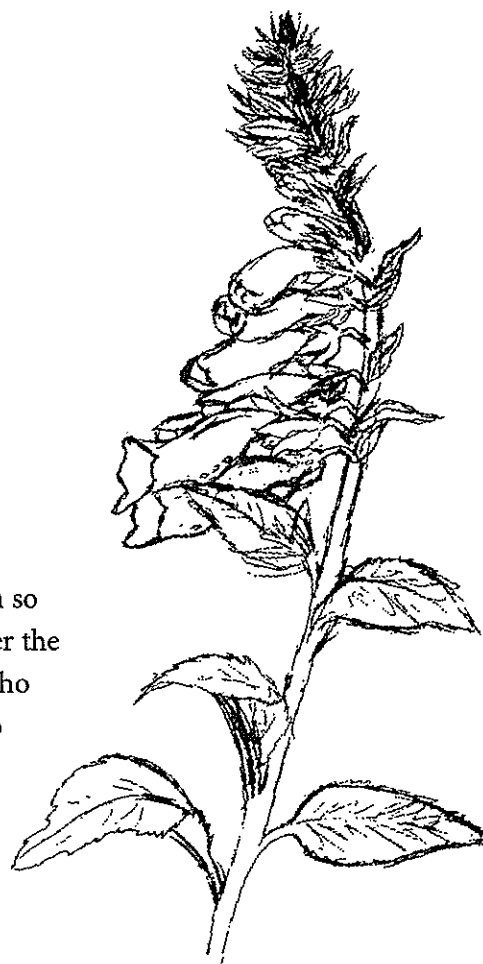


ETHNOBOTANY Patterns in Relationships

Dedication

I dedicate this curriculum to the children and teachers of Grandview/?uuqinak'uuh Elementary School who have given so much time, energy and caring to the garden creation process over the last 3 years. I also dedicate it to Ramona Gus, the school elder, who designed the totem poles for the garden and taught us all how to participate in the traditional art of totem painting. Ramona has shared with me her childhood memories of gathering wild berries and plants with her grandmother and mother.

ILLÈNE PEVEC



Forward

I, like many Canadians, am an immigrant to Canada. I have been fortunate to know First Nations' people most of my life and am grateful for all of their culture that they have shared with me. I hope I can do this life embracing world-view justice in this curriculum. My first gardening teacher besides my parents was Jenny Pattison, a Cherokee who lived down the road from me and had one of the loveliest flower and vegetable gardens I have ever seen. She was my gardening Elder and shared her knowledge and her plants very generously with me. May each teacher and child interested in tending the plants of this earth find a Jenny in their neighbourhood to help them learn on this wonderful journey of earth tending.



Introduction

In 1998 I met the children, parents and teachers of Grandview/ᑭᓄᓂᓂᓂ Elementary School in Vancouver, B.C. Canada. The children come from many cultures: First Nations, Chinese, Vietnamese, Filipino, Hispanic, African, South Asian and Eastern European. They face the challenges of living in the inner city where nature has long ago been replaced with cement and apartments. I offered to help them start a school garden to bring some nature back to their learning and play environment. In the last three years with the dedicated work of landscape architect Tracy Penner, and many other volunteers including the Environmental Youth Alliance and Master Gardeners, we have transformed a one acre tract of muddy grass into a series of beautiful gardens. We have created a school food garden, a hummingbird and butterfly garden, a wild bird habitat, a bosque of Canada's maple trees, a mound and dissipation pond for creative play and an ethnobotanic garden of the native plants used traditionally by the First Nations people of this region. The children have planted every plant except the larger trees.

This curriculum was written to help the children at Grandview learn about the traditions associated with First Nations' cultures and their relation to the earth. It is written for all children and their caring teachers, parents and grandparents who wish to explore this rich cultural legacy wherever they live. Some of the activities list plants native to this region of coastal British Columbia. Simply replace those plant names with plants native to your own region and proceed with the activity. The web sites cited for ethnobotany are for Western Canada, so some research on your part will be necessary if you wish to find web sites for your own region of the earth. The internet is allowing us to connect to ancient cultures in a new way.

I thank all the ancestors who have preceded us and collectively discovered and preserved this knowledge by passing it on from generation to generation. I thank the trees that gave their lives to make the paper that we use for communication. I thank Elder Amy Eustergerling for sharing her knowledge of the Medicine Wheel and for her help and advice in preparing these lesson plans. The Cycle of Life Poster and explanation of the life cycle and its relation to medicine wheel teachings were created by Amy Eustergerling. I wish to acknowledge and thank Dr. Brian Compton, ethnobiologist, who introduced us at Grandview to ethnobotany. He has also shared his immense knowledge with us and involved his class at the University of British Columbia in helping the Grandview children discover the fun of learning about native plants. Thank you to Cece Wyss, native herbalist, for her help and advice too. A very special thank you to the Vancouver Foundation who made this curriculum possible with their support. Many thanks to Evergreen who have agreed to distribute this with the excellent school grounds environmental curriculum, *Patterns, Plants and Playgrounds* that they publish.

May the pleasure of being in the out of doors in touch with Mother Earth augment all your studies of the life cycles of our planet and her bounty. May these human relationships to the natural world of plants and animals grow in beauty for you.



Introduction to Ethnobotany

Ethnobotany studies the relationships between people and plants. Plants are the oldest living things on the earth. Our relationship to plants is as ancient as human occupation of this earth. In fact, our life on earth depends on the chlorophyll in green plants that channels the sun's energy via photosynthesis into making sugars and releasing oxygen. Plants are at the base of the food chain that sustains all animals, including humans, on this planet. We eat the sugars and breathe the oxygen the plants give us. Therefore, our health depends on healthy plants. Maintaining a viable global biological ecosystem in which plants play a vital role requires responsible actions on the part of all people so that the conditions necessary for good plant (and human) growth exist.

The interrelationship between earth, plant, animal and human health plays a key role in First Nations' culture. By studying this traditional knowledge we learn respect for First Nations' culture and basic ecology too. This curriculum introduces elementary teachers and students to some of the native plants of the coastal region of British Columbia and to the ways in which the First People's of the region traditionally used these plants. It also introduces the philosophy based on the cycle of life expressed in the Medicine Wheel.

Until very recent history most humans spent a great deal of their time gathering food from the wild or cultivating it. Medicines were those leaves, roots, flowers, and bark that people identified as having certain beneficial effects on the human organism. Local natural resources such as trees, sod, or mud were harvested on the spot for home building. Giant trees were carved into canoes for silent, non-polluting transportation on the rivers and oceans. The last century, however, has seen a huge change in human lifestyle.

In a modern urban environment the very important relationship of humans to plants often gets forgotten. We live far removed from the sources of what we eat or use for daily necessities. What implications do these shifts in lifestyle have for the health of people and the local ecosystem?

We buy our food from supermarkets rather than grow it or gather it so we inadvertently consume harmful chemicals often used in commercial food growing and processing. We build homes from materials inappropriate for our environment and then the homes leak. Doctors prescribe drugs in a bottle from the pharmacy and even if their source was once a plant, they often have dangerous side effects. We drive machines that use fossil fuels that pollute the air with too much carbon dioxide and create global warming. Traditional indigenous knowledge of plants and our environment predates industrialization and urbanization and has much to teach us about a more harmonious way of relating to the earth's resources.



Introduction

How did the First Nations' people live in relationship to their natural environment, most particularly the plant world, pre-European contact? What plants did they use for food, medicine and material purposes? We offer these lessons to:

- Understand the First People's basic philosophy of life, which includes respect and reverence for the majesty and mystery of the creation of life on Earth,
- Give students some experiences that will help them understand interrelationships among the living creatures in our ecosystem.
- Support teachers and students to become more knowledgeable about our local environment and how to live in harmony with it.
- Offer practical learning activities for studies in outdoor environments and classrooms.
- Develop children's oral presentation skills in keeping with First Nations' traditions so that they can share what they have learned with others.

References: We highly recommend you obtain a copy of *Plants of Coastal British Columbia* (1994) by Pojar and MacKinnon, published by Lone Pine in Vancouver. This book provides excellent plant photographs and notes, including plants' uses by First Nations' people. It provides an essential guide to the indigenous flora of British Columbia. This information is vital for effective and accurate implementation of these lessons and for groups wishing to plant gardens of native plants. Please see the reference list at the end of the curriculum for other books that will enrich your studies.

Journals

We suggest that all students keep journals of their nature activities. Observing, reflecting and recording one's observations of nature is a first step in becoming an earth steward. If students keep all activities and journal entries together they will have a wonderful record of their development in this life-long endeavor of stewardship.

Wherever we live we need to develop a basic understanding of our environment and how to live harmoniously with it so that we are not destructive. We only have one earth. Earth did not come from the Creator with a guarantee. If it breaks or ceases to function as a biosphere we cannot turn it in for a new one. These lessons can help children establish the observation and study skills that will help them make good decisions for healthy living as members of a greater biological community called Planet Earth. We hope these activities will help students respect the First Nations' spiritual tradition of living in harmony with one's self and all of creation.

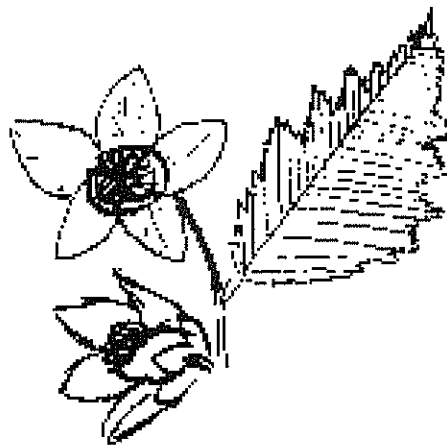
This curriculum can also be of use to community groups interested in starting native plant gardens as sites for dynamic learning and play. Whether we live in cities, small towns or rural areas we need to know the plants and animals native to our region so we do not damage them unintentionally. Once we know about them we will be able to care for them.



Indigenous societies and cultures learned about native plants in this region from knowledge and skills passed down from their Elders. Children and young adults gained a deep insight into natural species from watching and listening to experienced plant gatherers. Then they, in turn, passed on the knowledge to future generations. We encourage you to call a First Nation's resource centre in your community for names of individuals who have plant knowledge to share with your classes.

NOTE: The information presented in this educational curriculum reflects aspects of the cultural heritage of First Nations' people of British Columbia. It is not meant to serve as a guide for amateur medical experimentation, including self-medication, nor as a guide to edible plants and animals. Care should always be taken to properly identify any plant or animal material intended for collection, consumption, or medicinal use.

While none of the plant species discussed in this curriculum is highly toxic, some of them contain toxic substances or possess structures that may cause mechanical injury (e.g., spines, thorns, or spiny leaf margins in *Ribes*, *Rosa*, *Rubus*, *Mahonia*, etc.).



SALMON BERRY



Introduction

British Columbia Ministry of Education Learning Outcomes

Integrated Learning Outcomes as per the Ministry of Education, British Columbia: Per Activity

MODULE 1 THEME 1: A FIRST NATION'S PHILOSOPHY OF THE EARTH

1. SEASONAL ILLUSTRATIONS OF THE MEDICINE WHEEL

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Visual Arts	Demonstrate the ability to create a group display.
5&6	Visual Arts	Demonstrate a willingness to experiment with a variety of materials, tools, equipment and processes.
4	Social Studies	Demonstrate understanding of Aboriginal people's relationship with the land and natural resources.
4	Social Studies	Analyze how people interact with their environment, in the past and in the present.
5	Social Studies	Explain ways people preserve and transmit culture.
6	Social Studies	Assess the relationship between cultures and their environments.
6	Social Studies	Analyze how a society's artistic expression reflects its culture.
7	Social Studies	Demonstrate understanding of events as part of a chronological series.

2. GETTING ORIENTED OUTSIDE

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Math	Select the most appropriate unit(mm, cm, m, km) to measure length.
4	Math	Communicate and apply terms of directions to maps.
5	Social Studies	Locate and describe major physical features... using topographic and thematic maps.
6	Social Studies	Describe the primary features of the solar system.
6	Social Studies	Describe information contained in simple and direct illustrations, maps, charts or other graphic representations.
6	Science	Relate the movement of the sun, moon, and Earth to the seasons, tides, eclipses and the phases of the moon.
7	Science	Illustrate the seasonal position of various constellations.
7	Science	Identify characteristics of known objects outside the solar system.
7	Social Studies	Construct, interpret, and use graphs, tables, scales, legends and various types of maps.

3. MAKING A MEDICINE WHEEL

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Math	Communicate and apply terms of directions to maps.
5	Social Studies	Locate and describe major physical features... using topographic and thematic maps.
6	Social Studies	Describe information contained in simple and direct illustrations, maps, charts or other graphic representations.
7	Social Studies	Construct, interpret, and use graphs, tables, scales, legends and various types of maps.

4. DIRECTION QUESTIONS

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
5	Social Studies	Gather and record a body of information from a variety of primary and secondary sources.
6	Science	Write clear, step-by-step instructions for conducting investigations, operating something, or following a procedure.
6	Science	Compare ways of solving problems and finding explanations.



5. MAKING A MAP OF YOUR SCHOOL GROUNDS

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
5	Social Studies	Use topographic and thematic maps.
5,6,7	Social Studies	Describe information contained in simple and direct illustrations, maps and charts.
7	Social Studies	Locate and describe current and historical events.

6. SHADOWS

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
7	Science	Illustrate the seasonal position of various constellations.
7	Science	Analyze ways that people's interactions with their physical environments change over time.
7	Social Studies	Evaluate how ancient cultures were influenced by their environment.
7	Math	Solve problems involving the properties of circles and their relationships to angles and time zones.
7	Math	Develop and implement a plan for the collection, display and analysis of data, using measure of variability and central tendency.

7. A DISCUSSION OF PRINCIPLES: THE FOUR R'S, RELATIONSHIPS, RESPECT, RESPONSIBILITY RECIPROCITY

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Social Studies	Describe traditional technology used by Aboriginal people in Canada.
5	Social Studies	Analyze the relationship between development of communities and their available natural resources.
6	Social Studies	Describe ways social and economic organizations satisfy needs and wants in a variety of cultures.
6	Social Studies	Describe and compare different economic systems.
7	Social Studies	Analyze ways that people's interactions with their physical environments change over time.
7	Social Studies	Evaluate how ancient cultures were influenced by their environment.
7	Social Studies	Compare how various cultures meet common needs.
4	Personal Planning	Point out the possible impact of their decisions on themselves, on others and on the environment.
5	Personal Planning	Distinguish between short- and long-term goals.
6	Social Studies	Demonstrate an understanding of sustainability, stewardship, and renewable versus non-renewable natural resources.
7	Personal Planning	Demonstrate a commitment to participate in the development of a healthy school and community.

MODULE 1 THEME 2: HABITAT

1. A CHILD HABITAT MURAL

Part A: Draw your own Habitat

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Science	Discuss how changes in an organism's habitat can affect the survival of individual organisms and entire species
4	Science	Relate the structure and behavior of local organisms to their survival in local environments
4	Personal Planning	Point of the possible impact of their decisions on themselves, on others, and on the environment



Introduction

Part B

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Science	Describe the changing requirements of organisms as they grow.
4	Science	Relate the growth and survival of organisms to a variety of conditions.
5,6,7	Visual Arts	Demonstrate the ability to collaborate to develop a group display for the school or community.

2. BIRD HABITAT WALKABOUT

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Science	Relate the structure and behavior of local organisms to their survival in local environments.
4	Science	Relate dietary habits and behaviors to an organism's health.
4	Science	Give examples of how the differences in individuals of the same species may give an advantage in surviving and reproducing.
5	Science	Compare and contrast sensory systems of humans and animals.
7	Science	Describe ways in which species interact with each other.
7	Science	Determine limiting factors for local ecosystems.

3. INSECT ART: RECYCLED MATERIALS SCULPTURE

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
5,6,7	Visual Arts	Make 2 and 3-D images using a variety of resources.
4	Science	Relate dietary habits and behaviors to an organism's health.
4	Science	Relate the growth and survival of organisms to a variety of conditions.
7	Science	Describe all living organisms in terms of their roles as part of interconnected food webs.

4. NATIVE PLANT HABITAT

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Science	Relate the structure and behavior of local organisms to their survival in local environments.
5	Social Studies	Describe the diverse distribution of natural resources.
6	Science	Develop common classification systems for organisms.

MODULE 1 THEME 3 TREES

1. CHOOSE A CLASS TREE

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOME
4	Social Studies	Demonstrate understanding of Aboriginal people's relationship with the land and natural resources.
5	Science	Identify living resources in the local environment.
6	Science	Develop common classification systems for organisms.

2. ADOPT-A-TREE

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOME
4	Visual Arts	Demonstrate the ability to create a group display.
5&6	Visual Arts	Demonstrate a willingness to experiment with a variety of materials, tools, equipment and processes.
4	Social Studies	Demonstrate understanding of Aboriginal people's relationship with the land and natural resources.
4	Social Studies	Analyze how people interact with their environment, in the past and in the present.



3. ORAL PRESENTATIONS ON TREES

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOME
4	Social Studies	Demonstrate understanding of Aboriginal people's relationship with the land and natural resources.
5	Language Arts	Create a variety of personal and informational communications, including written and oral stories, poems, or lyrics; explanations and descriptions; informal oral reports and dramatics; and brief factual reports.
5,6,7	Language Arts	Demonstrate confidence in their abilities to communicate effectively in various classroom situations.
5,6,7	Language Arts	Select and shape information appropriately for specific audiences and purposes.

MODULE 1 THEME 4 FOOD, PAST AND PRESENT

1. A BERRY GOOD FIELD TRIP

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Social Studies	Describe traditional technologies used by aboriginal people.
4	Social Studies	Analyze how people interact with their environment, in the past and in the present.
5	Science	Identify living resources in the local environment.

2. BAKE A BERRY PIE OR MUFFINS

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Science	Compare the uses of simple machines with those in the past.
4	Social Studies	Describe traditional technologies used by aboriginal peoples.
5	Science	Describe how technology has affected human health.

3. MAKE A "WHAT IS HOME GROWN?" POSTER

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
5	Visual Art	Identify aspects of selected images that indicate the social, historical, or cultural context in which they were created.
5	Social Studies	Describe the diverse distribution of natural resources.
5	Science	Identify living resources in the local environment.
5	Social Studies	Assess effects of lifestyles and industries on local and global environments.

4. WHERE AND WHEN DO WE HARVEST?

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
5	Science	Describe the diverse distribution of natural resources.
7	Science	Compare and contrast major biogeoclimatic regions.
7	Science	Analyze ways that people's interactions with their physical environments change over time and contrast major biogeoclimatic regions.

5. BREAKFAST, NOW AND THEN: COMPARE AND CONTRAST RAW FOODS AND MANUFACTURED FOODS.

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Science	Relate dietary habits and behaviors to an organisms health.
4	Social Studies	Identify economic and technological exchanges between explorers and aboriginal people.
4	Personal Planning	Point out the possible impact of their decisions on themselves, on others, and on the environment.
5	Science	Describe how technology has affected human health.
7	Social Studies	Evaluate how ancient cultures were influenced by their environment.



Introduction

6. BASIC BOTANY OF WHAT WE EAT. IS IT A ROOT OR A LEAF?

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
5	Science	Develop and implement a plan for the collection, display and analysis of data gathered from appropriate samples.
6	Science	Demonstrate that different outcomes may occur when the same experiment is repeated.
7	Social Studies	Evaluate how ancient cultures were influenced by their environment.

7. A THREE SISTERS GARDEN

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Social Studies	Identify economic and technological exchanges between explorers and aboriginal people.
5	Science	Predict outcomes, conduct experiments, and communicate the probability of single events.
7	Science	Analyze ways that people's interactions with their physical environments change over time.

8. THE FOOD CHAIN STORY AND STORYBOARD: ALL MY RELATIONS

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Science	Relate the life processes of an organism to its use of nutrients, water, and oxygen.
5	Science	Identify living resources in the local environment.
7	Science	Describe all living things in terms of their roles as part of interconnected food webs.
7	Science	Describe ways in which species interact with each other.

MODULE 1 THEME 5 TECHNOLOGY BRIDGE TO THE KNOWLEDGE OF THE ELDERS

1. BURIED TREASURE AND RESEARCH SKILLS

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Social Studies	Analyze how people interact with their environment, in the past and in the present.
5	Science	Identify living resources in the local environment.
6,7	Language Arts	Locate, gather, select and record information for specific purposes from various human, print and electronic sources.

2. LET'S TELL ABOUT WHAT WE HAVE DISCOVERED!

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
5	Language Arts	Select and shape information appropriately for specific audiences and purposes.
6,7	Language Arts	Create a variety of written and oral communications to record their views, opinions, values and beliefs.
5,6,7	Language Arts	Demonstrate confidence in their abilities to communicate effectively in various classroom situations.

3. HAVE A BURIED TREASURE FEAST:

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Personal Planning	Classify foods into groups.
4	Personal Planning	Point out the possible impact of their decisions on themselves, on others, and on the environment.
5,6	Language Arts	Assume a variety of roles when interacting in groups.
7	Language Arts	Share responsibility for the effective functioning of groups.

**4. GRAPHIC ART ACTIVITY: MAKE SIGNS FOR THE PLANTS IN YOUR SCHOOL GARDEN**

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
5	Visual Art	Describe individual opportunities for visual arts in the local community.
5,6,7	Visual Art	Demonstrate the ability to collaborate to develop a group display for the school or community.

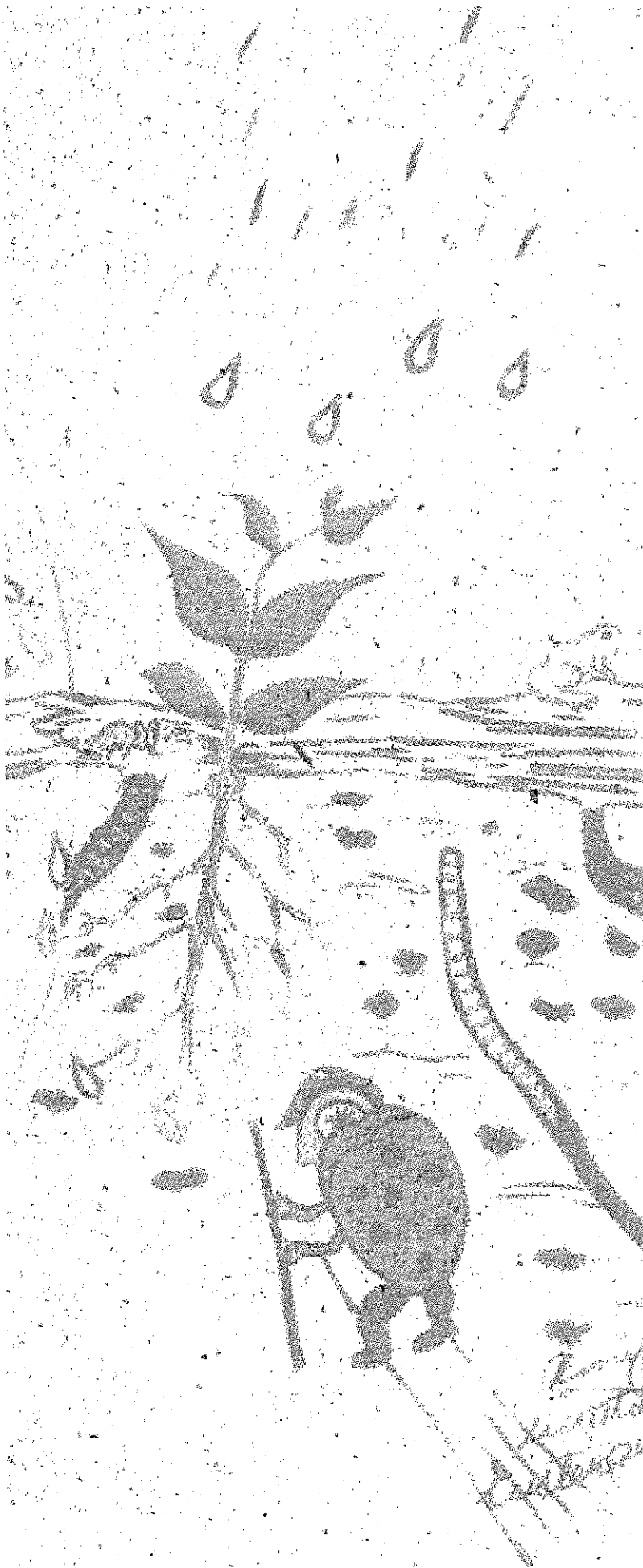
5. TECHNOLOGY BRIDGE TO OTHER SCHOOL GARDENS AND GARDENERS.

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
6,7	Language Arts	Create a variety of written and oral communications to record their views, opinions, values and beliefs.
6,7	Language Arts	Use text and electronic media features, including indices, tables of contents, and keyword searches, to locate specific information or material.

MODULE 1 APPENDIX A NATIVE PLANT HABITAT QUESTIONNAIRE

GRADE	SUBJECT	MINISTRY PRESCRIBED LEARNING OUTCOMES
4	Science	Relate the structure and behavior of local organisms to their survival in local environments.
5	Social Studies	Describe the diverse distribution of natural resources.
6	Science	Develop common classification systems for organisms.

MODULE 1





MODULE 1 THEME 1: A First Nation's Philosophy of the Earth

INTRODUCTION

A person's relationship to nature in First Nation's culture has a spiritual significance. All life comes from the Creator and is honored as part of the whole. Before any plant is used, permission needs to be asked of the spirit of the plant and an offering of thanks left. We who find ourselves surrounded by clear cut forests and pulp mills that spill toxic chemicals into the sea have much to learn from people who understand that they must not take more than is needed of any natural resource. Our first lessons on the medicine wheel introduce these concepts of responsibility and respect.

The Cycle of Life by Elder Amy Eustergerling

The Cycle of Life poster symbolizes the interdependence, co-operation and co-existence between organisms and the environment in the natural world. Everything in nature is connected and works together in a process that includes flux, harmony and balance.

This poster represents the Cycle of Life within the context of the Medicine Wheel. The four directions are represented: East, South, West and North; the four seasons: Spring, Summer, Autumn and Winter, as well as the four elements: Earth, Fire, Water and Air. The tree in the centre represents the Tree of Life and is surrounded by the sun.

Everything in this picture is organic and biodegradable, and will eventually return to the soil. From a healthy soil, we grow healthy plants, which in turn provide nutritious food for animals and man.

The decaying organic matter in soil is called humus. Humus provides food for macro-organisms, (earthworms, beetles, sow bugs, centipedes and millipedes and insects in general). In the final stages of decomposition, microorganisms, (mold, mites, bacteria, fungi, and actinomycetes) break down the organic matter until it is fine enough to be absorbed by the water. The roots of plants bring the dissolved minerals and nutrients from the soil in the water into the plant.



Crobapple



Module 1 Theme 1

The Four Seasons

The direction EAST is depicted to the right of the poster and is represented by the sprouting of a seedling plant. The seedling needs the warmth of the **spring** sun, the minerals and nutrients from the water, to begin its growth process.

The earth/soil is the element represented by the direction East. Earthworms, beetles, and assorted bugs are hard at work below the surface of the soil. The star of the soil world is the earthworm, which eats mineral and organic matter that it grinds up in its gut. As the worm digs through the soil, it leaves channels, which increase soil aeration and drainage, and encourages deep rooting. Every day worms produce their own weight in worm casts which are highly fertile, containing more nitrogen, phosphorus, potassium, magnesium and calcium than the surrounding soil. The earthworm has been called the "intestines" of the Earth. Notice the "Little Worm Maid" sitting in this section enjoying the waterfall.

The direction SOUTH is represented by nature in full bloom, the **summer** season. The element is fire, or, the Sun. The rainbow is the promise for the continued fertility of the earth and bountifulness of nature. The butterfly and the bee are the pollinators who ensure that the plants can reproduce by moving pollen from flower to flower. The bird carries seeds from place to place and plays her role in the ongoing procreation of life.

WEST represents **autumn**. It is the time for reaping the harvest, as the apples on the tree indicate. Also it is the time for making preparations for winter and the storing of food, (see the nuts the squirrels are gathering to store for winter). The poster shows the rabbit and his den. His tunneling habits help to keep the soil loose and aerated for the tree roots. The "Worm Farmer" does his job of enriching the soil by eating organic matter and creating worm casings that are rich fertilizer for plants. The spider catches and eats some unwanted garden insects.

Autumn is when the leaves fall, as well as the time when the seeds are distributed. The leaves will decompose and provide nutrients for the soil. The seeds will rest over the winter and the Cycle of Life will continue into the spring with the seedling sprouts. The fall is when the snow geese make their annual migration to the south. Water is the element which represents the West.

NORTH represents **winter**, the quiet time when the snow covers the earth like a white blanket. It is the time for rest and regeneration, in preparation for the growth that will take place in the springtime. In this section, the macro-organisms, as well as the microorganisms (in the small circle) are depicted. It also shows the water, the final stage of transformation, going to nourish the roots of the seedling plant. The sacred circle of life goes on. The element for the North is air.

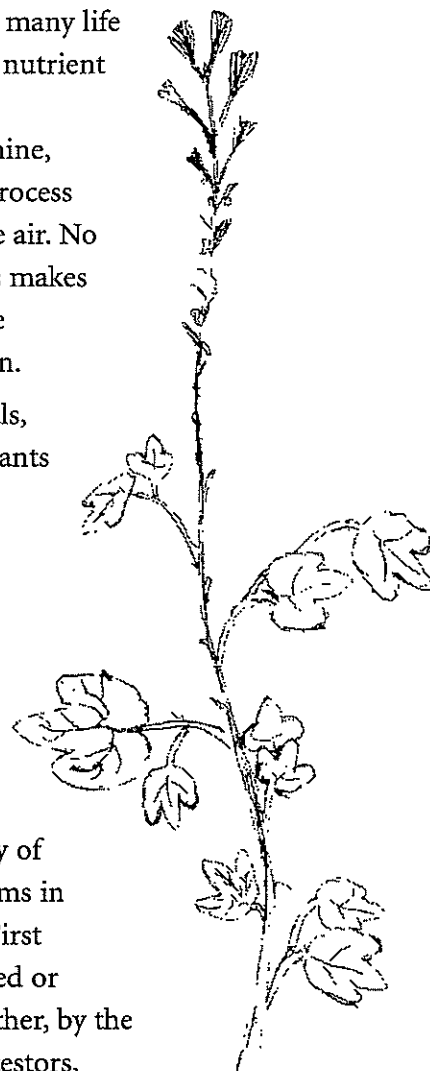


THE NUTRIENT CYCLE AND PHOTOSYNTHESIS

The Medicine Wheel visually represents the cycles of life. One cycle we can see clearly in Amy's Tree of Life illustration is the nutrient cycle with its many life forms harvesting different kinds of food. Photosynthesis begins this nutrient cycle. Photosynthesis is the chemical process that happens when the chloroplasts in a plant harvest the sun's energy. The plant uses sunshine, water (H₂O) and carbon dioxide (CO₂) to go through a chemical process that creates several types of sugars and releases oxygen (O₂) into the air. No scientist to date can duplicate photosynthesis. This chemical process makes life on this planet possible for all other living creatures. It creates the bottom of the food chain. It replenishes our atmosphere with oxygen.

When plants convert the energy of sun into simple sugars, all animals, including we humans, have access to the sun energy by eating the plants or another animal that has eaten the plants. That energy is not lost when we eat it, but is transformed into our bodies and the work we accomplish by using the energy. When you throw a ball on the playground you are using some of that sun energy.

When an animal or plant dies its body goes into the earth and all the decomposers (worms, insects and bacteria) recycle it into further nutrients to feed the plants that will follow. Some plants and animals that lie buried for millions of years become fossil fuel through eons of pressure applied to the organic matter.). The energy of that dead body is recycled into new life by millions of microorganisms in the soil. This knowledge leads us to a deeper understanding of the First Nations expression "All our relations". Since energy cannot be created or destroyed, but is recycled, each of us is nurtured, in one way or another, by the life that has preceded us on the planet. We are all, including our ancestors, literally part of one life. The decomposers do most of their work hidden from the light, but it is vital work to the health of the soil, the life it nurtures and the planet.



Red Currant

Additional resources: *Shared Learnings: Integrating BC Aboriginal Content K-10* has two lesson plans with a wonderful story of the nobility of worms on pp. 148-152 to further develop the concepts of the Medicine Wheel, soil and an aboriginal view of science.



Module 1 Theme 1

THE MEDICINE WHEEL

An Orientation to the Earth and a First Nations' Philosophy

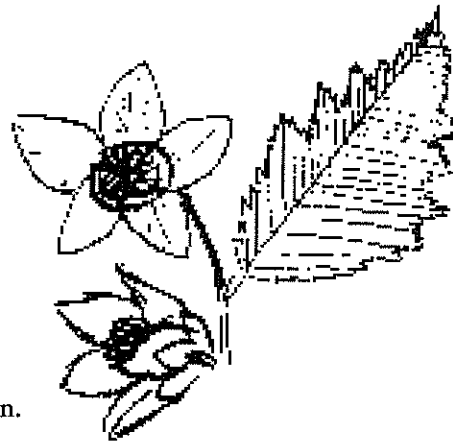
The Medicine Wheel symbolizes life in a continuous cycle, a circle of becoming, repeated annually as the year progresses through the seasons. Many indigenous peoples of the North and South American continents have traditionally honoured the four cardinal directions with sacred respect. Medicine Wheels made of stone were used by many early indigenous cultures for such seasonal celebrations as the annual solstices and equinoxes of the sun. Typically these large and often permanent Medicine Wheels were oriented accurately in the four cardinal directions. But, most importantly, these medicine wheels represented a physical manifestation of respect for a creative life force. (There is a Medicine Wheel in the Vandusen Botanical Garden in Vancouver you can visit.)

Many Aboriginal cultures today continue to value and honor the concept of a natural balance in the circle of life. When we think of the two vast continents of the Americas with their mountain ranges, rivers, deserts and plains, it is not hard to understand why knowing the cardinal directions symbolized knowing the wisdom at the centre of life. To know where one is on the surface of the earth means one can find home and survive.

We shall use the medicine wheel as a guide for students to be successful: to develop their own talents, to be respectful of self and others, to live in harmony with the natural world and their community. When students go into their school gardens or into a natural area like a forest or meadow to study nature, remind them of these principles which will help them to walk lightly on the Earth and respect its gifts of life.

These lessons serve two purposes:

- To gain a physical understanding of the cardinal directions.
- To understand the sacred principles attributed to each direction.



SALMON BERRY



SUGGESTED ACTIVITIES

1. Seasonal Illustrations of the Medicine Wheel

Divide the class into four groups. Many activities in this theme will be done in small groups. Have each group draw cards on which are written North, South, East, West. That direction will be the group name. Each group, throughout the course of these activities, will thoroughly learn about their direction and share their knowledge with the rest of the class.

Materials

- Old calendars or nature magazines with good photos of nature (Realtors often distribute calendars to clients and might have a box full to donate to your class.)
- Glue sticks
- Paper
- Scissors

Supplemental reading: *How Summer Came to Canada*, a First Nations' story retold by William Toye and illustrated by Elizabeth Cleaver, has wonderful collages to tell the story of the seasons.

- a) Begin by putting a circle, divided in quadrants, on the board for the students to see a Medicine Wheel.
- b) Label the North with winter, the East with spring, the South with summer and the West with autumn.
- c) Have the students in each directional group do a collage of their season. This can be a group activity to encourage students to work together as they will be working in a team for many of these directional lessons.
- d) Encourage students to generate a list of words that go with their season, describing temperature, changes in nature and activities related to the season.
- e) Have each student write a poem about her season based on these descriptive words
- f) Mount the seasonal collages in a circle with North and winter at the top, etc.
- g) Include the group poem in the display.



2. Getting Oriented Outside

The following activity helps students orient themselves to their school and community using a First Nations' method of observing the path of the sun and also using a compass and map making approach. Take time to reflect with students on the differences in these two ways of understanding direction and where we are. (For an excellent introduction to compass use see *Patterns, Plants and Playgrounds* Unit 2, Theme 1, Activity 6, Put Red to Bed: a primer on compass use.)

Materials

- Paper
- Pencil
- Clipboard
- Indelible marker to write on stone
- Four compasses

Begin with a walk around the school grounds. Bring 4 compasses with you (If possible have 3 volunteers with you who know how to use a compass and can each work with one group.) Go to the approximate centre of the grounds.

Ask students to point out the sun and identify what time of day it is. (Warn students that looking directly at the sun can damage their eyes.) What season is it? We know the sun is more to the south in the winter and more to the north in the summer in the Northern hemisphere. It rises in the east and sets in the west. Can students tell what direction the sun is from considering the time of day and the season?

After everyone has discussed in what direction the sun may lie, each group can check with a compass. Have them experiment with how the compass works. Once children have found north, ask them point to each of the other cardinal directions. Have each group mark the cardinal direction they represent with a stone on which they have written the direction with a permanent ink magic marker. Place those stones in a small circle where they can be left undisturbed for future activities.



3. Making A Medicine Wheel

The North group will form a straight line coming out from the centre of the circle, pointing north, and likewise for all the other groups.. Once students have formed the cardinal lines of this medicine wheel with their standing bodies, go around the circle and have each group state the direction they represent and are facing. Have each person make a statement about something they see facing their direction. (e.g. When I face west I see downtown). Have each group indicate where the sun is in relation to the direction they are facing.

The four groups will end up lined up like the spokes of a wheel pointing at north, south, east and west. While they are pointing in their cardinal direction, have a note-taker in each group write down the direction the group is facing and what distinguishing landmarks lie there. Write down the season and where the sun is in relationship to their gaze. (e.g. in Vancouver when we look north we can see the coastal range of mountains. In the winter the sun is behind us and in the summer it is more overhead and in front of us.)

Have students continue to stand with their groups as they make a large circle with the whole class holding hands. This large circle encompassing all directions and all people is the medicine wheel. It represents the seasons of the year, the ages of life, the races of people on the earth and the four elements. Understanding that all these are of equal importance and part of the whole will help students gain an understanding of the interrelationships of all things that the Medicine Wheel symbolizes.

Did First Nations' people have a compass or rely on their observational skills to determine directions? What else might they have used to orient themselves besides the sun? Are there major geographic features like a mountain range visible from your school?

Have a discussion to compare what kind of observational skills are necessary to find one's way in the wilderness using the sun and stars as guides compared to finding one's way using a compass.

At night people have used the North Star, the moon, planets and constellations to help find directions when in the Northern Hemisphere. Do students know how to identify any of these objects in the night sky? Perhaps your class can have a night field trip or a trip to a planetarium.



4. Direction Questions

How do students find their way to school? What are some important landmarks that students use to find their way around? Who has ever been lost? How did they get themselves "found"? Do students know how to get to different locations in their community? Ask them to describe their routes. Do they know what direction downtown is from the school? Have they ever needed to go to another town? How did they find their way? Did they use a map?

Materials

- Pencil
- Paper
- Clipboard for each group

Encourage students to come up with four places in opposite directions from each other. These places should be visible to students from the school grounds. Have each group write down their questions to take outside. Once you get outside have the class restate what direction your school faces and have each group point out their cardinal direction. Each student group will now give their group's directional questions to another group to answer.

While you are outside take turns with each group reading one of their questions and showing others the directional answer while saying the name of the direction out loud. Once back in the classroom, discuss why knowing the cardinal directions might be useful in everyday living today, and in the past.

5. Making a Map of Your School Grounds (an advanced activity requiring good team work)

Materials

- Clipboards
- Graph paper
- Blank paper
- Coloured pencils

Have students brainstorm how people may have found their way many years ago before there were printed maps in North America? What might happen to someone who went hunting for food and didn't know how to return home?

Discuss the existence of maps, roads and road signs. Put up examples of maps: the world, the province, and the town.

Have the class divide into their directional groups. Make up a drawing on the blackboard of the school site and have a student from each directional group label their group's cardinal direction. (From your outside experience you all know which way the school faces.) With input from the students, add the school's bordering streets to the site drawing. Have the students work out a map key. The complexity of the key will depend on their age. What will be the system for measuring? A foot pace? How long is each foot pace? (Or will you use a measuring tape and have each meter be a



square on graph paper)? What will symbolize a tree, what will connote a piece of play equipment? What else is on your school grounds that needs to be noted? (Landscape designers use a circle with spokes inside to connote a tree.)

Draw the map key on the blackboard, adding whatever is necessary, but keep it as simple as possible. Divide the map into quadrants on the blackboard. (eg the northeast quadrant, southeast quadrant, southwest quadrant, northwest quadrant) Assign groups to a quadrant.

N
W E
S

Have each of the four groups copy its map quadrant onto a piece of paper to be carried outside. Have one person write down the map key and carry that and have one person take blank paper to list student observations.

Outside:

Assemble in the middle of the playground where the students placed their directional rocks previously. Agree on the dividing lines of the quadrant for each group's direction section. Have students collectively observe their quadrant.

- How many trees, boulders, pieces of equipment or other important features can they see? List them.
- Have students pace off the size of the quadrant using whatever measuring medium you agreed on such as the pace of a walking person.
- Write down how long the section is and how broad.
- Have students mark the distance to major objects like trees and note that on the paper. (If you are working with young students, estimations are fine. The idea is to get a general map of the school grounds that everyone understands because they have been outside and really observed where things are in relation to each other and to the cardinal directions.)

Optional art activity:

Students can do a drawing of their quadrant of the school grounds instead of a map if they are too young for map making or if they want to do an additional activity. Create a display of any maps and drawings done.



6. Shadows

This activity helps students understand the relationship between the position of the sun in the sky and the shadows cast and to understand the path of the earth around the sun

Materials

- Chalk
- Sunshine
- Measuring tapes if you have them for each pair of students
- Pencils
- Journals

Go outside in the morning and afternoon of the same day—a clear sunny day when there will be shadows. Do this once a month or every other month to note changes in the path of the sun using the following procedure.

Pair students up. Each pair needs a piece of chalk. Have the students stand on the blacktop or sidewalk. Have one student draw around the other student's feet and then draw around the shadow of the person.

Reverse roles.

Have each student date her journal entry and include the time of the drawing. Then have each student measure the length of her own shadow and write down the length in cm. Also record what direction the shadow is pointing (from feet to head).

Repeat this procedure in the afternoon. Do the shadows fall in a different direction now? Discuss where the sun is in the afternoon and how that affects where the shadows are cast.

Go outside once a month at the same time of day, either early morning or later afternoon when shadows will be long, and repeat the procedure for the whole school year. **Does the shadow stay the same size all year? Why or why not?** Do you see any change in where the shadow falls? What is it? Can you figure out what is happening as the year progresses? Brainstorm possible reasons for any observed changes. Do you suppose aboriginal people living close to the land noticed such things? Why would it have been important for them to notice where the sun was in the sky?



7. A Discussion of Principles: The Four R's *Relationships, Respect, Responsibility Reciprocity*

In the indigenous world-view, people live with and from the natural environment. Kirkness, Verna J. & Barnhardt, Ray offer these four principles in *First Nations and Higher Education: The four R's* as a framework for developing a respectful relationship to the Earth and to all creation. We can develop an intimate **relationship** with the Earth by observing it carefully as it changes through the seasons (illustrated by Amy Eustergerling's poster). We can learn the role each part plays in the whole.

Indigenous people used the plants they found growing around them in their natural sites. They learned about the plants in relationship to each other in their specific ecosystems. They discovered what those plants had to offer them in the way of food, medicine or materials for making what they needed. Some of what they know came from observing animals use certain plants. A good example of this is the deer fern used by deer to rub on wounds when they lose their antlers.

In the Medicine Wheel the **East** represents Spring, the earth, soil, children and youth, the physical aspect of life, the Red tribe and the principle of **reciprocity**. In the **South** we find summer, the Sun, fire, adulthood, the emotions, feelings, the Yellow tribe and the principle of **respect**. From the **West** comes autumn, water, grandparents, mental and intellectual development, the Black tribe and the principle of **responsibility**. The North symbolizes winter, air, Elders, the spiritual, the White tribe and the principle of **relationships**.

We can learn reciprocity by seeing that huge trees protect smaller plants with their shade. In turn, those small plants shed leaves which decay and nurture the giant trees. The squirrel takes the trees' nuts and buries them in the ground, insuring her own food supply and the eventual regeneration of a new tree sprouting from a forgotten nut. These relationships show us reciprocity. Indigenous people traditionally leave an offering for anything they take from the Earth as a thank you. It may be as simple as pulling a hair out of our heads to leave for a bird to find for a nest. It may be that we leave some of the seeds in the sunflower head for the birds instead of eating them all ourselves. First Nations people teach us to acknowledge the gifts the earth gives us.

We can learn **respect** by learning about the natural world and treating the part of the Earth where we live well so the cycle of life can continue. Indigenous people have laws which govern their use of earth resources. They understand that their existence depends on the earth remaining in balance and that they must **respect** this balance. If we gather wild foods we must never take all we find in one site, but always leave enough so the plant can regenerate for future food gatherers. Camas bulb fields were carefully tended by native families in Coastal BC to insure the continuance of this favorite wild food. This shows **respect** for the plants and their important role in the ecosystem. It also shows responsible action for the future by making sure enough plants are always left for upcoming generations.

We learn to be **responsible** to the Earth through caring actions. We can learn **responsibility** by observing that wild animals do not kill more than they need to eat. We learn about relationships by watching all the **relationships** around us in nature. In the spring we see the wild animals protect



Module 1 Theme 1

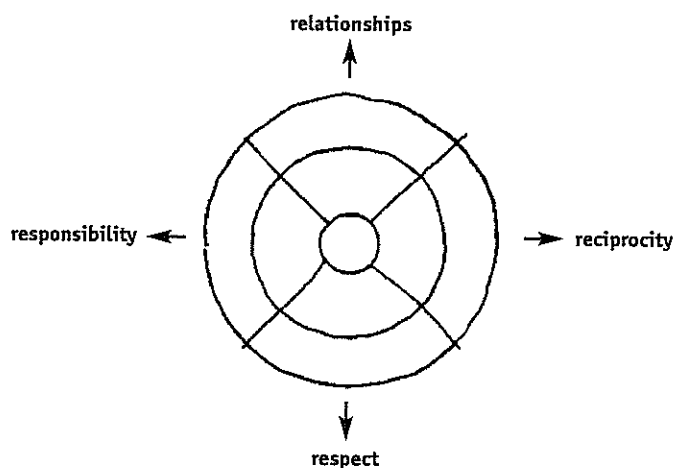
their young from harm when they first venture forth in the world just as humans protect their children. We see the relationship of insects to the health of the garden when they pollinate the flowers. We show our understanding of relationships by being kind to the people, plants and animals around us.

- Divide your class into their direction groups. Have them discuss the guiding principle attached to their direction of the Medicine Wheel and together come up with a definition.
- Once they know the meaning of the principle, have them make a statement about their behaviour in relation to the natural world that shows their understanding of the principle. (Since many children have pets for whom they care, that offers a good entry point to discussing all these principles.)
- Have each student write about their principle in their garden journal.

Example: Reciprocity means a mutual giving and receiving. Reciprocity: I show reciprocity by leaving berries at the foot of the plant from which they were picked. These berries are my way of saying thank you to the plant for its gift. In time they will break down and feed the soil that feeds the plant.

After each group has made an oral statement showing they are aware of the proper way to behave in relation to nature, they are ready to begin their work of learning about the plants, their environment and how people have used the plants historically.

We encourage you to ask your students to compare their experience in doing these activities with their experience of contemporary western culture where such concepts are challenged by the norms of industrialization and consumerism. Advertising directed at children and young people in North America totals two billion dollars US annually and encourages buying things as a means to beauty, fame and money. Students have the opportunity to become self -reflective if we ask them how they feel watching TV advertisements or shopping in a mall and then compare that with how they feel in a forest or a garden or by the sea. Does the natural world offer them something intangible that the material world does not? First Nations' traditions regarding natural resources encourage a conservative approach that considers human actions in terms of their effect seven generations from now.





MODULE 1 THEME 2: Habitat

INTRODUCTION

Habitat is that area in which a living organism is most likely to be found. It includes all an organism's requirements for life and reproduction: shelter, water, food, adequate space. We hear a great deal in the news about endangered species. Many organisms become extinct because their habitats are destroyed. They no longer have a place to live or a source of food or enough members of their species to reproduce. Whether it is a spotted owl that requires old growth forest for nesting sites or a salmon that requires clean gravel in clean water for laying eggs, habitat is a complex set of requirements for all living creatures.

We humans have an influence over the habitat of every other living being through our actions. The First Nations' philosophy of acknowledging all living creatures as "all my relations" expresses a profound understanding of the human link to all life and our responsibility to care for it. No one would knowingly destroy her grandmother's home. We have a responsibility to care for the home of a bee as well as for our auntie or grandparent's house.

Ecology comes from two Greek words, *oikos* and *logia*. *Oikos* means house or home. *Logia* means study. Ecology is the science that studies the home of each organism on earth, including humans. We shall begin the activities in this section by defining what we humans need in our home environment (our habitat) and then look at other kinds of habitats, such as trees, on our school grounds.

Trees provide habitat for the animals that live in them, such as squirrels, birds and the insects that live under the bark. But they also shade the streams by which they grow. Their roots hold the soil and keep the river clean. Shade and clean water is part of the habitat requirement for salmon reproduction. We have learned in recent years that clear cutting forests doesn't just destroy the forest, but affects the life of streams, rivers and all their inhabitants as well. Bears fish in the salmon streams and then haul their catch up away from the stream to eat it under a tree.



Saskatoon berry



Module 1 Theme 2

They leave bones and organic debris behind which fertilize the soil and maintain a healthy habitat for the tree. Ecology looks at these links that exist between the many living things on Earth, and helps us to understand how all these life forms function together to form a whole.

This past century, due to our increased ability to use machines to do the heavy work that once took many men a long time by hand, people have been altering natural habitats by cutting down forests, building dams, and filling in swamps. No other living creature can alter the natural environment as much as we can with our actions. For that reason we have a large responsibility to consider our actions carefully before we destroy other creatures' habitats in the name of "progress". There are unexpected consequences in the natural world caused by human actions. In a rush to eradicate diseases affecting humans and pests affecting plants, many insecticides were used enthusiastically in North America following World War II. In the 1950s Rachel Carson discovered that the massive spraying of natural habitats and farmland with DDT not only destroyed the insects, but the birds that fed on them. Her research and book, *The Silent Spring*, sparked the environmental movement and led to a ban on DDT in North America. Her book, *The Sense of Wonder*, explores natural habitat with a young child and provides beautiful photos to inspire nature study.

Thanks to Rachel Carson's research, we now can understand more about the various links between organisms in our environment. Some of the tiniest animals play a very big role on this earth. Bees play the lead role when it comes to pollinating food-bearing plants that we humans eat. If people spray pesticides on all the wild flowers and berry bushes in an area, the bees will die for lack of food. If we lose the bees, many plants will fail to reproduce and we will not have enough food.*

We have the power to destroy environments through our actions or protect and create environments. We can create wildlife refuges, plant gardens, and use native species of plants to provide habitat for local animals. School children can be restorers of habitat by planting gardens on their school grounds. The following activities help children understand what habitat is for themselves and other creatures and gives some suggestions for studying the habitat that is already in the school yard.

* Simon Fraser University has a web site at www.sfu.ca/~onceupon about a bee project and an excellent booklet, *A Bee Friendly Habitat* free to schools. Send an email to onceupon@sfu.ca to request the booklet.



SUGGESTED ACTIVITIES

1. A Child Habitat Mural (an activity in two parts)

Part 1: Draw Your Own Habitat

Materials

- Plain paper that can fit in your garden journal.
- Markers or crayons.

Question the students about their requirements for habitat: food, water, shelter, room to play, and parents or caregivers who will provide them with these necessities

Have each child draw her personal habitat and label all the elements present.

Part 2: A Collective Mural

Since no one lives in isolation, do a collective mural that shows the shared habitat of the children, their immediate neighbourhood. Children can work in teams on portions of the mural that you all decide on together are necessary.

Materials

- Poster paper or blackboard for listing brainstorming ideas
- Long piece of paper suitable for a mural
- Paints and brushes or markers

Discuss with the class what elements are in their collective habitat and make a list. Remember to include where they get their food—backyard gardens, community gardens, corner stores, supermarkets. Also ask them where they play, since that is a necessary part of a child's life. If students have questions about habitat, list them.

Divide the class in small groups to work on portions of the mural. Decide if you will portray it in blocks to reflect the actual layout of the neighbourhood or if you will take artistic license and simply include all elements of habitat the children have listed but not make it geographically accurate.

Display the finished "Our Habitat" mural on the wall outside the classroom. If the children came up with some good questions about what habitat is, write those down and display them with the mural.

Activity Extension: Since most students enjoy studying animals, have students choose an animal and investigate its habitat needs on the internet or in the school library and report their findings orally to the class.



2. Bird Habitat Walkabout

Materials

- Sketch books or garden journals
- Pencils
- Battery-operated tape recorder and a blank tape (optional).

Suggestion: The teacher needs to make a habitat walkabout alone before the class to determine how far you will have to walk before you can find a place where there are birds. The easiest way to find birds is by listening. Bushes and trees that provide berries will likely have birds and you will hear them chirping.

Before you leave the classroom discuss what senses the children will use to find birds on the playground. If they are talking will they hear the birds chirping? Would their voices scare the birds away? Take a quiet walk around your school grounds. Is there anywhere on the grounds where there are trees and bushes that provide a safe place for birds to nest and to eat?

When you find a place with birds, turn on the tape recorder and record the bird calls for a few moments. Spend a few minutes by an area with birds to see if you can see several different kinds of birds. Can you tell what they are eating? Birds eat lots of things in gardens including insects, worms, seeds, fruit, seedlings.

Have the students do a drawing while they are outside by this habitat. Include the habitat in the drawing: one bush or a tree, or a grouping? If possible, return to this same spot each month of the year to record any changes as plants blossom, form fruit, lose leaves, etc. Record the changes you notice in a drawing and in words in your journal.

Do you see more birds in certain months? When?

You may have to leave the school grounds to find habitat for birds. Perhaps your class will want to provide more habitat for birds on the school grounds after this activity.

Naturescape BC provides a colour brochure of native plants that attract birds and butterflies. Call 1-800-387-9853 and ask for *Native Plants for the Home Garden* brochure. Naturescape also has volunteers trained to do slide shows of native plants at schools to encourage habitat creation and protection. Other provinces and states will have similar organizations that can help you identify what plants would provide bird habitat.



3. Insect Art: Recycled Materials Sculpture

Materials

- Books from the library that show real insects in magnified form
- Some fictional picture books featuring insects in the illustrations
- Recycled items like egg cartons, toilet paper rolls, coloured paper scraps, pipe cleaners, straws from juice boxes
- Glue and stapler
- Paint and markers

In the previous activity we observed bird habitat on the school grounds. Insects are part of that habitat because they are often food for birds and live on many of the same plants where birds nest, rest or eat. Insects use plants as food and as habitat. Some insects drink the nectar of flowers. Some, like bees, pollinate flowers by moving the pollen from flower to flower when they drink nectar. Some insects eat the plants themselves, but then they, in turn, become food for another insect or small animal. Spider's webs often catch insects that may be harmful to a garden and the spider then eats that insect. Each creature has a role to play in nature, its niche in the ecosystem. Do you see any insects on any of the plants on your school grounds? Some plants attract certain beneficial insects that will help keep pests from other plants or pollinate the plants. Ladybugs, a kind of beetle, eat aphids that can be a pest to many plants.

Have students observe some insect life on the school grounds, in nature books and documentary videos. Based on their observations, have students make a real or imagined insect from recycled items. Have a discussion of how these insects eat and move so that students provide their art pieces with a means of locomotion and a way to eat their preferred food. Have the students create a habitat display of their insects labeled with their real or imaginary names as well as where the insects live and what they eat.

4. Native Plant Habitat

Begin by researching the growing requirements of a plant in your school garden or one of the ones listed on the questionnaire. (*See worksheet, Appendix A, page 55*)

Divide the class into small groups and have each student in each group choose a plant to research that is different from one chosen by other members of the group.

Once students have completed the questionnaire have them share information they have learned with the others in their small group.



Module 1 Theme 2



MODULE 1 THEME 3: TREES

INTRODUCTION

British Columbia is a forested province where conifers, the cone bearing trees, dominate. Along the coast is a temperate rain forest. Trees form the basis of First Nations' traditional culture in the region as the primary material for homes, transportation, most tools, as well as fine art such as totem poles, masks and even clothing. Since colonization the settlers have treated trees as a resource to be harvested for profit to make houses, furniture, and a myriad of products. The "trees for mass harvest and profit" attitude has resulted in the loss of most coastal old growth forest in the last one hundred years.

Trees' importance to humans is as important as their role in the natural ecosystem. They are the largest life forms on land. Indigenous peoples of the Pacific Northwest consider the Western Red Cedar the "Tree of Life" because it was used for so many basic necessities. In First Nations' cultures, when a group planned to use a tree for something like a totem pole or canoe, they asked the tree's permission to use its life in this way before they cut it down. A ceremony of thanks to the tree was performed. The interior plains First Peoples hold sacred the tree chosen for the Sun Dance.

Many books are devoted to the cedar tree and its importance. (See references.) Many other books offer information on trees in general. We encourage you to use these excellent resources to expand the scope of your knowledge about the trees of your geographical region, their role in habitat and their important cultural role in First Nations' life. We will just begin the process of learning about trees here with these activities.

A tree can be an ecosystem in itself. Mushrooms may grow up from a tree's roots, and provide the tree with important mineral elements. Lichens and mosses may live on the trunk of the tree. Insects like centipedes may live just under the bark. Birds may build their nests in the tree or come to the tree to eat insects that live on it, as well as berries or other fruits. Squirrels too make their homes in trees. When the leaves fall they decompose on the ground and feed the soil that feeds the tree. When the tree dies, its decaying matter feeds the soil and gives life to new trees.



Crabapple



Module 1 Theme 3

In BC forests we see new plants and tree saplings growing from the rotting wood of old trees stumps. These dead trees now teeming with new growth are called "nurse logs". They illustrate the cycle of life vividly: birth, growth, death, decay, birth...

To get to know the trees on your school grounds, use reference books with pictures and ask people who are tree experts to help identify and learn something about your trees.

- Some trees are **conifers**. Their leaves are needle-like. They are usually evergreen, but Larches have needles that change color and fall in the autumn as do the Dawn Redwood and the Bald Cypress. Conifer seeds are enclosed in a cone. Ask students to name some conifers they already know. Do you have a conifer on your school grounds?
- Some trees are **deciduous**. They lose their broad, flat leaves annually. Their seeds are enclosed in a fruit. Have students name some deciduous trees they know already. Do you have deciduous trees on your school grounds?

The following activities are designed to help you get to know the trees at your school and nearby.



SUGGESTED ACTIVITIES

1. Choose a Class Tree

Suggestion: A staff walk with a person knowledgeable about trees would allow teachers to pre-identify trees before doing this lesson with students. Resource people you can call on include school grounds personnel, a local parks department arborist, a member of a local natural history or native plant society or your town forester or ecologist. (See worksheet, Appendix A, page 56)

Materials

- Plastic bag
- Blank paper
- Pencils
- Clipboard or other portable hard surface for writing and drawing
- Tree reference books suitable for the geographic region

Take the class on a walk around the school grounds and choose a class tree to begin the process of learning how to identify trees. Is your tree deciduous or is it a conifer? Pick a leaf or a small bunch of needles from your tree and put them in a bag to take back to class and press.

Do all the activities on the *Tree Observation Sheet, Appendix A, page 56*.

If you have a camera, take a photo of your class with the tree they have chosen.

Back in class, press the leaf or needle sample between pieces of paper towel in a big book. Using the human and book resources you have, find the name of the tree in English and Latin. If the tree is a native tree you may be able to find the local First Nations' name. (For trees from British Columbia the Web site www.sfu.ca/Halk-ethnobiology has some Halkomelem names of trees. The book, *The Living World* by the U'mista Cultural Society, Juanita Pasco and Dr. Brian D. Compton offers names in Kwak'wala. For trees from other parts of North America you will have to do some internet research or call your local university to speak to an ethnobotanist specializing in your region. Display in class of the tree photo, the class drawings, the leaf or needle sample and the tree name.

2. Adopt-a-tree

Materials

- *Tree Observation Sheet, Appendix A, page 56*
- Plastic bag
- Tree reference books suitable for the geographic region
- Blank paper
- Pencils
- Clipboard or other portable hard surface for writing and drawing



Module 1 Theme 3



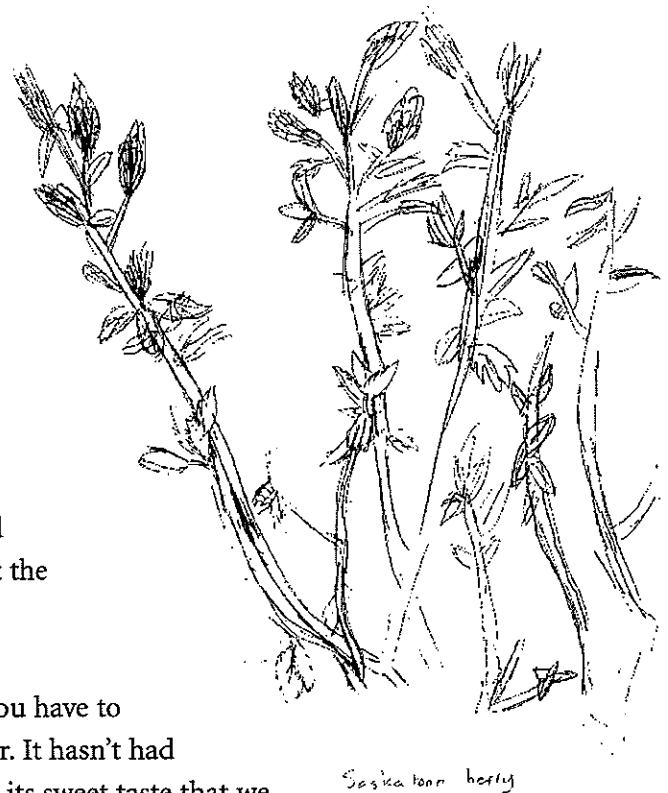
MODULE 1 THEME 4: FOOD, PAST AND PRESENT

INTRODUCTION

What is more basic to any culture than food? If we have never been to Italy we still know that the Italians eat pasta. Amongst the Coastal British Columbia First Peoples animals, fish and shellfish formed the major portion of their diet before they had contact with Europeans. Plant foods provided important vitamins from shoots, leaves, roots and fruits. Traditionally men hunted and fished, and the women, sometimes accompanied by children, did the plant and berry gathering. Sometimes a family "owned" a certain food gathering area, but sometimes it was "first come, first picked". As different plants and berries came into season the women needed to be attentive to what was ripe in order to harvest it at the peak time. Sometimes women went as a group to pick berries, sometimes alone.

Berries are ripe when they pull easily off the plant. If you have to pull hard the berry is likely going to be unripe and sour. It hasn't had enough time in the sun to fully mature and develop all its sweet taste that we identify with a berry. Berries were the natural sugar that was most prevalent in the First Nations' diets. There were no processed sugars at all on the West Coast. (In eastern North America the indigenous people boiled down the sap of the maple trees to make maple syrup and maple sugar, still a delicious treat today.)

After a woman came home from berry picking with her baskets laden she needed to prepare the berries. Some were eaten fresh, like salmon berries. Many were prepared for winter storage, like salal. Berries needed to be de-stemmed and mashed. They were cooked in wooden boxes with hot stones. The hot mash was poured into long wooden frames onto a layer of skunk cabbage leaves and set near a fire to dry into fruit leather. Then they were stored in dry boxes in a cool part of the house. In the winter when the family needed the vitamins and fresh, sweet taste, the dry berries were soaked in water overnight and sometimes mixed with a bit of fish grease



Salmon berry



Module 1 Theme 4

(eulachon oil). (Note that "eulachon" is sometimes spelled in a variety of ways, including *oolichan* or *ooligan*. It is the root of the name Oregon. Oolichan oil was so important in coastal culture that it inspired the name of the state.)

Many plants used by First Nations' people have their edible, medicinal and other useful parts underground. It is quite fascinating to ponder how people discovered that the roots, bulbs or rhizomes of certain plants had value for them.

- **Roots** are the underground portions of the plant which anchor the plant and absorb water and minerals from the soil for the plant. (carrots, beets)
- **Bulbs** are actually short stems bearing fleshy, food storage leaves (garlic, onions)
- **Rhizomes** are underground, food and water storage stems, which are typically more or less horizontal. (Licorice Fern "root," ginger)
- **Tubers** are underground fleshy stems that store food (white potatoes)

The First Nations of the Pacific Northwest coast harvested many "buried treasures" of their own that are indigenous to the BC coast. The most famous are common camas (*Camassia quamash*) bulbs. Meriweather Lewis, the explorer, made an entry in his journal on June 12, 1806, which shows how abundant camas must have been before cities and agriculture disturbed their natural distribution. "The quawmash is now in bloom and from the colour of its bloom at a short distance it resembles lakes of fine clear water." (Pojar and MacKinnon, 1994)

Indeed it is the lovely blue of the edible camas flowers that distinguishes it from its close cousin, the deadly white Meadow Death Camas, *Zygadenus venenosus*. Aboriginal peoples often tended fields of camas on a family basis and in fact "owned" them because the sweet bulb was much prized. They would weed out the white camas when the flowers bloomed to insure no mistake was made in harvesting the bulbs. Camas bulbs also were harvested at flowering time or right after flowering time to ensure a safe harvest. The whole family participated using digging sticks to pull out the bulbs. Only the large bulbs were kept. The smaller ones were left to ensure a future crop.

Blue Camas bulbs were prepared for eating by steaming them in pits for 24 hours or more. This long cooking process was needed to break down their chemical structure into simple sugars. They were either eaten fresh at potlatches or dried in cake form and stored for winter use. White camas must never be eaten as they are highly toxic and could be fatal if consumed.

Camases are in the lily family as are many of the other edible bulbs used on the coast of BC. Northern rice root, *Fritillaria camschatcensis*, is also known as Indian rice and Eskimo potato. It has a lovely bronze-coloured, trumpet-shaped flower. The bulbs look like tight clusters of white rice and grow close to the surface, making them easy to harvest. All the coastal indigenous people harvested and ate these, either in the spring before flowering, or later on in the summer. They could be eaten freshly cooked through steaming or stored partially dried. Similarly, the



bulbs of Chocolate lily, *Fritillaria lanceolata*, were harvested and eaten in the same manner. They are quite rare now and should be left undisturbed.

Yet another member of the lily family, which is easy to grow in gardens, is nodding onion, *Allium cernuum*. The Squamish, Sechelt, Comox, Nuxalk, Tsimshian, Makah and Kwakwaka'wakw all used it sparingly. They marked the plants in the spring, but came back later in the summer to harvest them. They too were steamed in pits. They grow in similar locations as the death camas, but death camas bulbs do not have the onion scent. They are in the same genus (the scientific plant grouping above the species level) as onions, garlic, leeks and chives.

A fascinating plant that First Nation's people use as a natural sweetener and medicine for sore throats is the Licorice Fern. Licorice Fern grows on mossy tree trunks and rock faces. The root-like rhizome, or modified stem of this plant was used because of its licorice-like flavour. A rhizome that we use today for sore throats is ginger.

Even though the potato is not native to North America it rapidly became a part of the diet through trade. Indigenous to Peru, the potato spread rapidly throughout the world once the Spanish conquistadors sailed back to Europe with this edible treasure amongst the many other treasures they took from the Incas. The Incas grew 10,000 varieties of potatoes at the time the Spanish arrived in Peru. They grew them at every elevation from sea level to the high Andes, developing varieties to fit many little microclimates and specific needs.

The Incas discovered how to freeze-dry potatoes. They set them outside at night in the frigid cold of the Andean night to freeze and then stomped on them in the morning to press out all the water. They did this several times until what they had left was a small compact package of carbohydrate dried and ready to store in caves against times of crop failure to protect against famine. One of the ways the Spanish destroyed the Inca culture was by robbing them of their stored food supplies (Weatherford, 1988).

Refrigeration and mass transportation of food by truck and jet has changed eating patterns of all people dramatically in the last hundred years. Before the time of rapid transportation, knowing when to harvest certain wild foods was important information for maintaining the health of a community. If berries were not harvested on time, a vital food source for vitamins throughout the winter would be lost. If people did not harvest the salmon during the late summer and fall salmon run, the whole community might starve. Now we just go to the grocery store and if a food is not in season fresh, it is often available frozen.

What we shall be doing in these lessons is exploring the plants that occur naturally in our region and how the First People traditionally used them for food. We shall also learn about some of the traditional foods of the indigenous peoples of the Americas that have spread all over the world. We will compare the diet of pre-contact indigenous people to a modern diet to learn what we still eat that is native to our region. We will ask students to consider the differences in food



preservation from a time when there were no refrigerators to now. Because diet is the basis of people's health, we will ask students to consider the health impact of eating native and locally-grown foods compared to eating manufactured, processed foods.

SUGGESTED ACTIVITIES

1. A Berry Good Field Trip

Materials

- 1 or 2 litre milk carton or pop bottle for each student
- Large basket lined in leaves

Picking containers: First Nation's women traditionally had a small basket with a hanging strap on it to put around their necks which allowed them to pick with both hands free. Students can use any 1 or 2 litre milk or pop container with the top cut off and a string tied through to form a loop to hang around their necks in a similar way. Traditionally, because people picked berries for their whole families and also shared with other families, a larger basket would have been kept in the shade and the contents of the smaller containers poured into it. Bring a big basket lined with leaves, for students to use communally in this way. (For a wonderful native story on the first basket see Caduto and Bruchac's *Keepers of Life* p. 150 'The First Basket.')

In British Columbia we have many kinds of native berries: blueberries, cranberries, raspberries, blackberries, huckleberries, salal, gooseberries, soopalalie, and saskatoon berries. Some grow in the wild as well as commercially. Many other kinds of berries occur in the wild, but are not commercially available. If you live somewhere that has another wild fruit, use this lesson to pick and taste whatever grows locally for you.

Most cities in coastal BC have Himalayan blackberry bushes growing on disturbed sites and in parks. This is an imported plant that came with European settlers and went wild. It does provide delicious fruit for those willing to risk the scratches from the brambles and the stains from the berry juice. (We do have wild blackberries native to BC called trailing blackberries, *rubus ursinus*. Its berries, roots and leaves were used extensively by coastal peoples.) If your school has access to a berry patch of any sort of edible berry that is ripe when school begins make an outing of it. There are "U-Pick" berry farms in many areas that welcome field trips and some mountainsides with wild blueberries accessible by school bus. Remember to show respect for the berry bushes for sharing their fruit by saying thank you and leaving a few berries beneath the bush. If you are picking in the wild, remember that many wild animals also depend on the berry bush for food and be sure to leave some berries for them on each bush.

Safety tip: Ascertain whether anyone in your class is allergic to bee or wasp stings. They too like to buzz around the berries at end of summer. Make sure you have the appropriate first aid supplies for any allergic student before embarking on this berry picking adventure and know how to use the supplies in an emergency. Long sleeves can protect students from scratches.



2. Bake a Berry Pie or Muffins

Materials

- Berries, fresh or frozen
- Berry recipes
- The rest of the ingredients in the recipes you choose
- Cooking pans
- Stove and/or oven

Have students bring in a favorite berry recipe. It could be blueberry pancakes, muffins, a berry crumble, muffins or pie or a berry fruit salad with a variety of berries. (If you live where soapberries grow and have access to some, ask an Elder to help you make soapberry ice cream.) If there is nowhere convenient to pick wild berries, buy a bag of frozen blueberries at the store and bring them to school.

Choose the recipe you will use and bring in the ingredients. Included here is a delicious pie that does not require an oven, just a stove burner, to make. Use this as an opportunity to celebrate the gift of berries that late summer brings and to give thanks for the abundant crop. When we buy our berries from the grocery store it is easy to forget the work of the plant to produce this food for us. Recent research shows that berries are very important for our health. There is some evidence that blueberries are one of the best cancer prevention foods there is.

Invite another class or some parents to share in this berry feast with you. Sharing food and giving thanks for the earth's abundance is a primary part of First Nations' culture.

Recipe: Environmental Youth Alliance has a booklet of recipes called Recipes with Native Plants that you can get for free by calling them at 604-689-4446 in Vancouver, BC. This recipe for Blackberry pie is from their booklet.

Unbaked Blackberry Pie—Serves 8

- 1 pre-baked pie shell
- 4 cups blackberries
- 3/4 cup sugar
- 1 cup water or juice drained from frozen berries
- 1/3 cup cornstarch
- 2 T. lemon juice

Crush 1 cup berries, blend sugar, cornstarch and water and add to berries. Cook over medium heat, stirring constantly until mixture thickens. Remove from heat. Stir in remaining berries and lemon juice. Pour into baked pie shell. Top with whipped cream or vanilla ice cream. You can use blueberries too, but decrease sugar to 1/2 cup.



3. "What is Home Grown?" (Poster)

Materials:

- A basket of produce from different geographical regions
- 2 big poster papers, one titled "Home Grown Produce" and one titled "Imported Produce"
- Newspaper food advertisements in color
- Pojar and Mackinnon's *Plants of Coastal British Columbia* or a similar reference book of native plants for your region
- Scissors
- Glue
- Markers

Bring in a small basket of produce from the grocery store that includes some tropical fruits and some locally grown produce. Cut it all up in small pieces for tasting. Give the children tastes of the different fruits and vegetables in the basket. As you pass around the foods, one by one, identify it with the children and have them discuss where they think each of the foods originates. After you have identified all the foods and put them on the "home grown" or "imported" poster, count how many you have of each and put the total at the bottom.

How many have been grown elsewhere and trucked or flown to local markets? Are there more local or imported foods to buy and eat? Are any of these foods, even the locally grown ones, foods that occur naturally in our region? Berries may be the only local produce that you can find in the store that is indigenous to the region if you live in B.C.

Ask the children if any of them have ever eaten any food picked in the wild. Do they have parents or grandparents who have taught them what wild plants are edible? Find out if any of the children have ever gone fishing or hunting with their parents, another way of harvesting local food.

Discuss why or why not they think harvesting wild foods is commonly practiced these days. Have students work in groups to add pictures to the posters of local and imported foods. They can make a collage by cutting out pictures from grocery store advertisements and also drawing pictures of what is not included in the advertisements.

Indigenous people have always traded with one another to obtain products not available in their own regions. Have the children imagine what they might want to trade for if all that was available to them locally was what grew naturally around them.



4. Where and When Do We Harvest?

This lesson offers students a chance to research local harvest times and where non-native food originates.

Materials

- The completed "What is Home Grown?" posters from page 41.
- World map
- Push pins
- Encyclopedia or other reference books to determine what countries grow different foods
- Yarn
- Color food advertisements from the newspaper
- Two pieces poster paper
- Markers
- Tape

Put the posters on the wall on either side of a world map. Divide the class in small working groups and give each group an equal number of kinds of produce to research from the completed posters, some local, some imported.

Once each group has done its research, have a student tape a piece of yarn to the side of the produce picture and then tape the other end to the map where the produce originates. Since many fruits and vegetables grow in many countries, have students limit this exercise to two places for each kind of produce. For instance, a mango could have yarn leading to both Brazil and Mexico. Blueberries will have yarn leading to BC and perhaps Washington. With a marker have another student write under the picture when that item is ripe and can be picked if they have been able to discover that information. (Greenhouse growing of produce has changed the seasonal aspect of when food is available. Often we can get food all year now that used to only be available at the end of the summer). For all the foods grown locally, determine whether the food is native or not. (That is, does that food occur naturally in the wild in your region.) Write "native" beside those foods that you think grow naturally in your region.

For further reference: A good website that features BC food is <http://www.bcfarmfresh.com>.

Wherever you live see if there is a website that promotes the foods grown locally.

(For excellent garden-based nutrition and food lessons see *The Growing Classroom* by Jaffe and Appel, Nutrition units, pp. 315 –386.)



Module 1 Theme 4

5. Breakfast, Now and Then: Compare and Contrast Raw Foods and Manufactured Foods.

Materials

- Empty food packages breakfast products: (ex. cereal, bread, juice containers, milk containers, egg cartons, frozen waffles, pancake mix, syrup).
- Pictures of berries, meat, fish from grocery store ads
- A Canada Food Guide poster

Have the children bring in empty food packages from home of anything their family eats for breakfast. Make an ongoing display of these packages. Read the ingredient labels from these food package out loud.

Make a chart that lists the ingredients of the food products and the chemicals in them. Help students determine where these foods fit on the Canada Food Guide. (*See Food Ingredient Chart, Appendix A, page 58*). Have students count the number of additives and chemicals listed on the labels of manufactured foods.

Add some whole foods to the chart that students eat now for breakfast: oats, eggs, bacon, fresh fruits or juices. Compare and contrast the ingredients of these different foods and discuss what it might mean to human health to consume things that are filled with additives.

What are the implications for anyone eating a large number of manufactured products?

Discuss the pre-contact First Nations' breakfast of fresh or dried fish or meat, fresh or dry berries and a tea of local herbs. Compare it to the number of products the children have brought in from their current day breakfasts.

Use the Food Ingredients Chart in Appendix A with the whole class to chart a typical pre-contact First Nations' breakfast and look at what suggested foods are included. (You can do this with an overhead projector.)

The change in diet for First Nations' people since Europeans brought their wheat, flour, alcohol and sugar into the region has been dramatic. First Nations' people are prone to getting diabetes. Could it be that this radical change from whole foods to manufactured foods has had something to do with the problem of diabetes? Have each student fill out a food ingredient chart for the breakfast she ate that day to determine if there is a good distribution of recommended foods in her own diet.



6. Basic Botany of What We Eat. *Is it a root or a leaf?*

Plants have nine different possible edible parts depending on the plant. These are roots, stems, buds, leaves, flowers, seeds, fruits, rhizomes (underground stems that grow horizontally) and bulbs (underground plant parts that are a piece of stem bearing short, fleshy leaves). In Module 1 Appendix A, page 59 there is a chart that gives some examples of the plant parts that we eat and the plants from which they come.

Materials

- *Plant Part Chart, Appendix A, page 59.*
- A small selection of vegetables and fruits cut into pieces on a plate, one plate per group. Include something from each of the seven different plant parts (most bulbs and rhizomes are not eaten raw). Suggestions include: lettuce, green peas, red pepper, carrot, potato, celery, broccoli, nasturtium, pansy or violet, sweet onion.

Make an overhead transparency of the *Plant Part Chart*. Make a photocopy of the chart for each working group. Divide the class into small groups. Have a class discussion of the *Plant Part Chart*. Have each group taste and write down the name of each vegetable or fruit and what part of the plant it is. They can use the chart and fill in the blanks or make their own list. Try to include a taste from each of the parts: bud, leaf, flower, seed, fruit, rhizome, and bulb. Have each group share their discoveries with the class.

7. Plant A Three Sisters Garden

Anthropologists believe that about 5000 years ago the First Nations people of Mexico discovered how to cross breed some grasses until they came up with corn. First Nations' traditions across the Americas attribute corn to its divine origins, a gift from the creator. The people of Mexico discovered that their corn grew well with beans growing next to it climbing up the stalk and with squash vines intermingled on the ground. The big squash leaves shaded the soil, kept in the moisture and suppressed the weeds. The beans, modern science tells us, take nitrogen from the air and fix it in the soil next to the roots of the corn plant that needs lots of nitrogen to grow.

Corn, beans and squash spread both north and south through trade. The first European settlers on the east coast of North America found native people growing the crops using this traditional method. The native people taught them how to plant these basic foods which provide a balanced diet. This intermingling of crops is one of the major differences between the traditional farming methods of the indigenous people of the Americas and modern commercial agriculture. While these crops were not traditionally planted on the BC coast, they do grow well here and are a wonderful way to learn a tradition that features in Thanksgiving feasts. The native people generously shared their knowledge with the new European settlers and saved their lives by teaching them how to farm on this new continent when they first arrived. You also can plant a Three Sisters Garden on your school grounds based on the traditional methods.



Module 1 Theme 4

Materials

- Corn, beans and squash seeds suitable for your local climate.
- A patch of fertile soil, well dug.
- A roster of people to water in the summer when school is out.
- A layer of good mulch around the plants to help the squash plants do their job.

Research what kind of corn, beans and squash do well in your climate. In order to choose a seed variety that will have time to mature you will need to discover:

- ▶ last frost date in the spring
- ▶ first frost date in the fall

Make sure you plant at least 3 rows of corn in order to insure pollination of each ear.

(See *Native American Gardening* by Caduto and Bruchac, and *In the Three Sisters Garden* by Dennee for further curriculum.)

8. The Food Chain Story and Storyboard: All My Relations

Once upon a time a little plant grew in a clearing. Its leaves reached up to the sun and absorbed energy from the light, mixed that energy with water and made sugars to run through its veins. A grasshopper happened by and took a big mouthful of that juicy, sweet plant (Chomp! Chomp!) and got energy to hop some more. He hopped to the edge of a pond where a frog saw him, zapped out his tongue and gobbled him up (Gulp! Gulp!) The frog needed to eat in order to live and swim and hop. A tall Great Blue Heron was hiding in the cattails at the edge of the pond just waiting and watching for his dinner. He gobbled that frog up quickly. (Gulp! Gulp!) That same heron died of old age. His body fell onto the ground and a vulture smelled it and came down for a good meal. (Chomp! Chomp!) Out came an army of decomposers: flies, maggots, and micro-organisms and quickly finished off the rotting flesh of the heron. (Chomp! Chomp!) The soil in that spot was richer for the heron's organic matter joining it, and a new plant soon sprouted.

Storyboard Drawing: This can be done as an individual activity or with a group working together in which each child draws one panel of the storyboard.

Materials

- Paper
- Felt pens

Have students identify and make a list of all the characters of the food web story. Have them make a list of each scene in the story and draw one panel of the story for each scene listed. Shape the individual panel like a link in a chain instead of just a rectangle and make the whole story into a chain instead of a strip.

Make a display of these storyboard chain link panels for other people to learn about the food chain.

(Students can use other animals to tell this food chain story as long as they understand the food chain of their chosen animals like grass, rabbit, coyote, vulture, micro-organisms.)



MODULE 1 THEME 5: TECHNOLOGY BRIDGE TO THE KNOWLEDGE OF THE ELDERS

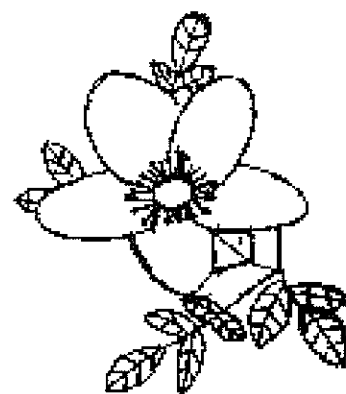
INTRODUCTION

First Nations' people traditionally passed on knowledge orally, often in the form of stories. How wonderful if all children could have a walk in the wilderness, a backyard garden or a schoolyard with a knowledgeable elder who could tell about plants and their uses! Since colonization began, the Canadian and United States government policies deliberately suppressed native language and culture to such an extent that very few elders remain who know traditional plant use and the names of these plants in their native languages. Fortunately scholars have worked with elders to learn about many aspects of First Nations' culture and made it available on websites to anyone who is interested.

www.sfu.ca/Halk-ethnobiology is a Website that lists some plants and animals of coastal British Columbia and how they were used. In addition, the traditional name for each plant and animal appears both written and spoken in Halkomelem, the language used by many of the First Nations' people in this region. Another web site to investigate for Northern British Columbia plants and their uses is

<http://collections.ic.gc.ca/hazeltons/mainpage.htm> If you live in another region of North America, see if you can find an ethnobotany web site for your own region.

These web sites are tools that give us all a chance to learn names and uses of the plants and animals of this region in the tradition of the First Peoples. While a website cannot possibly replace the warm human contact of learning with an elder, it can preserve knowledge and make it available to anyone in the world. The internet provides a link for us to learn about things that interest us anywhere. Learning to use the internet to pursue our interests broadens our horizons. When you discover new websites with relevant native plant information, please share them with others including Evergreen (infobc@evergreen.ca). Surfing the world wide web for



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Module 1 Theme 5

information you want is a new kind of treasure hunt where the rewards can be unexpected and offer rich resources for free.

The plants listed in these activities are all plants growing in the Grandview/?uuqinak'uuh garden. If you have a school garden do these activities using the plants that grow on your own school grounds. The internet research project on plants will be more meaningful if students see the plants in real life.

SUGGESTED ACTIVITIES

1. Buried Treasure and Research Skills

Materials:

- Pojar and MacKinnon, *Plants of Coastal British Columbia* OR
- Internet access
- *A Native Plant Habitat Questionnaire, Appendix A, page 55*, one copy per student

Divide the class into research groups of three or four students each to do their research. Each group chooses one of the traditional root, rhizome or bulbs (refer to these as buried treasures) growing in BC from the following list. Each group prepares an information sheet on their buried treasure. (Please note that the best known plant that grows underground, the potato, is actually a fleshy stem referred to as a tuber, but it is not included in this exercise because it is not native to British Columbia.) You can use the questions from *A Native Plant Habitat Questionnaire Appendix A* to complete the information sheets.

1. Meadow Death Camas, *Zygadenus venenosus*.
2. Blue Camas *Camassia quamash*
3. Nodding onion, *Allium cernuum*
4. Northern rice root, *Fritillaria camschatcensis*
5. Chocolate lily, *Fritillaria lanceolata*



2. Let's Tell About What We Have Discovered!

Have each group do an oral presentation on its buried treasure to another group of students.

Materials

- A completed work sheet on one of the buried treasures from **Buried Treasure and Research Skills**, page 47
- A living sample of each one of the plants

Remind students to keep the following guidelines in mind while delivering their brief oral presentations about the plant they researched:

- ▶ Proper posture
- ▶ Clear enunciation of words
- ▶ A voice that varies in tone to engage the listener
- ▶ Eye contact with the audience
- ▶ Good understanding of the subject matter

If the Halkomelem name was on the website, have students include that name in the oral report. If you were able to get samples of each of the plants, see if you can now plant them on your school grounds to create a Buried Treasures Garden. Please **don't plant** the Death Camas, *Zygadenus venenosus*.



3 Have a Buried Treasure Feast

Materials

- *Plant Part Chart, Appendix A, page 59*
- Electric crock pot OR stove with a big pan
- Root, rhizomes and bulb vegetables brought in by the students
- Olive oil or butter (small amount)
- Salt
- Dishes
- Eating utensils
- Dish soap and place to wash dishes

Divide the class into groups according to roots, rhizomes, tubers (enlarged underground stems) and bulbs. See *Plant Part Chart, Appendix A, page 59* for reference help as to what is a root, rhizome, underground stem (tuber) or bulb. Have each group make a list of the vegetables that fall into their category. Agree on a day for the Buried Treasure feast.

Roots students can each bring one root vegetable that they like to share (e.g., carrots, beets, parsnips, etc.) Rhizomes students can bring in a vegetable from that category like ginger. Bulbs students can make their list from the Allium group such as onions, garlic, etc. Tuber group brings potatoes.

If you have a large crock-pot, you can make this dish right in your classroom, as long as you have a safe place to plug it in. This stew will depend on what the children bring, but will taste good whatever the combination. Don't overdue the ginger, which is quite hot in flavour and should be used sparingly. Cut the vegetables up in bite-sized pieces, add enough water for the volume of vegetables to slowly steam them together in a crock-pot or on a kitchen stove. Drain the water. Add a little salt and perhaps a bit of butter or olive oil when done and you have a feast fit for a cold, winter's day. These plants are all cousins of ones eaten by the indigenous people of BC.



4. **Graphic Art Activity: Make signs for the plants in your school garden (Advanced activity)**

If you have a school garden or you have just begun one by planting the "Buried Treasures" from the preceding activity, make some signs on the computer to help visitors know what they are seeing. This will also help students learn how to use technology to aid in visual communication. If your school does not have computers, do these signs by hand.

Materials

- Computer
- Paper
- 110 pound heavy card stock
- Access to a laminating machine
- Small wooden stakes
- A stapler that will work on wood

Choose a plant or several that you are going to label with a sign. Discuss with the class: What information would be useful to people? Name? How it was used? A picture? What information do you want to show? What languages will you use? In what order do you want different languages? Are you going to use visual cues like color, drawings, numbers? What kind of materials will you use make your sign? Paper, card, wood?

Signs can have visual clues, such as colour, that help people read them more easily. In the Grandview/uuqinak'uuh Spirit of Nature Garden we are using a color code to indicate the plants' ecological niche. Each sign will have a color border to indicate the plants correct ecology.

- a) Moist Shade garden Blue Border
- b) Dry Shade garden Green Border
- c) Moist Sun garden Yellow Border
- d) Dry Sun garden Red Border

Decide what information will go on each of your signs. (Remember: All plants known to scientists have names in Latin because that is how scientists all over the world can talk about the plants with a common reference name for each. We also have plant names in English. For some plants it is possible to use a local First Nations' language name too.)

Decide in which order you want the languages to appear on your signs. If you are making more than one garden sign, be consistent in your ordering. Consistency helps with clear communication. If you want to include the Halkomelem name of the plant use the information available on the Web site www.sfu.ca/Halk-ethnobiology Use the "Dialect and Communities" button to choose the version of Halkomelem you want to use: Island, Upriver or Down-river location.



Module 1 Theme 5

Paper that is 8.5" x 5.5" (1/2 of a full sheet) works well for garden signs. Print the sign on computer paper, then cut and paste it to 110 pound heavy card stock. Laminate the sign, making sure the laminate plastic extends .5 inches past the paper. Staple the sign through the plastic laminate border onto a wooden stake. If the staples pierce only the plastic laminate, the paper will stay protected from moisture.

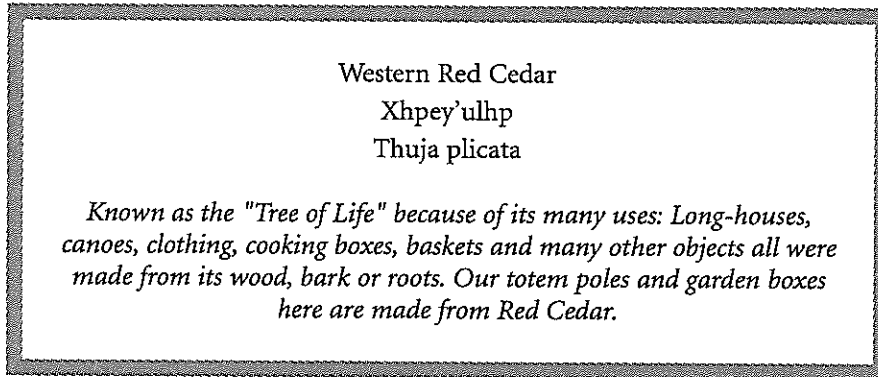


Figure: Example garden sign at Grandview Elementary

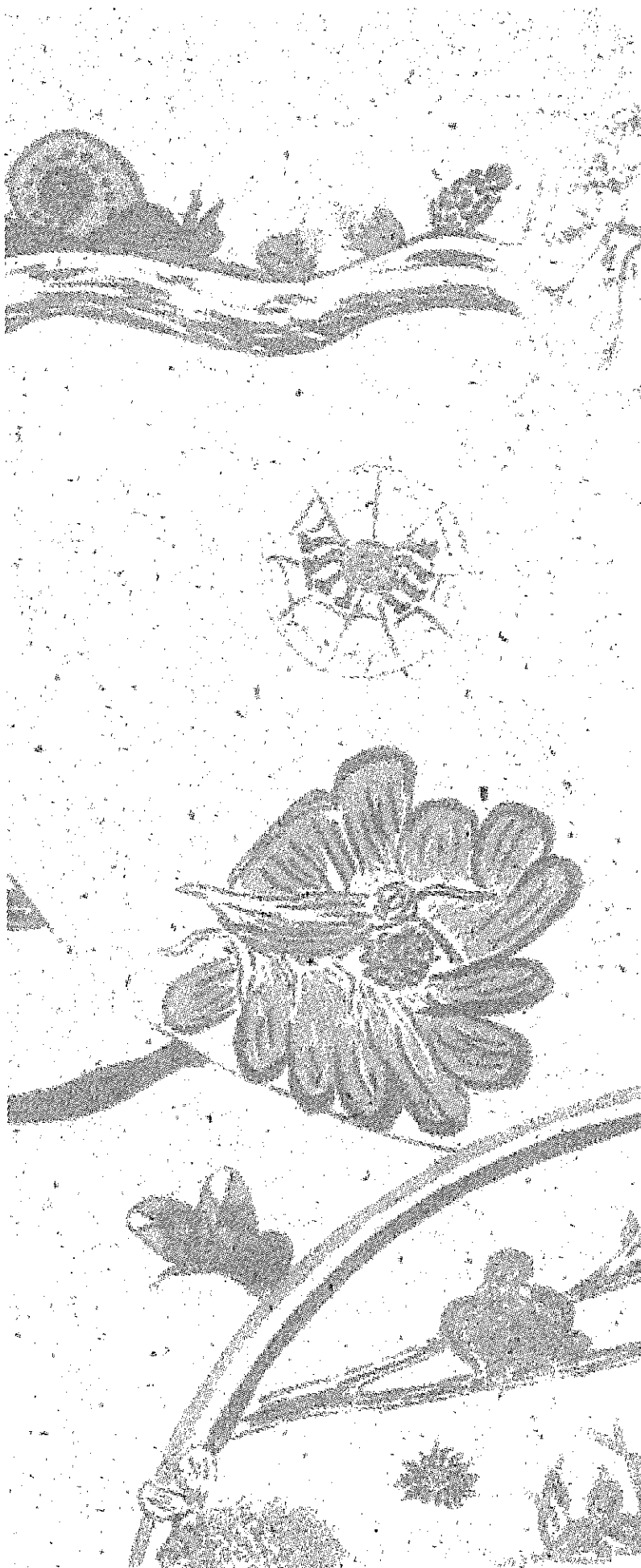
5. Technology Bridge to Other School Gardens and Gardeners.

Materials

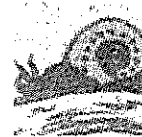
- Computer with internet access

Have each student choose one of the web sites from the *Appendix B Web Site References* or find an ethnobotany, habitat or gardening website for herself. Each student will write a paragraph about the chosen website highlighting something of particular interest in the chosen subject area.

Compile these web sites and paragraphs to form a class reference list.



Appendices



Native Plant Habitat Questionnaire

For use with a comprehensive plant book like Pojar and Mackinnon's Plants of Coastal British Columbia or with a web site like www.sfu.ca/Halk-ethnobiology

Choose one plant from the following list of BC native plants or choose one from your own region and answer the following questions about the plant:

Camas	Labrador tea	Mahonia	Red Cedar
Douglas-fir	Licorice Fern	(Oregon-grape)	Western Soapberry
Huckleberry			

1. What is the name of the plant you have chosen in English and Latin?

2. Does it like to grow in sun or shade?

3. Does it like a wet or dry environment?

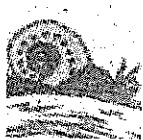
4. At what elevation does the plant grow?

5. If the plant you chose is on your school grounds, look at it where it is growing. Is the plant doing well where it is planted?

6. Does it look healthy?

7. Is there anything you can do to help it have a better environment now that you have learned what it likes best?

8. In what way did First Nations' people use this plant traditionally?



Tree Observation Sheet

Choose a tree to observe.

Do a rubbing of the bark by putting a plain piece of paper on the trunk and then rubbing a peeled crayon or the flat side of a pencil lead over the paper. The bark pattern will come up in relief with the color. Do a rubbing of the leaf or needles of the tree also on the same piece of paper. Label your rubbing with the tree name if you know it and with the location. Date your rubbings.

Do a large drawing of the tree that fills the whole paper. Focus on capturing the shape of the tree. Notice the angle of the branches in relation to the trunk. Do they reach up, droop down or are they more parallel to the ground? Date your drawing.

After making your drawing, look at other trees nearby and notice a difference between your tree and one other. What is that difference?

What does the tree's bark feel like?

How is the tree shaped?

How long are its needles or leaves?

If it has needles, how are they clustered? How many to a cluster?

If it has leaves, what is their shape?

What color are the needles or leaves?



What month of the year are you observing the color?

Do you see any other living creatures in the tree? What do you see?

Does the tree have a visible fruit?

Do you see any creatures eating something from the tree?

What creatures do you see and what are they eating?

Does this tree provide habitat for some animals that you can see? Are there perhaps unseen insects or larger animals that you can't see?

Back in class, research where the tree lives naturally. Is it a native tree or one that is imported from somewhere else? Does it like a dry or wet climate?

Back in class, write a poem using some of the words you have used on this sheet to express what you have learned in your observation of the tree.



Appendix A

Food Ingredients Chart

FOOD NAME	FOOD INGREDIENTS	ADDITIVES	LOCATION ON CANADA FOOD GUIDE
apple	apple	none	Fruits and Vegetables



Plant Part Chart

PLANT PART	FIRST NATIONS TRADITIONAL FOOD	COMMON EUROPEAN FOOD
Root	Springbank clover, Pacific Cinquefoil	Carrots, radishes, parsnips
Stem	Shoots of young salmonberries, shoots of wild roses	celery
Bud		Broccoli, Brussels sprouts
Leaf	Stinging nettles, Labrador tea, Fireweed	Lettuce, mint, chives
Flower	Wild roses	Nasturtiums, chamomile
Seed	Corn came from the indigenous people of Mexico, dry beans	Shell peas, wheat, peanuts
Fruit	Wild crabapple, huckleberry, salmonberries, cranberries, rosehips	Green beans, tomatoes, peaches, apples, grapes
Rhizomes	Licorice root fern, potatoes came from the Incas	Potatoes are now eaten by almost the whole world, yams
Bulbs	Blue Camas, Chocolate Lily, Nodding onion	Onions, garlic

PLANT PART	FIRST NATIONS TRADITIONAL FOOD	COMMON EUROPEAN FOOD
Root		
Stem		
Bud		
Leaf		
Flower		
Seed		
Fruit		
Rhizomes		
Bulbs		



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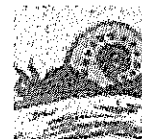
Appendix B

Food Plants of Coastal First Peoples. Vancouver: UBC Press, 1995.

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Appendix B Web Site References

<http://collections.ic.gc.ca/hazeltons/mainpage.htm>

www.aces.uiuc.edu/~uplink/gpe/

University of Illinois Cooperative Extension Service

<http://www.greengrounds.org/>

Canadian site to help plan a project

www.cityfarmer.org

Canada's office of urban agriculture with links to many school gardens and much international info

<http://www.cityfarmer.org/grandview.html>

is Grandview/?uuqinak'uuh Elementary School garden Web site with full plans and ethnobotanical list of plants

www.fvs.cornell.edu/gardening/

excellent resource for information about relationships between plants and humans

www.wowpages.com/nga/edu

listing of Web sites on school gardens

<http://aggie-horticulture.tamu.edu/kindergarden/index.html>

Info and activities about kids and gardens, nutrition, composting

www.nwf.org/habitats/schoolyard/

Backyard Wildlife Habitat program

www.teleport.com/~eversc/NFC.htm

offers activities and lesson plans

www.kidscook.com

projects and recipes for kids.

www.sfu.ca/~onceupon

all about bees

www.wildededucation.org

<http://grandview.vsb.bc.ca/>

for color photos of garden

<http://cityfarmer.org/brazilGarden.html#Brazil>

for Peace in the Environment Project

<http://www.sfu.ca/Halk-ethnobiology/>

native plants and animals of BC



Appendix B

<http://sciencenorth.ca/schools/rootsandshoots/index.html>

<http://www.gbr.org/school/resource.htm>

To order teaching materials for garden or environment

<http://lifelab.ucsc.edu> www.letsgetgrowing.com

Life Lab Science Program

www.garden.org

National Gardening Association

ag.arizona.edu/maricopa/garden/html/pubs/sch-bk.htm

www.kidsgardening.com

eelink.net/ee-linkintroduction.html

Environmental Education Link

www.mindspring.com/~discoverygardens/occguide/occguide2.html

www.everychild.com

aggie-horticulture.tamu.edu/kindergarden/child/school/step.htm

www.extension-horticulture.tamu.edu/county/smith/kids.html

youth gardening resources

www.nwf.org/habitats

National Wildlife Federation

www.cwf-fcf.org www.wildaboutgardening.org

Canadian Wildlife Federation

www.evergreen.ca

Evergreen

www.communitygarden.org

The American Community Gardening Association