

OUR RELATIONSHIP WITH

WATER

in the

OKANAGAN



Explorations in Outdoor Education to Support the B.C. Curriculum
INTRODUCTION

OKANAGAN 
waterwise

One valley. One water.

ACKNOWLEDGMENTS

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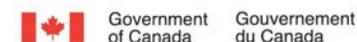
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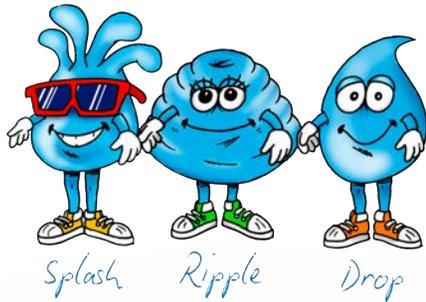
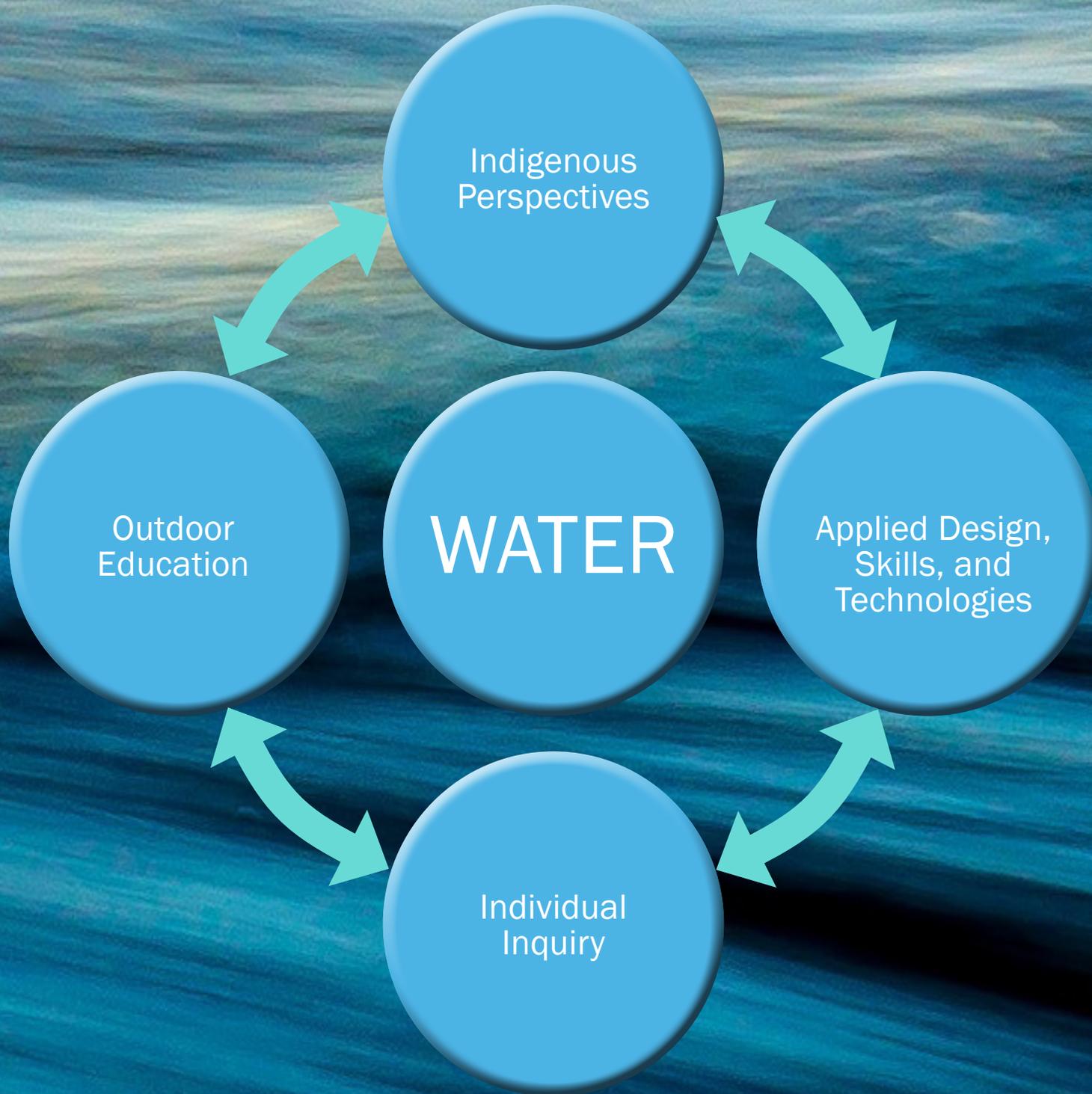


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OBJECTIVES OF “OUR RELATIONSHIP WITH WATER IN THE OKANAGAN GUIDE”

The Okanagan is Canada’s most water-stressed region, with less water available per person than anywhere in Canada. We also use two times more than the average Canadian, in part due to our hot climate and water-thirsty landscaping choices. As our climate changes and we experience more weather extremes with drought, flood and fire, and as our population continues to grow and demand for water increases, we recognize the need to build a stronger water ethic within the broader community.

At the same time, there has been a growing number of requests from teachers looking for education materials with an Okanagan focus on water issues.

This unique resource will help local educators meet curriculum guidelines, while examining the relationships between water and humans, plants, ecosystems, the water cycle, water conservation, and “the myth of abundance” of water in Okanagan lakes.

The B.C. curriculum asks teachers to support deeper learning by exploring student interests, while practicing collaboration, critical thinking, and communication. Students learn reading, writing and arithmetic

through real-world situations, and active engagement of students. The activities in this resource support project-based, hands-on learning, collaboration, and real world problem-solving in an outdoor setting around the theme of *water*.

The information also incorporates an “Okanagan perspective” for ecosystems, species at risk, and traditional knowledge. It includes resources and materials to help teachers examine the relationships between water and humans, soil, plants, ecosystems, erosion, weather, the water cycle, and water conservation and “the myth of abundance” in Okanagan Lake, as noted above.

This introduction will provide you with an overview of the context for the resources that are available in the *Our Relationship With Water in the Okanagan* guide. In addition to the curriculum-related activities in this guide, we have included several resources to delve more deeply into various aspects of teaching outdoors.

The **Okanagan Watershed and Climate Module** investigates the Okanagan watershed and how climate in the area affects the water cycle. Inherent to the

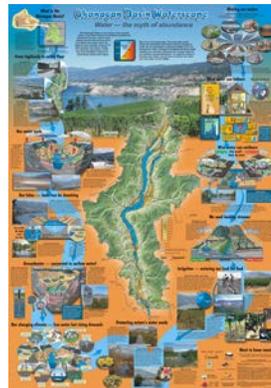
Okanagan is the *Syilx* idea of respect for the spirit of water and the interconnectedness of all things. This is related to the concept of conservation. Activities in this module address the changes being seen due to climate change and how erosion and the water cycle feed into this.

The **Building Outdoor Learning Spaces Module** is intended to assist the teachers, administrators, and parents in the Okanagan valley who are dedicated to enhancing opportunities for outdoor education at your local school. We hope this chapter will help you navigate the process of creating and enhancing outdoor learning spaces for your school. Acknowledging that each school and each space will be different, the steps in this chapter are intended to assist you in identifying and addressing key considerations at all stages of the project, from the ‘visioning’ stage, to the planning and design, installation, and long-term maintenance of the project.

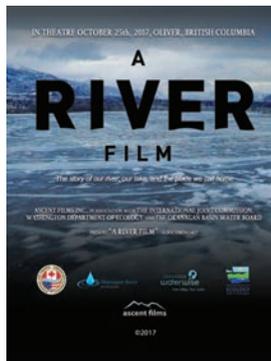
The **Syilx (Okanagan) Indigenous Knowledge and Perspectives Module** provides a collection of information that supports Okanagan teachers and educators

in enhancing Aboriginal Education in their classes. It also helps with understanding and discussion around Okanagan-specific Traditional Knowledge, culture, and history with students, especially as they undertake outdoor environmental education. This chapter outlines the highly interconnected relationship local Indigenous people share with water and the environment, and suggests a number of ways to connect with project-based outdoor learning in this context.

Finally, the **Okanagan Water Basin Curricular Concepts and Connections Module** is a larger set of lessons built upon local perspectives and issues. Educators will be able to use these lessons to fulfill many of the curricular requirements laid out in the B.C. Curriculum. As all teachers and classes are different, these lessons can be used as a set or individually. Educators can be assured that these will support their planning in multiple disciplines, or be specific to a single subject, based on their preference.



WATERSCAPE POSTER



A RIVER FILM



CLIMATE INFOGRAPHIC

We also recognize the need to be environmentally and financially sustainable with resources, so we have attempted to minimize the amount of new materials needed.

We encourage you to access a number of already available and valuable resources through the OBWB-OkWaterWise, including:

- The **Okanagan Basin Waterscape Poster** available in both French and English, and supported by “Unraveling the Myth of Abundance: A Teacher’s Guide to the Okanagan Basin Waterscape Poster.” Find this item on the Okanagan WaterWise website¹, and through the activities highlighted within “Our Relationship with Water in the Okanagan.”
- **A River Film** - an award-winning short documentary showcasing the Okanagan/Okanogan watershed.²
- **Okanagan Climate Infographic** - discover Okanagan specific climate issues and their impact on water, the challenges and the solutions.³

Another excellent water-related resource is the Okanagan Nation Alliance’s booklet, “*nsiwtkwcn* - The Language of the Water.”⁴

1 <https://okwaterwise.ca/resources.html#obwp>

2 https://www.youtube.com/watch?v=P6lzkUhDpC0&list=PLg7XjOZTdpR07eeI03jxbfE6WOMi7b4f_

3 <https://okwaterwise.ca/resources.html#infographic>

4 <https://www.sylx.org/shop/#:~:text=nsiw%C9%ACkwcn%20The%20Language%20of%20the,is%20our%20most%20sacred%20medicine>

Why Water?

Water is something everyone has experience with, and a great need for. It transcends boundaries and cultures, and species. Long-term and interdisciplinary learning benefits from being structured around a theme, and water is an excellent unifier to support learning about a wide variety of important life skills, knowledge, and social relationships.



Why Outdoor Education?

Teachers with years of experience in outdoor education have found that, when children of any age go outside, their curiosity and desire to explore will naturally lead them towards the competency goals outlined in the curriculum. Your role as teacher is to start them off with some general or provocative questions that encourage them to observe and interact with their environment; to be a facilitator, the “guide on the side, not the sage on the stage.” This role as facilitator gives you “permission” to not have all the answers, which in turn, encourages students to be comfortable with ‘not knowing,’ with asking questions, and with exploring the finding of answers.

Given time and your guidance, students will learn to observe, explore, question, and engage with their classmates and their environment. With their curiosity piqued, students may head off in unexpected learning directions, coming up with questions they didn’t know they had in them, to discover that imagining or seeking out answers to their questions can be fun. The process of asking questions, proposing answers, and/or verifying the answers, is a huge part of becoming a life-long learner. Being outside and observing nature invites a sense of wonder...wonder leads to questions...questions lead to knowledge... knowledge leads to more questions...

Outdoor Education offers many opportunities to connect in particular with the science and Indigenous studies objectives, and as a result, this guide is based mainly on B.C.’s Big Ideas, Curricular Competencies and Content for these subjects. Although not all of the B.C. Curriculum has been addressed directly in this module, we encourage teachers to find ways to connect all subjects to outdoor learning, and the importance of water. The units in this guide provide information and resources for you to work with. Connections to other subjects are also suggested throughout this guide, but the basic premise is that it is of

huge benefit to students to be taken outside and for them to be given the opportunity to explore, observe, and ask questions.

Teachers can get outdoors for any subject, and outdoor education can facilitate interdisciplinary, deep learning:

- Have students create and keep notes about their inquiry in an “Outdoor Journal.” Make observations throughout the year about something outside. Encourage students to record their thoughts, observations, and questions in the journal when discussing topics related to outside activities. Incorporate elements of the following subjects:
 - **Language Arts** – outdoor-inspired writing, holding reading time outdoors
 - **Social studies** - environmental ethics, Indigenous knowledge, culture, history, and law
 - **Math** – shapes in nature, measurements, natural patterns and outdoor examples
 - **Art** – write music, draw, sculpt, paint, collage with outdoor and natural elements
 - **Language** – learn outdoor words and conversations in French and *nsyilxcən* (language of the Syilx people)
 - **Career education** – explore outdoor career paths and skills.



- **Physical Education** – go on a hike or a run through a natural area, relate health and the body to the outdoors, and environmental health. Relate the outdoor experiences and physical activities to studies in other subjects. For example, games played outdoors can be related to math problems, and social study lessons on rules, laws, and ethics. Facts about distance or weight could be investigated by running the distance or carrying the weight.
- **Applied Design, Skills, and Technologies** – Explore what students can build with natural material found outside, and around the school. Remember to always discuss the ethics of how to use natural materials outside responsibly and sustainably. Build field observation equipment like insect traps, smartphone microscopes, field guides, safety or measuring equipment.
- **Hide or “Geocache”** quiz questions or activity instructions outside for any subject. Students work together as a class, or in small groups to find and complete the questions/activities. Students could find the geocached items using riddles, directions, number of steps, coordinates on a battleship-style grid, directions and angles using a compass, or using GPS devices.

Indian Dogbane Hemp, once common in the Okanagan, was used to make rope and was a major trade item in the Okanagan and traded for buffalo hide. Cattails, which are still seen, were used to line diapers, and make bandages, and more. A *Syilx* Knowledge Keeper or Elder can enrich your class discussion with knowledge of plants and harvesting protocols.



VOLUNTEERS HELP PARKWAY ELEMENTARY STUDENTS PLANT THE FOOD FOREST GARDEN. PENTICTON, B.C.
PHOTO COURTESY JANDI DOYLE

Food for thought from teachers who have been taking students outdoors for many years:

“It is better to know some of the questions than all of the answers.”

“I find that, if I let them, students will guide me with their inborn sense of wonder.”

“We all learn best by doing.”¹

“I used to think that encouraging curiosity in an outdoor setting would lead to chaos, students running around, out of control. But experience has taught me that, whether in the classroom or outdoors, students just need a bit of guidance and focus and, before they know it, they’ve become engaged in learning. “Meanwhile, the benefits of having students learn outside the four walls of the classroom are huge - this made overcoming the fear of chaos well worth the effort.”



¹ “This is what the traditional education system consisted of, hands-on learning, like a life-long apprenticeship.” Pamela Barnes, Sylx Knowledge Keeper

TIPS FOR SUCCESSFUL OUTDOOR EDUCATION EXPERIENCES

Knowing why you should try outdoor education is different than attempting to incorporate it into your learning experiences.

Teachers who are used to classrooms inside the school may find some challenges to setting up an outdoor learning experience.

One of the first things to remember is that as the novelty of going outside becomes more routine, regular classroom management protocols will become standard practice again for your class. Start small. One class experience outside, to work on an assignment or project, is all you need to start the journey. Let students spread out within a defined working area and walk between groups to check on progress and answer questions.

Some teachers find that it is helpful to have a class set of magnifying glasses, clipboards or hard writing surfaces, string and aquarium or butterfly nets (per group). Experienced teachers also suggest pairs, or groups of three students, work together best.

The weather may not always cooperate, and rain does happen. This does not need to be a barrier to going outside. If your students have appropriate outside clothing, don't let inclement weather stop you from being outside. Things do change and new observations can be made in the rain and snow. Just put your plans etc. in a plastic sleeve before you go out!

If you are still unsure or hesitant to try a lesson outside, consider asking for help from a district specialist, your Aboriginal department or an Elder. It is always nice to have an extra set of eyes and hands available.

Things to consider before leaving the classroom:

- ✓ A clipboard and attached pencil to keep lesson plans and assessment documentation organized and available for use during the class,
- ✓ A whistle or other auditory cue for bringing the class back together,
- ✓ A first aid kit if you are far from the office (a band aid or two is always good to have on hand, just in case),
- ✓ A set location for students to find you if dispersed,
- ✓ An awareness of your school or district guidelines for outdoor excursions,
- ✓ Things may take longer than you originally planned,
- ✓ Watching for the "Teachable Moment" opportunity.

KEY PEDAGOGY - IMPLEMENTING THE B.C. CURRICULUM

British Columbia’s Ministry of Education has redesigned the B.C. Curriculum, and asks teachers to support deeper, flexible, student-centered learning. It asks them to imagine students learning by exploring their interests and passions, while practicing collaboration, critical thinking, and communication. It asks them to imagine their classes learning reading, writing and arithmetic through real-world situations. The curriculum emphasizes concept-based learning and development of competencies that foster deeper, more transferable learning. The curriculum also focuses on the active engagement of students, since deeper learning is more likely achieved through hands-on doing rather than through passive listening or reading.

British Columbia’s curriculum has opened the door for educators to embrace a way of teaching that can be immensely rewarding for both teacher and student. We know that for many of you the approach of the curriculum is not ‘new.’ For you, this curriculum simply gives you ‘permission’ to carry on. For some of you, the

curriculum may represent an approach that feels unfamiliar, perhaps a bit daunting. We have designed this guide to support you in the implementation of its approach, with a specific focus on Okanagan content.

This guide is designed to support interconnected, deep, social learning, and integrate hands-on activities with the B.C. Curriculum. *Our Relationship with Water in the Okanagan* uses the theme of water to meet these goals, while fostering a connection to the natural environment, and inspiring a drive to learn more. The activities outlined in the following units have been designed to facilitate the learning of Curricular Competencies and Content, through hands-on activities, asking leading questions, and providing opportunities for students to explore concepts and ideas on their own. The intent of these units is to lead students to a better understanding of their relationship with water and their local environment, as they exercise their grade-level skills:

OUR RELATIONSHIP WITH WATER RESOURCE GUIDE

MAIN IDEA
Water is life, and people in the Okanagan must learn to respect water

ACTIVITIES
Support development of key concepts and competencies

Evaluate competencies through student-led-inquiry and project-based learning

BC CURRICULUM GUIDELINES

BIG IDEAS
Provided for each grade along with broad questions to engage learning

CURRICULAR LINKS
Curricular Competencies and Content

ADST GUIDELINES
Make something to innovate and demonstrate knowledge

INDIGENOUS EDUCATION PEDAGOGY

For each subject at each grade level, the B.C. Curriculum has been divided into “Big Ideas,” “Curricular Competencies” and “Content.”⁵ All areas of learning are based on a “Know-Do-Understand” model to support a concept-based competency-driven approach to learning. The Curricular Competencies are the “Do” part of this equation, and are a main focus for the activities in this guide. These skills, strategies, and processes that students are to develop over time, are grouped into categories: Questioning and Predicting; Planning and Conducting; Processing and Analyzing Data and Information; Evaluating; Applying and Innovating; and Communicating.

These Curricular Competencies categories mirror the process taken in the scientific method of inquiry, and The Spiral of Inquiry framework. The UBC Learning Exchange Trek Program and Let’s Talk Science “Scientific Methods and Research Techniques (SMaRT)” mentorship program describes the scientific method in a very simple way: **ask** a question, **read** about what others have learned already, make an educated **guess** (hypothesis) about the answer to your question, develop a way to **test** if your guess is supported, make **conclusions** from your test and decide whether to update your guess and test again. The Spiral of Inquiry involves a similar approach, structuring inquiry in stages: scanning, focusing, developing a hunch, learning, taking action, checking.⁶ These strategies can be used to guide inquiry based in areas other than science, like music, or social studies.

UBC Centre for Teaching and Academic Growth training also recommends employing the “BOPPPS Model” of lesson planning⁷, which starts with an interesting hook (bridge-in), a simple pre-test, learning objectives, participatory learning activities, post-test questions, and a summary. The pre- and post-tests assess prior knowledge and development of skills and competencies. Learning objectives provide the student with a basis of knowing what they should be able to do by the end of the lesson, how they can achieve the objective, and the standard of performance that is desired.

As a result, this guide follows a similar structure for supporting inquiry:

- Inspire the class with thought-provoking questions
- Inquire about their thoughts
- Identify their interests
- Investigate the unknown – through activities and resources in this guide, as well as the self-led study that is inspired. Teachers and students learn together
- Innovate or invent a solution to a problem
- Invite others to be involved
- Inquire again to check how much you learned and see what new questions arose.



MAKE CURRICULAR CONNECTIONS

Do you know how to inspire natural inquiry through thought-provoking questions? These callout boxes throughout the activities will suggest some questions to help you get the inquiry started.

5 <https://curriculum.gov.bc.ca/curriculum/overview>

6 <http://dx.doi.org/10.1787/9789264277274-en>

7 https://wiki.ubc.ca/Documentation:Mini-Lessons_Basics_-_BOPPPS_Model_for_Planning_Lessons

INDIGENOUS PERSPECTIVES AND CULTURE

The *Syilx* (Okanagan) people have a deep connection to the natural environment, and particularly with water. Water is sacred to *Syilx* people⁸. *Syilx* perspectives and culture around water provide core concepts about respect for the environment, sustainable living, responsibility, ethics, technology, and outdoor survival skills, which carry wide-reaching benefits to the Okanagan as a community.

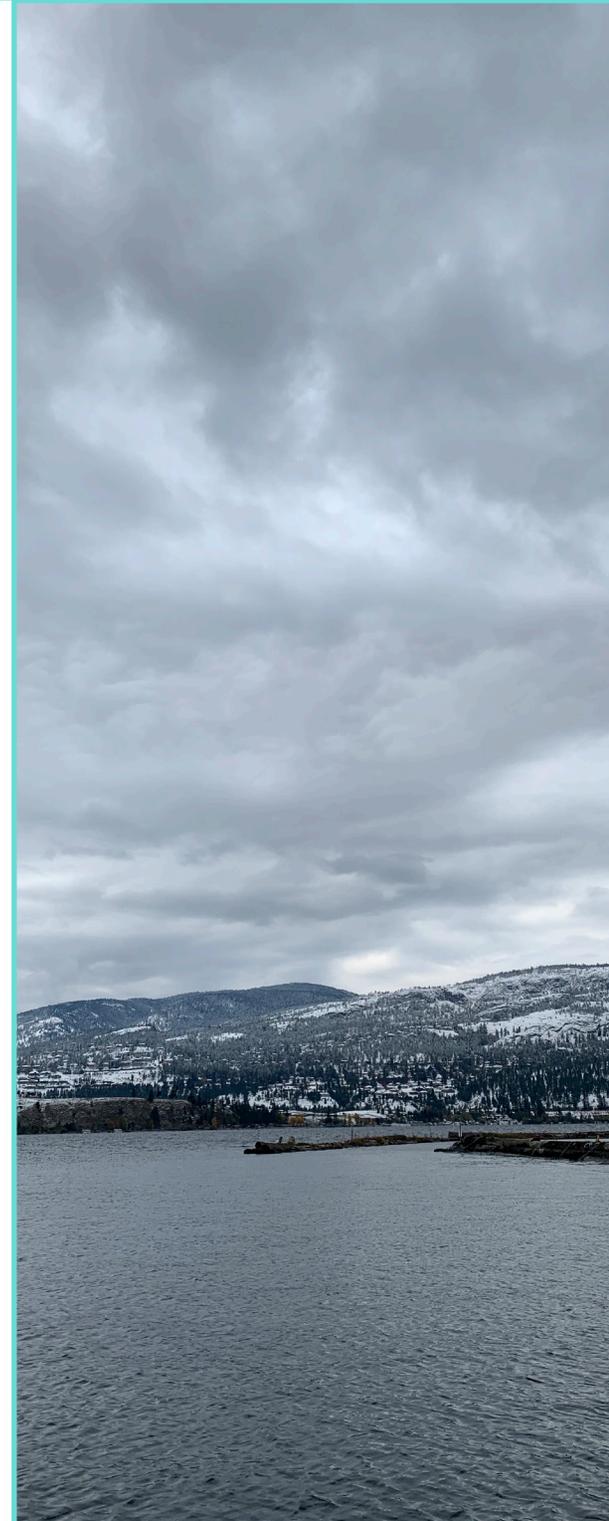
Respectfully incorporating local Indigenous perspectives and culture into learning is an essential part of the B.C. Curriculum, and a path towards reconciliation. *Our Relationship with Water in the Okanagan* includes a resource section to help Okanagan teachers connect with existing, authentic resources about local *Syilx* (Okanagan) perspectives and culture. A series of professional development workshops for local teachers was developed alongside these resources, with the help of *Syilx* Knowledge Keepers. The workshops were delivered in 2019 in each of the three Okanagan Regional Districts, and this process helped us identify some key activities that teachers can include, like learning some key vocabulary in the *Syilx* language, *nsyilxcən*, exploring published stories through art and acting, and hosting a cultural experience at the school.

THE APPLIED DESIGN, SKILLS, AND TECHNOLOGIES (ADST) CURRICULUM

Addressing the major updates in the B.C. Curriculum can be largely achieved through the Applied Design, Skills, and Technologies (ADST) curriculum guidelines. Constructing things helps students exercise their critical thinking and collaborative skills, while demonstrating their grasp of concepts and transferable knowledge. ADST objectives focus on understanding context, defining the project, ideating, prototyping, testing, making, and sharing. Student-led ADST projects could be used after group activities, to allow individual students to express their interests and expand their knowledge. These projects are also a valuable way to assess improvement in student skills and knowledge. Please review the B.C. Curriculum website for more information.⁹

8 <https://www.syilx.org/natural-resources/water/water-declaration>

9 <https://curriculum.gov.bc.ca/curriculum>



THE BIG IDEAS ASSOCIATED WITH THE ADST CURRICULUM

Kindergarten to Grade 3¹⁰

- “Designs grow out of natural curiosity
 - Ideating - Generate ideas from their experiences and interests
- Skills can be developed through play, practice, effort and action.
- Technologies are tools that extend human capabilities.
 - Explore the use of simple, available tools and technologies to extend their capabilities.”

Note: An example may be traditional dye making with plants, stone/earth.

Grade 4-5¹¹

- “Designs can be improved with prototyping and testing.
- Skills are developed through practice, effort, and action.
- The choice of technology and tools depends on the task.

- Determine whether their product meets the objective and contributes to the individual, family, community, and/or environment.”

Note: There is a difference between needs and wants. *Syilx* philosophy and values consider the impact our decisions will have on seven generations into the future. As such, one may ask: “Do any of my everyday decisions impact the future of water in the Okanagan?”

Note: The choice of technology and tools can also depend on the availability of required materials.

Grade 6-7¹²

- “Design can be responsive to identified needs.
 - Identify the personal, social, and environmental impacts, including unintended negative consequences, of the choices they make about technology use
- Complex tasks require the acquisition of additional skills.

- Complex tasks may require multiple tools and technologies.
 - Identify how the land, natural resources, and culture influence the development and use of tools and technologies.”

Note: Ownership is a European concept. The *Syilx* concept is that we borrow. For example, if I own my necklace, I can sell it, trade or throw it away. But if its borrowed I can't sell, trade or give it away. I'm expected to look after it to the best of my ability and return it in as good, if not better, condition than when I received it. Traditional *Syilx* values instill a profound responsibility to care for the environment and future generations.

Note: *Captikwł* are creation stories and the source of *Syilx* laws. The *captikwł* of “How Food was Given” speaks to how plant and animals can live without humans but we cannot live without them. Find a video-telling of this story at https://youtu.be/wfF-XR_DxJw.

10 <https://curriculum.gov.bc.ca/curriculum/adst/k>

11 <https://curriculum.gov.bc.ca/curriculum/adst/4>

12 <https://curriculum.gov.bc.ca/curriculum/adst/6>

LEARNING PRINCIPLES FOR INNOVATIVE LEARNING ENVIRONMENTS

The Organisation for Economic Co-operation and Development (OECD) provides tools to evaluate novel learning environments.¹³

They recommend that Innovative Learning Environments:

- allow individual learners to have a voice in determining their learning challenges
 - be flexible, to support a variety of individual strengths, interests, and prior knowledge
 - maintain structure and clear expectations for learning
 - use formative assessment tools like the Spiral of Inquiry or learning logs to provide feedback and ensure each student is challenged at the right level
- involve a variety of perceptions, perspectives, teachers, and locations
 - include discussion boards and other platforms to support collaborative and social learning
 - work to enhance the interconnectedness across disciplines, with other classes, and the wider community (other primary students, secondary and university student mentors, partner classes or teachers, other schools, parents, First Nation Elders, community experts, and other learning centres like museums and nature centres)

13 <http://dx.doi.org/10.1787/9789264277274-en>



GREAT BASIN SPADEFOOT.
PHOTO COURTESY MICHAEL BEZENER

CONSIDERING MINDSETS

Student-driven learning can be met with resistance at first, but establishing positive mindsets can help. Carol Dweck, Professor of Psychology at Stanford University, has researched the importance of mindset in success:

“In a fixed mindset, people believe their basic qualities, like their intelligence or talent, are simply fixed traits. They spend their time documenting their intelligence or talent instead of developing them. They also believe that talent alone creates success—without effort. They’re wrong.

“In a growth mindset, people believe that their most basic abilities can be developed through dedication and hard work—brains and talent are just the starting point. This view creates a love of learning and a resilience that is essential for great accomplishment. Virtually all great people have had these qualities.”¹⁴

Reinforcing a growth mindset:

- “It may be hard, and you may not be sure you can do it now, but I think you can learn to do it with time and effort.”
- “I like how you keep trying.”
- “What is your favorite way to connect to this problem?”
- “Remember, you can always try again. Would you like to hear some suggestions that may help you get the result you want?”
- Praise the effort rather than focusing on how “smart” a student is: “I am smart, the kids’ reasoning goes; I don’t need to put out effort. Expending effort becomes stigmatized—it’s public proof that you can’t cut it on your natural gifts.”¹⁵

Another powerful aspect of considering mindsets is acknowledging unique perspectives, and taking time to bring different points of view to each problem. For example, invite the students to think about water conservation like a scientist, geologist, orchardist, ATV rider, artist, mathematician, a plant or animal, etc. This kind of exercise can help lead students to a deeper understanding of concepts like understanding conservation is not just about saving humans, or a rare species, it is about preserving the ecosystem.

14 <https://www.edglossary.org/growth-mindset/#:~:text=According%20to%20Dweck%2C%20%E2%80%9CIn%20a,talent%20instead%20of%20developing%20them>

15 <http://nymag.com/news/features/27840/index2.html>

Activity:

A Circular Garden

ADAPTED FROM THE B.C. AGRICULTURE IN THE CLASSROOM ACTIVITY,
PRESENTED AT A FEB. 22, 2019 PRO-D DAY WORKSHOP IN KELOWNA.

Grades: 3-8



ADST: Design can be responsive to identified needs.



BC Curriculum Core Competency:

Communication



Science:

Living things are diverse, can be grouped and interact in their ecosystems.

Curricular Competencies

- Science 3-7 (adaptable 2-9):
 - Experience and interpret the local environment
 - Identify First Peoples perspectives and knowledge as sources of information
- ADST 3-8 (adaptable 2-12)
 - Generate potential ideas and add to others' ideas
 - Evaluate their product against their criteria and explain how it contributes to the individual, family, community, and/or environment.

MATERIALS

- Blackline Master (BLM)
- Scissors

What to do:

- Explore Traditional Knowledge and memory in an oral culture and the effects climate change has on this.
 - In the *Syilx* oral tradition, information is remembered and passed along in *captikwł* (creation stories that hold *Syilx* natural laws) and in the seasonal calendar.
 - Environmental events are linked together in memory. For example, sunflowers blooming is linked to the time of coyote puppies. The time of the *siya?* (Saskatoon) bushes blooming tells the people when Rainbow Trout are starting to come up Mission Creek.
 - The *Syilx* know that the climate has always been changing, impacting life cycles and the environment. However, these changes were slow. Under current - extreme and rapid - climate change, it will require *Syilx* Traditional Ecological Knowledge (TEK) to find solutions to adapt.
 - What happens if the *siya?* berries start to ripen much earlier than the fish appear? What happens if less precipitation falls at a certain time of year? These events start to become mismatched and no longer coincide. If the *siya?* start to ripen earlier

then it will be up to *Syilx* TEK and Elders to decide the new indicators.

- Invite a *Syilx* member from one of the local bands in your area to share knowledge around plants and the interconnection between the seasons.
- Lay out the circular garden on page 21 in a garden, or temporarily on a grass field. Cut up a copy of the circle into puzzle-like pieces and distribute pieces to students. Have the students recreate the circle based on the shape and clues on their piece, allowing them to refer to the Blackline Master (BLM) chart on page 20, as needed.
- Have them stand in the correct quadrant of the wheel and move if necessary as you discuss how climate change could affect the seasonal cycles of water and temperature, and the seasonal life cycles of fish, insects, plants, other animals, and other cycles.
- Using Design Thinking, plan a workable garden based on the teachings / orientation of the circular garden.
- Estimate the amount of space needed and how to plant to optimize the yield.



MAKE CURRICULAR CONNECTIONS

Mathematics: What proportion or percentage of the garden will be used for what crop? What will the harvesting timeline look like?

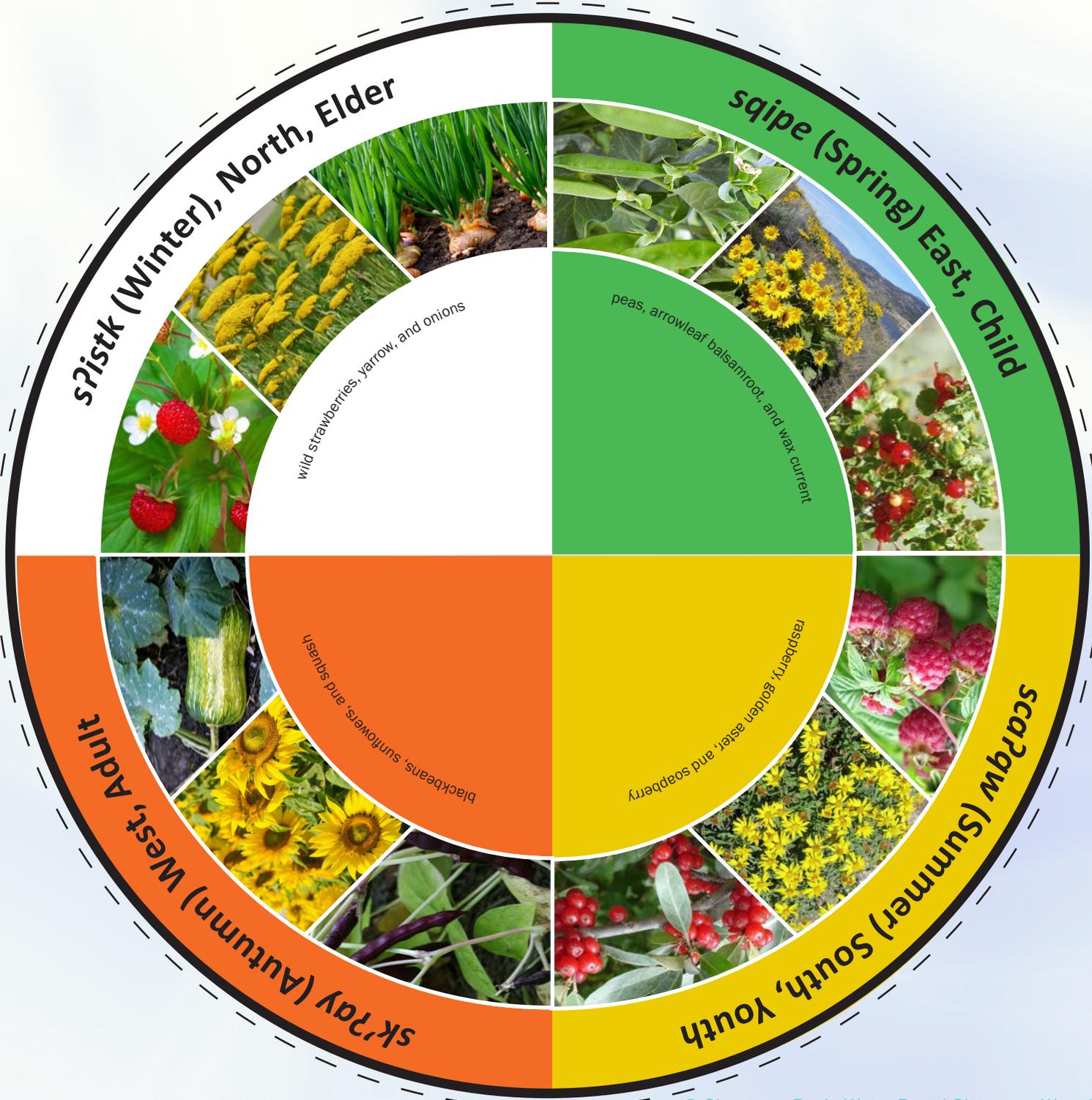
- Explain how the crops will be used and shared.
- Build a round garden highlighting and representing the four directions, the colours, and the seasons of a circular garden.

BLACKLINE MASTER: CIRCULAR GARDEN PLANTS AND PLANTING

Notice how the colours of the chart follow the colours of the circular garden wheel on page 21. Each section is related to a direction, a season, and a life stage. Each section has plants that grow and are harvested at the same time in the cycle.

The following list of plants is suited for this activity in the Okanagan. Both native Okanagan flowering plants, and agricultural relatives of wild North American food plants are listed:

<i>nsyilxcən</i> seasons	<i>sʔistk</i> (Winter) North, Elder	<i>sqipe</i> (Spring) East, Child	<i>scaʔqw</i> (Summer) South, Youth	<i>skʔay</i> (Autumn) West, Adult
Plant list for a circular garden	wild strawberries (<i>Fragaria virginiana</i> or <i>F. vesca</i>), parsnips, garlic, onions, leeks, cauliflower, kale, yarrow, old man's whiskers (<i>Geum triflorum</i>) pussytoes (<i>Antennaria umbrinella</i> , <i>A. dimorpha</i> or <i>A. howellii</i>)	peas, fava beans, spinach, celery, Oregon grape (<i>Mahonia aquifolium</i>), Desert parsley (<i>Lomatium macrocarpum</i> or <i>L. geyerii</i>), yellow bell (<i>Fritillaria pudica</i>) chocolate lily (<i>Fritillaria affinis</i>), spring beauty (<i>Claytonia lanceolata</i>), wax currant (<i>Ribes cereum</i>), willow, Douglas maple, bunchgrass (bluebunch wheatgrass, rough fescue) arrow-leaved balsamroot (<i>Balsamorhiza sagittata</i>)	raspberry, red hopi dye amaranth, Saskatoon (<i>Amelanchier alnifolia</i>), hawthorn (<i>Crataegus douglasii</i>), soapberry (<i>Shepherdia canadensis</i>), choke cherry, wild rose (Nootka or Woods rose), blanketflower (<i>Gaillardia aristata</i>), golden aster (<i>Heterotheca villosa</i>), bear-berry (aka, kinnickinnick; <i>Arctostaphylos uva-ursi</i>)	sunflowers (black seeds), Dakota black popping corn, black beans, squash (completes the 3 sisters garden), blue elderberries (<i>Sambucas cerulea</i> ; black elderberries more commonly available, but not native to Okanagan; Note: stems and seeds are toxic, but flowers and cooked berries are edible)



Activity:

Observation of a Decaying Log

Grades: K-3



BC Curriculum Core Competency:

Thinking



Science:

Living things have life cycles adapted to their environment.

Curricular Competencies

- Demonstrate curiosity and a sense of wonder about the world
- Observe objects and events in familiar contexts
- Ask simple questions about familiar objects and events
- Discuss observations
- Communicate observations and ideas using oral or written language, drawing, or role-play
- Collect simple data

Materials:

- Large durable plastic boxes with tight fitting lids (transparent, if possible)
- Magnifying glasses
- Decaying log or part of a tree stump—preferably with evidence of insect activity
- Paper and pencils to make drawings and write questions and observations

What to do:

- Take a decaying log/stump and place it in the plastic box. Include some of the natural elements that were under and around the log.
- It may be helpful to pull the log apart in places so that your students can see the interior more easily. This may also expose more insect activity and signs of decomposition.
- Simply place the box on a table and allow students time to observe the log and the other contents of the box. Encourage students to write about and draw what they see. Post a large piece of chart paper where students can write down their inquiry questions and pose ideas.
- For an extension to this activity, you may wish to store the box for a month or two and then return to it. How did the log change?



- When not in use, close the lid tightly to keep any insects inside the box. Some small airholes in the lid are suggested.
- Return the decaying log to the spot it was taken when finished.

Activity:

Exploring Leaves

Grades: K-3



BC Curriculum Core Competency:

Thinking



Science:

Living things have features that help them survive in their environment.

Curricular Competencies

- Demonstrate curiosity and a sense of wonder about the world
- Observe objects and events in familiar contexts
- Ask simple questions about familiar objects and events
- Discuss observations
- Communicate observations and ideas using oral or written language, drawing, or role-play
- Collect simple data

Materials:

- Reused plastic bags or containers
- Access to the outdoors and plants

What to do:

- Working in small groups of 2-3, take students outside to look for examples of different kinds of leaves. Remind students to collect only one leaf at a time and to be respectful to all of the plants by not damaging them.
- Return to the classroom and look at the leaf collections.
 - How many different kinds of leaves are there?
 - What are the shapes of leaves?
 - What do the leaves feel like? Are they sharp? Soft?
 - What do the leaves look like up close?
 - Can you identify the plant/tree? Is it native or introduced to the area? Have students look at how introduced species affect biodiversity. As a start, more information can be found at <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species>.
- Encourage the students to observe the leaves closely and to make labeled drawings.
- Extend the activity by having students compare their leaves.
- Consider the uses of the different plants. (e.g. Maple has traditionally been used to smoke and preserve meat, to make syrup, and the wood is used to make arrows. Poplar and birch have also been used to make syrup. Medicinal teas are made with spruce, pine and fir. Various tree saps are used for food, medicine, and glue. Saskatoon is used for making bows and syrup, Oregon grape for dye, Rose Hips for food and medicine, Cottonwood and Birch is used for making dugout canoes, and more.)
 - How would students classify or group their leaves? For example, long leaves and short leaves, brittle versus supple, thick or thin? Even the different shades of green or the internal leaf structures like veins, are different from leaf to leaf.
 - What will your students observe?



Activity:

Photosynthesis in a Jar

Grades: 4-7



BC Curriculum Core Competency:

Thinking



Science:

Multicellular organisms rely on internal systems to survive, reproduce, and interact with their environment.

Curricular Competencies

- Demonstrate a sustained curiosity about a scientific topic or problem of interest
- Make predictions about the findings of their inquiry
- With support, plan appropriate investigations to answer their questions or solve problems they have identified
- Identify patterns and connections in data
- Communicate ideas, explanations, and processes in a variety of ways

Materials:

- 2 large glass jars with lid
- Aquatic plants (for use in aquariums)
- Water from a natural source
- Water from the tap

What to do:

- Take the plants and place them in the jars. Cover with water, one from a natural source and the other with tap water, and close with the lid. Set the jars in a sunny spot.
- Let students observe the jars many times over the next few days. What changes do they see? What does the plant look like on day one? On day three? Make observations in a booklet or lab style report.
- Investigate photosynthesis.
 - How do plants make their “food”?
 - What are the steps in photosynthesis?
 - How does it work?



PHOTO COURTESY GROWSOMEGOOD.ORG

- Small bubbles of oxygen should appear on the leaves as a by-product of photosynthesis. What is causing these bubbles? How do we know that the bubbles contain oxygen?
- Did one jar produce more bubbles than the other? Hypothesize why this occurred.

Activity:

Sensory Walk

Grades: K-5



BC Curriculum Core Competency:

Communication



Science:

Living things have features that help them survive in their environment.

Curricular Competencies

- Demonstrate curiosity and a sense of wonder about the world
- Observe objects and events in familiar contexts
- Ask simple questions about familiar objects and events
- Make observations about living and non-living things in the local environment
- Discuss observations
- Communicate observations and ideas using oral or written language, drawing, or role-play
- Collect simple data

Materials:

- Access to the outdoors (e.g. playground, local park, nature trail, beach)
- Small notebooks, such as Nature Journals, and pencils
- Tarps or plastic bags to sit on

What to do:

- Review the five senses (sight, touch, hearing, smell, and taste). Take your students outside for a sensory walk.
- Start first with sight. Have the students choose a specific part of nature to observe. It could be the bark of a tree, watching a line of ants walk across the path, buttercups in the grass—anything the student chooses. Have them sit or kneel to observe closely. Encourage students to be silent during this time. Wait two to five minutes and then ask students to draw and/or write about what they saw.
- Have the students choose a different natural element. This time, they are to close their eyes and use only their sense of touch to explore this object. Perhaps they are touching the petals of a dandelion or the moss on a rock, the choice is up to them. Have them sit or kneel and to observe closely. As before, wait two minutes and then ask students to write words in their Nature Journals that describe how their object felt.
- Have the students choose an area and then sit on their tarp/plastic bag. Once everyone is seated and comfortable, instruct the students to sit completely still with their eyes closed so that they can listen. Spend two to five minutes sitting like this; listening to the natural world around. What sounds did they hear? Were there natural sounds? Animal sounds? Human and machine sounds? As before, students write about their feelings and impressions in their Nature Journals.
- Students choose something outside to smell. It could be something that they think has no scent or something that would smell beautiful or stink. Ask the students to smell the object. What does it smell like? For example, cut grass has a scent that many find very



- appealing. What about uncut grass? Does it have a scent? What does the earth smell like when rubbed between your fingers? Spend three to five minutes exploring the scents of things outside. Students can write about the experience in their Nature Journals.
- It is not advisable for students to go out and taste plants etc., therefore, to conclude the activity you may wish to bring students back as a large group to sit on their tarp/bags to enjoy a snack together outside. What ingredients of the snacks can be grown in the Okanagan valley? What can students grow at home?

OUR RELATIONSHIP WITH
WATER
in the
OKANAGAN

OKANAGAN 
waterwise

One valley. One water.