

CONNECTED BY WATER

INTERMEDIATE INQUIRY UNIT
GRADES 4 – 7

Comox Lake Watershed Protection and Water Conservation

FOR MORE INFORMATION, VISIT:
WWW.COMOXVALLEYRD.CA/WATERSHED

 **Comox Valley**
REGIONAL DISTRICT

The Connected by Water Inquiry Units teach students the importance of preserving our watersheds and conserving water.

High quality drinking water is produced by a healthy, properly functioning ecosystem. To have healthy water you need healthy ecosystems. Protecting our drinking water requires two important things - conserving it and protecting the source. The Comox Valley Regional District (CVRD) has developed these materials to support students in learning about their connections to the Comox Lake watershed, learning what makes a watershed healthy, and learning how to conserve water by using it efficiently at home. Our watershed is the entire area of land in which our drinking water flows, including streams, rivers, lakes, groundwater and shorelines. See www.comoxvalleyrd.ca/watershed for a more detail about the Comox Lake watershed.

The following resources are informed by the Watershed Protection Plan, and the Connected by Water project vision, all within the framework of the British Columbia Ministry of Education Curriculum. They are designed to support answering the driving question: What allows me to have safe water that I can drink?

An additional Connected by Water inquiry unit is available for primary grades (Kindergarten – Grade 3).

More information is available at www.comoxvalleyrd.ca/watershed/teacherresources

Optional learning kits are available at the SD71 Learning Resource Centre.

The project team would like to thank School District #71's Learning Resource Centre, Indigenous Education Team, Director of Instructional Services Geoff Manning, as well as the long list of local environmental educators listed in the Additional Resources appendix 6. These educators including SD#71 teachers provided feedback and tested the materials. The Comox Valley Regional District provided funding and project direction.

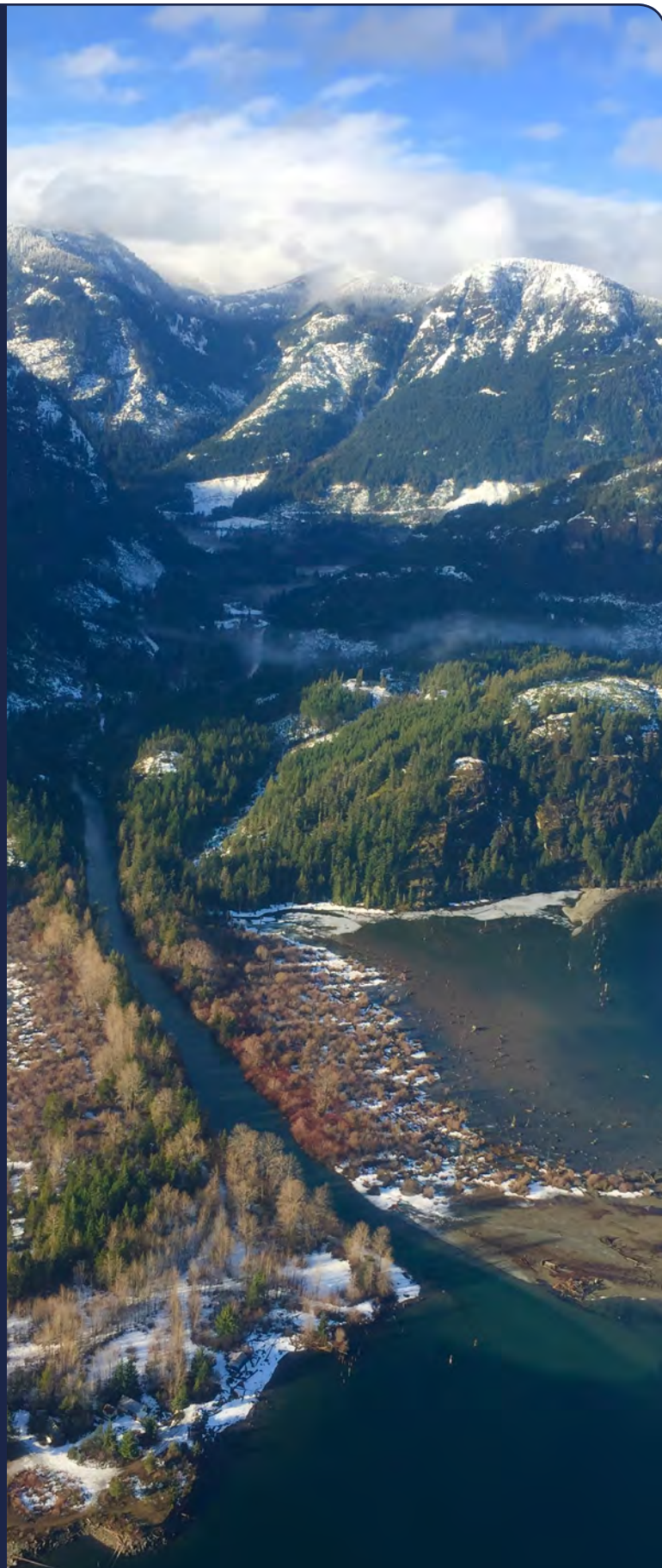
These materials were developed by Christina (Tina) Willard-Stepan and Angela Holmes, Curriculum Development and Delivery Team of Connected By Water.

Together we are creating a legacy of acting together to ensure the health and long-term viability of our communities through using our drinking water wisely and protecting the source of our drinking water.

We respectfully acknowledge that we live, work, learn and play on the unceded traditional territory of the K'omoks First Nation.

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Introduction to Educators

HOW TO USE THIS INQUIRY UNIT

Welcome to the Connected by Water Teacher Resource!

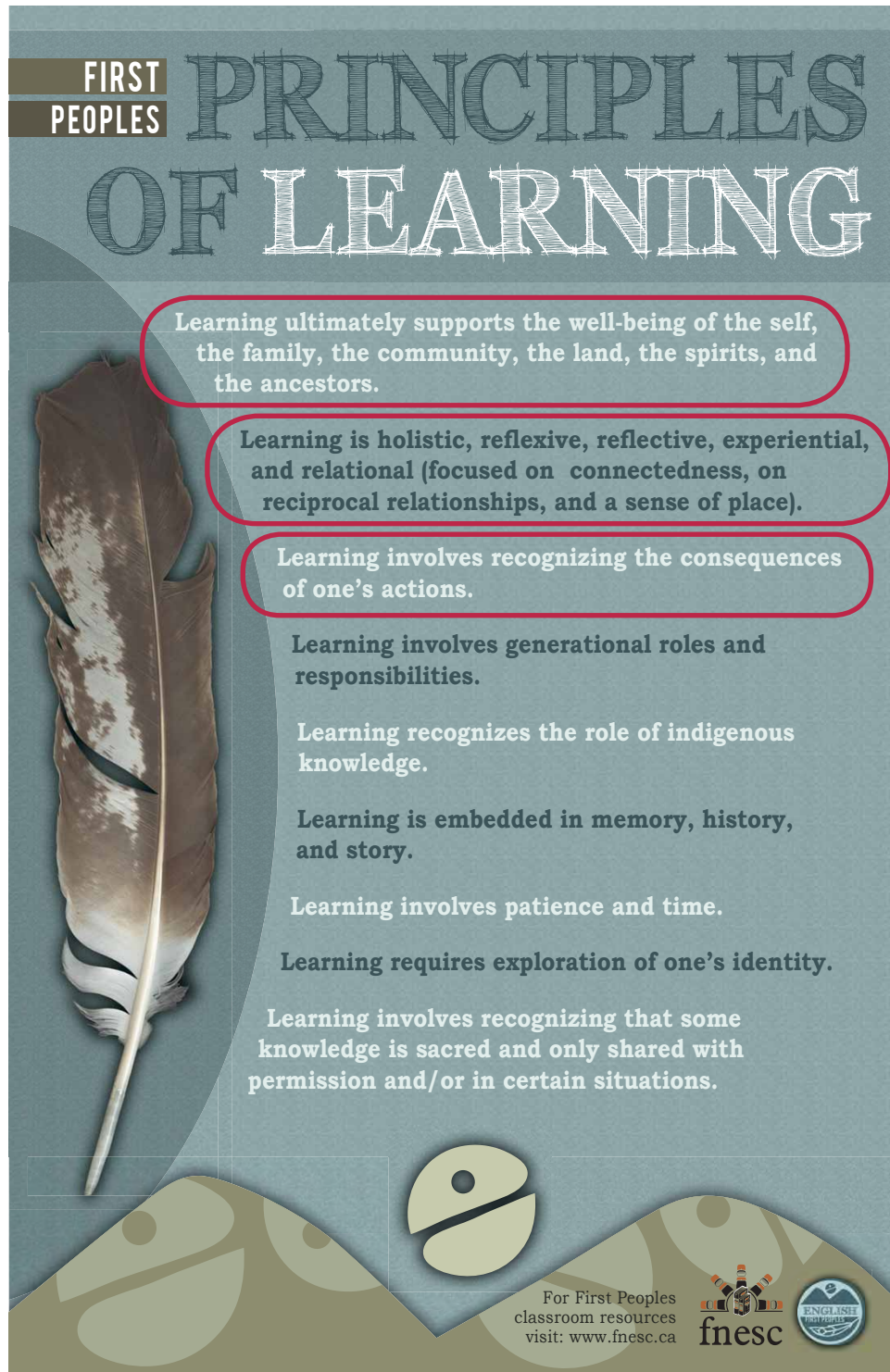
This Inquiry Unit can be used in its entirety, or the activities within the unit can stand alone. The end of this Inquiry Unit includes a very robust list of additional links and resources connecting you to many ideas and projects in the community including options for field trips.

Consider integrating the unit while your schools is working on themes such as sustainability, Earth Day, or social responsibility.

These materials can be downloaded, and there are also physical inquiry kits available to book for School District #71 teachers at the Learning Resource Centre, which include copies of the books referred to within the lessons, as well as other supporting materials. There is both a primary inquiry kit and an intermediate inquiry kit.

www.comoxvalleyrd.ca/watershed/teacherresources

The Connected by Water Inquiry Unit is most aligned with the three circled First Peoples Principles of Learning.



FIRST PEOPLES PRINCIPLES OF LEARNING

Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors.

Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place).

Learning involves recognizing the consequences of one's actions.

Learning involves generational roles and responsibilities.

Learning recognizes the role of indigenous knowledge.

Learning is embedded in memory, history, and story.

Learning involves patience and time.

Learning requires exploration of one's identity.

Learning involves recognizing that some knowledge is sacred and only shared with permission and/or in certain situations.

For First Peoples classroom resources visit: www.fnesc.ca

fnesc

ENGLISH FIRST PEOPLES



This Inquiry Unit and British Columbia's Curriculum

CORE COMPETENCIES

The BC Ministry of Education explains that Core Competencies, literacy and numeracy, and essential concepts and content are the foundations of the curriculum. Students will know, do and understand “Big Ideas” and what to do with this knowledge as they move from Kindergarten to Grade 12. Core competencies are sets of intellectual, personal, and social proficiencies that all students need to develop in order to engage in deep learning and lifelong learning.

Watch this video for a refresher on the Core Competencies: <https://youtu.be/uP4ndQ5ckoY>

An aim of the Connected by Water Inquiry Units is to teach students the importance of preserving our watersheds and conserving water. Tying the inquiry units to the core competencies allows students to gain an awareness and understanding of their watershed, take action to conserve and protect their watershed, and learn to use drinking water wisely. Listed below are some of the core competencies and curricular connections that are interwoven and interrelated in the Connected by Water Inquiry Units.

CORE COMPETENCIES



CRITICAL THINKING

I can analyze evidence from different perspectives

PERSONAL AWARENESS AND RESPONSIBILITY

I can imagine and work towards change in myself and the world

SOCIAL RESPONSIBILITY

Contributing to community and caring for the environment

I contribute to group activities that make my classroom, school, community, or natural world a better place.

I can identify how my actions and the actions of others affect my community and the natural environment and can work to make positive change.

I can analyze complex social or environmental issues from multiple perspectives. I can take thoughtful actions to influence positive, sustainable change.

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

This Inquiry Unit and British Columbia's Curriculum

SCIENCE

GRADE 5	
BIG IDEA	Multicellular organisms have organ systems that enable them to survive and interact within their environment.
CURRICULAR COMPETENCIES	<p>Questioning and Predicting</p> <ul style="list-style-type: none"> • Make observations in familiar or unfamiliar contexts • Make predictions about the findings of their inquiry <p>Planning and Conducting</p> <ul style="list-style-type: none"> • Observe, measure and record data using appropriate tools <p>Processing and analysing data and information</p> <ul style="list-style-type: none"> • Identify patterns and connections in data <p>Applying and Innovating</p> <ul style="list-style-type: none"> • Cooperatively design projects
GRADE 6	
BIG IDEA	Multicellular organisms rely on internal systems to survive, reproduce, and interact with their environment.
CURRICULAR COMPETENCIES	<p>Questioning and Predicting</p> <ul style="list-style-type: none"> • Identify questions to answer or problems to solve through scientific inquiry <p>Planning and Conducting</p> <ul style="list-style-type: none"> • Observe, measure and record data using appropriate tools including digital technologies <p>Processing and Analysing Data and Information</p> <ul style="list-style-type: none"> • Identify patterns and connections in data <p>Evaluating</p> <ul style="list-style-type: none"> • Identify some of the social, ethical, and environmental implications of the findings from their own and others' investigations <p>Applying and Innovating</p> <ul style="list-style-type: none"> • Transfer and apply learning to new situations <p>Communicating</p> <ul style="list-style-type: none"> • Express and reflect on personal, shared or other's experience of place
GRADE 7	
BIG IDEA	Earth and its climate has changed over geological time.
CURRICULAR COMPETENCIES	<ul style="list-style-type: none"> • Processing and analyzing data and information • Construct and use a range of methods to represent patterns or relationships in data, including tables, graphs, keys, models, and digital technologies as appropriate <p>Evaluating</p> <ul style="list-style-type: none"> • Consider social, ethical, and environmental implications of the findings from their own and others' investigations <p>Communicating</p> <ul style="list-style-type: none"> • Communicate ideas, findings, and solutions to problems, using scientific language, representations, and digital technologies as appropriate

This Inquiry Unit and British Columbia's Curriculum

ENGLISH LANGUAGE ARTS

GRADE 4	
BIG IDEA	Exploring stories and other texts helps us understand ourselves and make connections to others and to the world.
CURRICULAR COMPETENCIES	<p>Comprehend and Connect (reading, listening, viewing)</p> <ul style="list-style-type: none"> • Access and integrate information and ideas from a variety of sources and from prior knowledge to build understanding • Apply a variety of thinking skills to gain meaning from texts <p>Create and Communicate (writing, speaking, representing)</p> <ul style="list-style-type: none"> • Exchange ideas and perspectives to build shared understanding • Use language in creative and playful ways to develop style
GRADE 5	
BIG IDEA	Language and text can be a source of creativity and joy.
CURRICULAR COMPETENCIES	<p>Comprehend and Connect (reading, listening, viewing)</p> <ul style="list-style-type: none"> • Respond to text in personal and creative ways • Recognize how literary elements, techniques, and devices enhance meaning in texts <p>Create and Communicate (writing, speaking, representing)</p> <ul style="list-style-type: none"> • Use language in creative and playful ways to develop style • Develop and apply expanding word knowledge
GRADE 6	
BIG IDEA	Developing our understanding of how language works allows us to use it purposefully.
CURRICULAR COMPETENCIES	<p>Comprehend and Connect (reading, listening, viewing)</p> <ul style="list-style-type: none"> • Access information and ideas for diverse purposes and from a variety of sources and evaluate their relevance, accuracy, and reliability • Recognize and appreciate the role of story, narrative, and oral tradition in expressing First Peoples perspectives, values, beliefs, and points of view
GRADE 7	
BIG IDEA	Developing our understanding of how language works allows us to use it purposefully.
CURRICULAR COMPETENCIES	<p>Comprehend and Connect (reading, listening, viewing)</p> <ul style="list-style-type: none"> • Exchange ideas and viewpoints to build shared understanding and extend thinking

This Inquiry Unit and British Columbia's Curriculum

SOCIAL STUDIES – GLOBAL ISSUES AND GOVERNANCE

GRADE 6	
BIG IDEA	Complex global problems require international co-operation to make difficult choices for the future.
CURRICULAR COMPETENCIES	Differentiate between short- and long-term causes, and intended and unintended consequences, of events, decisions, or developments (cause and consequence) Take stakeholders' perspectives on issues, developments, or events by making inferences about their beliefs, values, and motivations (perspective)

MATHEMATICS

GRADE 6	
BIG IDEA	Data represented in graphs can be used to show many-to-one correspondence.
CURRICULAR COMPETENCIES	Reasoning and analyzing <ul style="list-style-type: none">• Model mathematics in contextualized experiences Understanding and solving <ul style="list-style-type: none">• Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving Communicating and representing <ul style="list-style-type: none">• Represent mathematical ideas in concrete, pictorial, and symbolic forms Connecting and reflecting <ul style="list-style-type: none">• Connect mathematical concepts to each other and to other areas of personal interests

Introduction to the Inquiry

An inquiry unit is often launched with an invitation or a provocation. Students' questions about the phenomenon they are experiencing through their senses are placed at the center of the learning.

In our rainy "wet coast" we seem to have lots of water. It is hard to imagine that the truth is we do not. If all the water on Earth is connected by the water cycle, we essentially have one big shared source of water. Every living organism on the planet needs water. That is a lot of life to support!

All water on earth is connected - let's call it a global well. This global well includes oceans, icecaps and glaciers, groundwater, lakes, inland saltwater seas, moisture in the soil, water in the atmosphere and rivers. This global well feeds our local Comox Lake watershed, and all other watersheds/water sources that all people, plants and animals use for daily activity and their survival.

Driving question: What allows me to have safe water that I can drink?



Launching The Inquiry

These First Nations stories takes a very broad perspective on the importance of water and how it connects us. The first is an origin story of how British Columbia came to be, and the second focusses on a more local landmark – the Comox Glacier.

ACTIVITY: THE CREATION STORY



First Nations Creation Stories include water and flood elements. Please read the recommended local creation story – **In the Beginning, There was the First World**.

In the Beginning, There was the First World by Jim Gilbert, Ron Stacy and Wedlidi Speck. It has a beautifully illustrated Pacific Northwest Coast creation story. You can find it in the Connected by Water Inquiry Unit kit from SD#71, Comox Valley Learning Resource Center, I-Hos Gallery in Courtenay, BC or order online through ravenpublishing.com – ISBN 0-9692979-5-5

Observing and Supporting Learning

Prompting Questions for Inquiry:

- How is water used to take care of the universe?
- How is water used to take care of your own garden?
- What local animals are Myth People in this story, who lives in the ocean?

Launching The Inquiry

ACTIVITY: THE LEGEND OF QUENEESH



Read aloud the Local K'omoks Nation Legend of Queneesh with the class (see Appendix 1) or show the student-made video of the storytelling from this link:

<http://www3.sd71.bc.ca/School/abed/resources/teacher/Pages/LegendofQueneesh.aspx>

Observing and Supporting Learning

Prompting Questions for Inquiry:

- What do you know about the Comox Glacier?
- How is water important in the K'omoks Nation?
- How do they use resources from the watershed to help them?



What allows me to have safe water that I can drink?



ACTIVITY: **DRIVING QUESTION**

Show this picture of water faucet.

Place a clear glass of water at the front of the class.

Observing and Supporting Learning

Prompting Questions for Inquiry:

What are you thinking? Noticing? Wondering?

Launching The Inquiry

ACTIVITY:

INTRODUCTION TO LOCAL WATER

When it rains all the time it might seem like we have a lot of drinking water but:

- Water on Earth is composed of only 2.5% fresh water.
- Only 1% of that is easily accessible for drinking.
- Comox Lake is approximately 61 meters deep in the winter months but we can only access the first 4.5 meters of the lake for our drinking water.
- The population of the Comox Valley is growing quickly.
- The climate is warming and droughts are becoming more common.

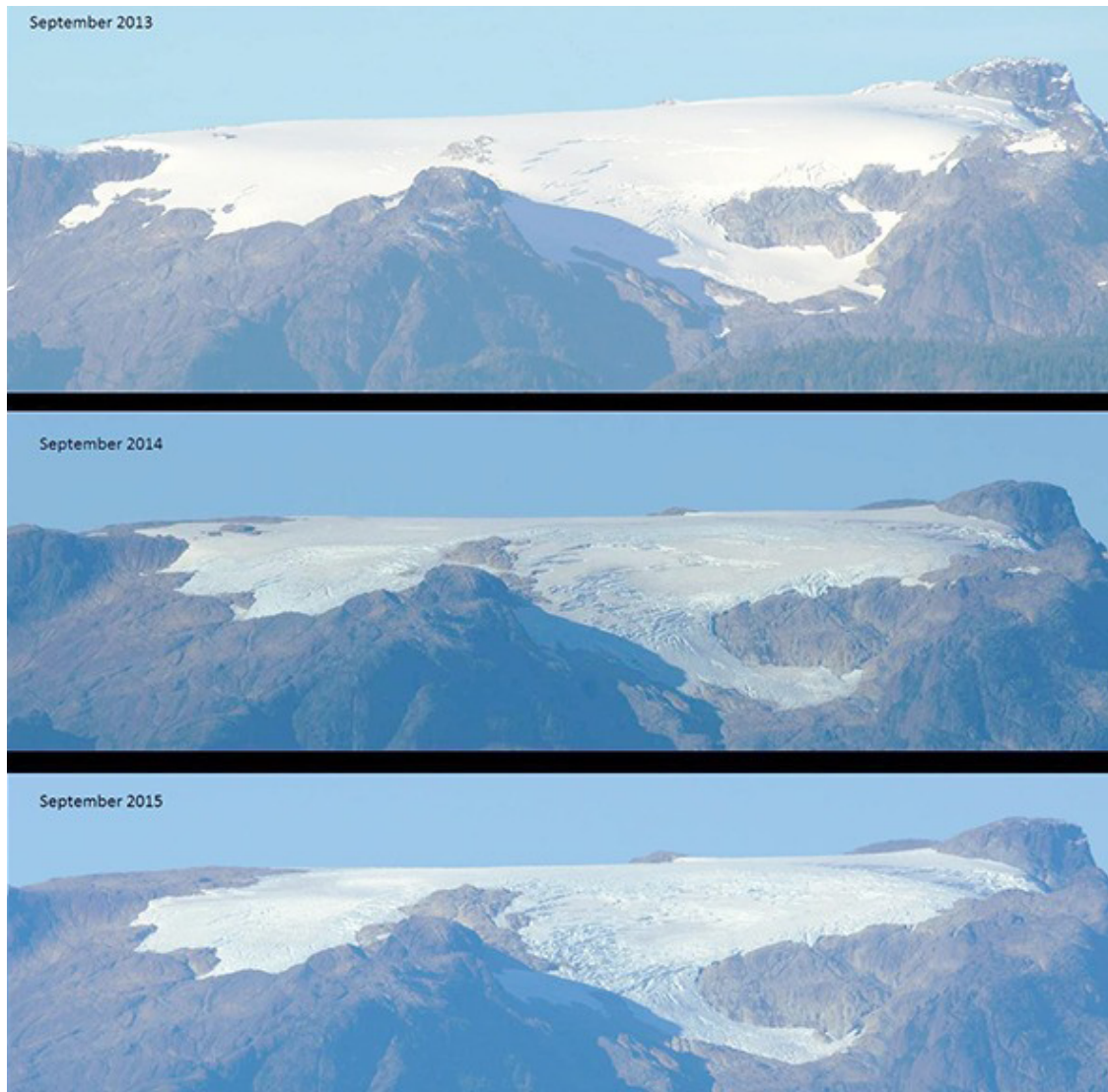
We need to find a balance between the demand for water and the amount of water that is available to us.

It is easy to take our water supply for granted because we seem to have so much water. Our forests are rainforests and Vancouver Island is thought to be the “wet” coast. In the summer months, consumption of water triples in the Comox Valley. As the population in the Comox Valley increases so will the demand on our fresh water. High quality drinking water is produced by a healthy, properly functioning ecosystem. Protecting our drinking water requires two important things - conserving it and protecting the source. The CVRD has developed the Connected By Water Inquiry Unit to support students in learning their connections to the Comox Valley watershed.

Launching The Inquiry

Instructions:

After sharing the above facts, show the following image of the receding glacier on the projector and lead encourage student discussion and observations.



Observing and Supporting Learning

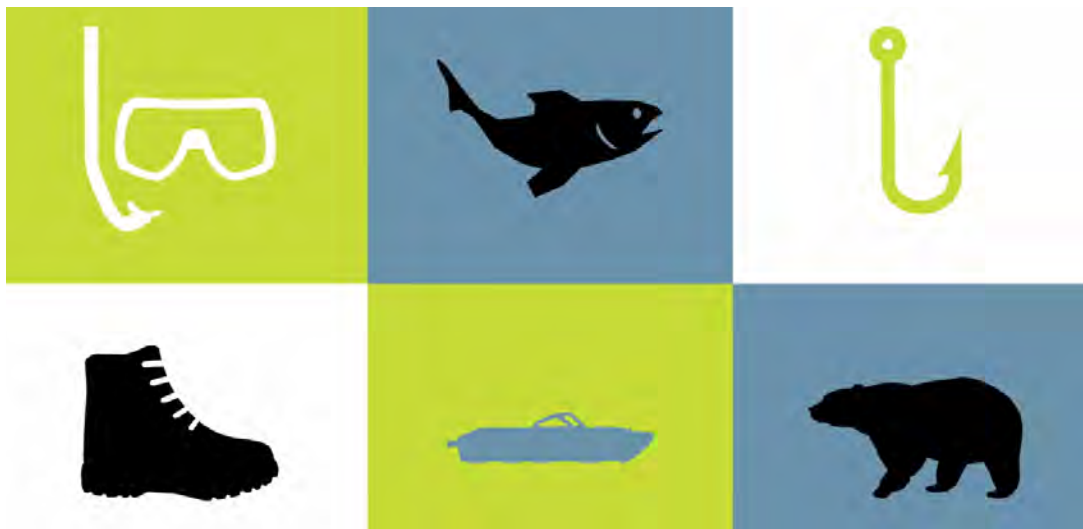
Prompting Questions for Inquiry:

- What are we looking at?
- Is there a difference between the photos?
- What does the glacier look like today?
- How did that glacier get there?
- Why is there not very much?

Launching The Inquiry

ACTIVITY:

WATER - THE BIGGER PICTURE



How we care for our water will affect our community and the plants and animals in the watershed, now, and for years to come.

Instructions:

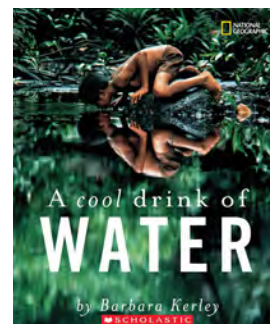
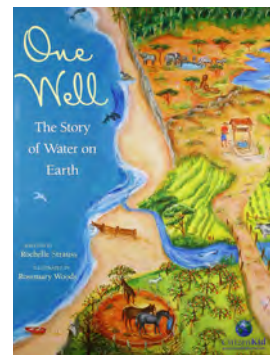
Watch this video for an introduction into the Comox Valley Watershed and the Watershed Protection Plan (WPP) <https://youtu.be/OZpolTgh2AY>

1. Load inquiry unit onto your classroom smartboard or projector, fill a tall clear glass of water and have it beside you, and play water music - suggestions are: Water Sounds Music Universe album Rain and Thunder Drone or Rain Drop Medley found on Spotify.
2. Read a book, such as *One Well the Story of Water on Earth* by Rochelle Strauss, or *A Cool Drink of Water* by Barbara Kerley in small groups of up to three people.
3. Ask one person to read a section and one person to actively listen. Ask the third person to take notes about what interests them.

Books can be found in Connected by Water Intermediate Inquiry Unit Kit from the SD#71, Comox Valley Learning Resource Center or ask your school library assistant to bring in the books for you or order through [amazon.ca](https://www.amazon.ca)

One Well the story of Water on Earth answers important questions while telling the eye-opening story of water on Earth.

A Cool Drink of Water, through poetic text and stunning National Geographic photos, depicts people's common need for water.



Connection and Awareness

ACTIVITY: DID A T-REX POOP IN MY DRINKING WATER? REVIEW OF THE THE WATER CYCLE

Materials:

- Ziploc bag per student,
- Permanent markers
- Water
- Place to hang the Water Cycles

Instructions:

Have your students create their own water cycle similar to this photograph.

Observing and Supporting Learning

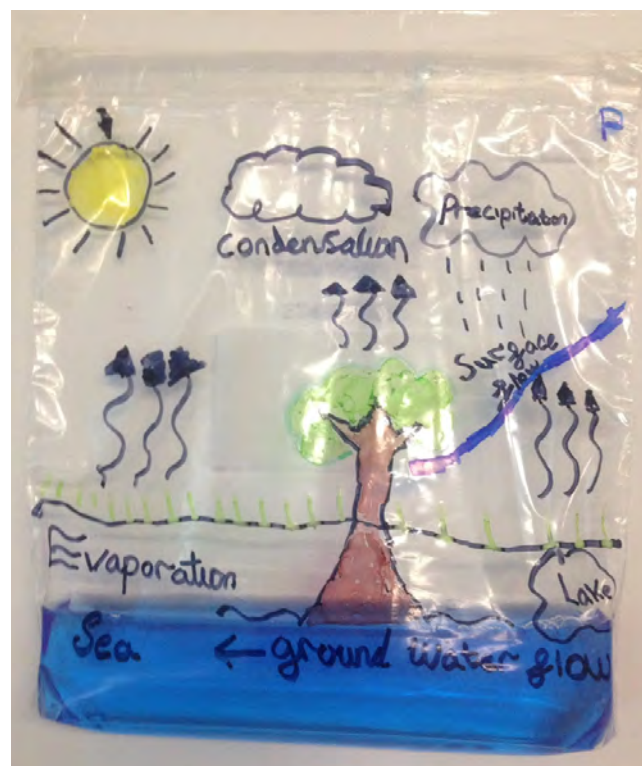
Prompting Questions for Inquiry:

- Where does my drinking water come from?
- How does water get in Comox Lake in the first place?
- The amount of water on earth now is the same amount of water as when the dinosaurs walked the earth. How can this be?

Additional Inquiry Opportunities:

If a refresher on the water cycle is needed, this interactive water cycle diagram can be introduced to students.

The water cycle: <https://water.usgs.gov/edu/watercycle-kids-int.html>



Credit to Mr. Noonan, St. Brigid's BNS,
Killester, Dublin.

Connection and Awareness

ACTIVITY:

TAKING IT OUTSIDE – PLACED-BASED CONNECTION TO WATER

Whether or not your school is near a creek or other body of water in the watershed, a walk outside will support students in connecting to elements of the water cycle that are in their surroundings all of the time.

Materials:

If you are lucky enough to be near access points to the watershed, or have access to field trip transportation, you can use the resource ‘Walking the Watersheds of the Comox Valley’. This resource is included in the Learning Resource Centre kits and also available for purchase online here: <https://projectwatershed.ca/portfolio-item/project-watershed-comox-valley-watershed-walks/>

- A writing journal for each student
- Pencils
- Permission slips for local walking field trip

Instructions:

This suggested activity is meant to encourage students’ presence and awareness of how water is connected to everything.

Following discussion about elements of the water cycle, pair students up to walk together in the vicinity of your school. Have them bring a journal to record ideas. Students could also draw their findings. Invite them to simply walk and talk to their partner as they notice parts of the water cycle in action. This could be a cloud, a puddle, a sprinkler, a creek, or dew drops on leaves or moss. Encourage them to also identify anything that they see that is connected to water in some way. This could be anything – a dog walking that must drink water, a flower or grass that needs water to survive.

Observing and Supporting Learning

Prompting Questions for Inquiry:

Once back in the classroom, have pairs share what they noticed:

- What surrounds them that is connected to water and the water cycle?
- How are they connected to water and our local watersheds?



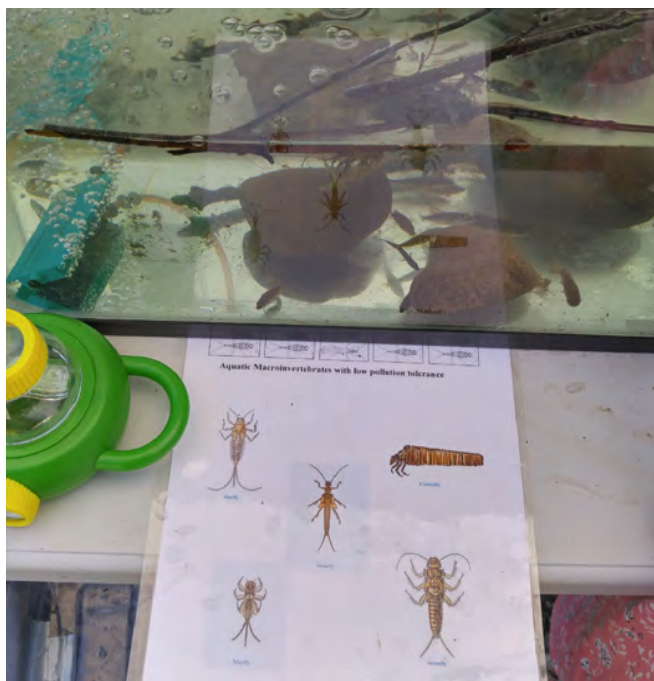
Connection and Awareness

ACTIVITY:

BUG LAB WITH TSOLUM RIVER RESTORATION SOCIETY

Contact the Tsolum River Restoration Society, meet them and their bug lab at your school's closest creek. Have a hands on experience catching and releasing water based bugs in their aquatic macroinvertebrate program. They have a variety of hand lenses, viewing scopes, and insect viewers so that students can collect, explore, and understand the aquatic insects that live in the local creeks, and why they are indicators of stream health (P.F.C. - Proper Functioning Condition) and learn about Riparian Zones. Ultimately students will have a deeper understanding of where their drinking water from and what a watershed is.

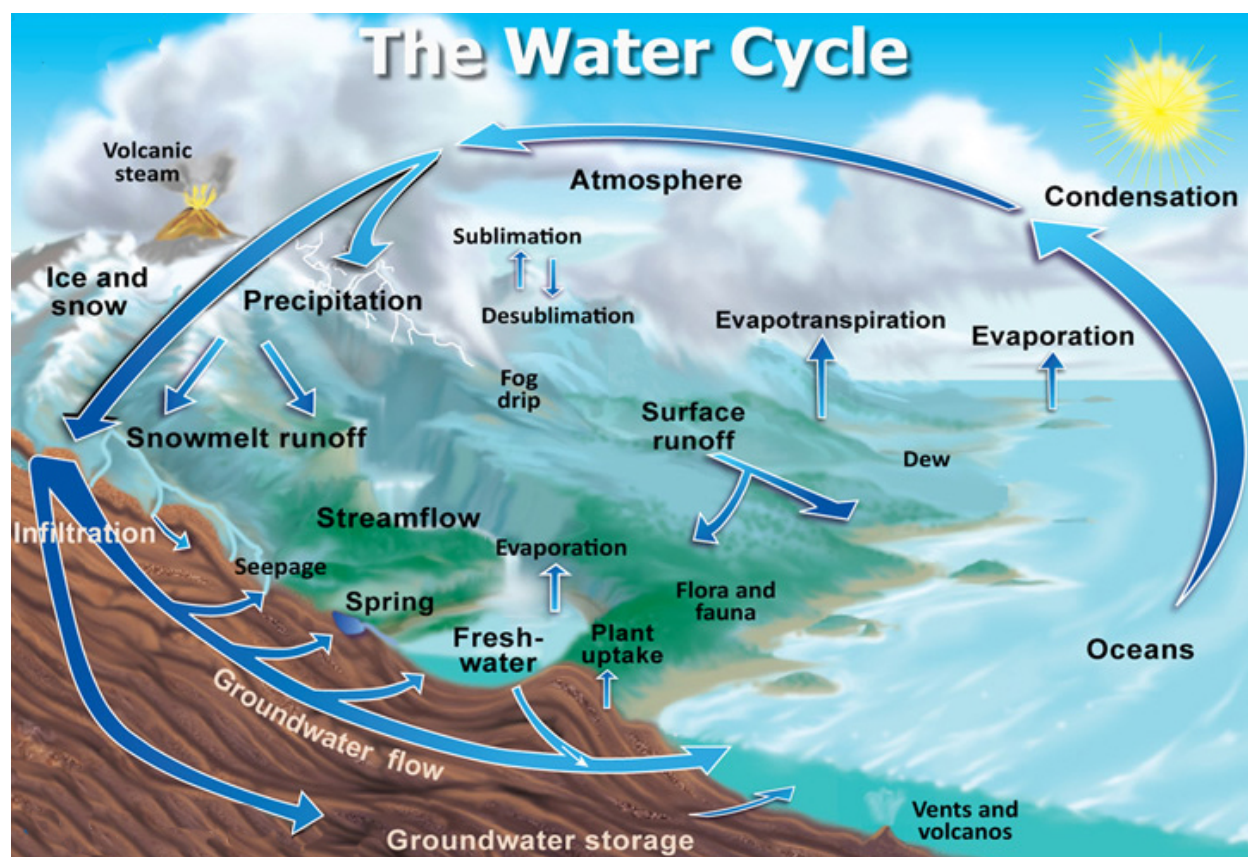
If you are interested in booking a field trip, contact: trrs.educationoutreach@gmail.com



Connection and Awareness

ACTIVITY: WORD MATCH

Looking at this image of the water cycle from Wikipedia, it uses some really scientific terms. What do these terms mean and how can we relate to them?



As humans we talk about the weather all the time. It is a topic we can all comment on, we can all complain about or exclaim about. We have it in common with others and generally it is not a controversial topic. For example:

“Isn’t it beautiful today?”

“Beauty Day, eh?”

“Oh, it’s raining hard!”

“Look at those clouds, storm’s coming!”

Connection and Awareness

Instructions:

Split the class into pairs, and have them have a conversation about the weather using the water cycle scientific terms. Set some guidelines - conversation must be a minute long, must use three water cycle terms and laughter is part of the fun. Water cycle terms are found here and in Appendix 2. Copy, print and cut the water cycle terms into individual terms to have a set of terms to be used by students.

Example:

Child 1:

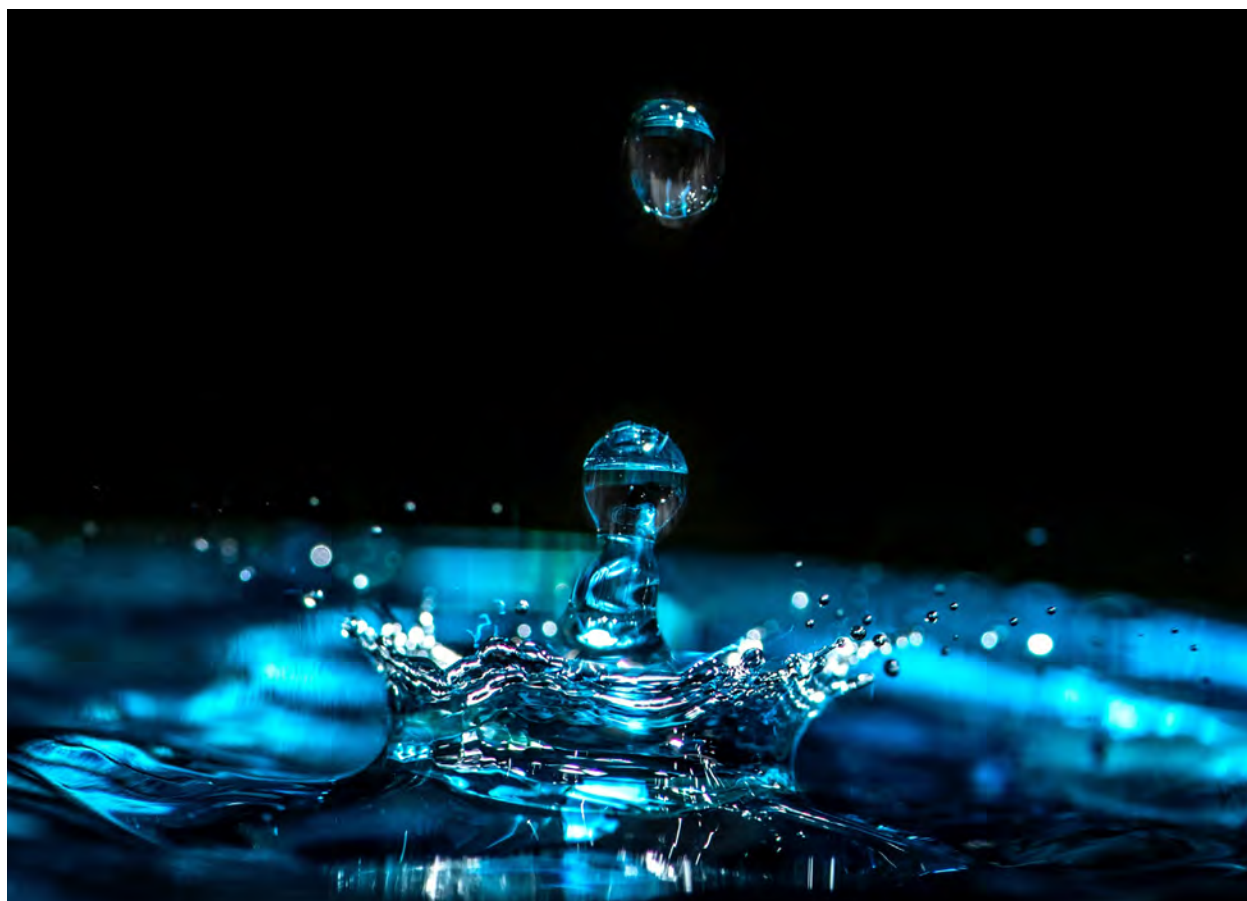
Acting that they are holding an umbrella says, “The water droplets got too heavy”

Child 2:

“I see that the precipitation is really creating some surface run-off from your dusty umbrella”

Additional Inquiry Opportunities:

<https://water.usgs.gov/edu/watercycle-kids-int.html>



Connection and Awareness

Water Terms:

Print one copy of terms per class. Cut into individual terms. If you have the LRC Inquiry Unit kit —Connected By Water—these are in the kit with the definition on the back of the them.

See Appendix 2

Condensation	Precipitation
Evaporation	Transpiration
Snow Melt	Run-off
Atmosphere	Dew
Groundwater	Water Vapour
Particulates	Turbidity
Boil Water Advisory	Weather Event
Hydrologic Cycle	Sunny
Collection	Sublimation
Infiltration	Lake

Connection and Awareness

ACTIVITY: **TAG**

What is your class's favorite version of tag? Is it Mantracker?

Materials:



- Access to drinking water
- Printed image of the above Earth Water Tap (available as Appendix 3) - recommended 11x14. This will become the Concept Map

Instructions:

Take your class outside to play an energy and thirst building game of tag. After tag, bring students back into the classroom and move students into groups of 4 - 6 for 10 minutes concept map activity.

Place the Concept Map in front of each student group.

Using open ended and probing questions, ask the student to reflect on what does that game of tag has to do with water and this picture?

Students share their ideas in words or drawing onto the concept map.

Observing and Supporting Learning

Prompting Questions for Inquiry:

Using open ended and probing questions, ask the student to reflect on what does that game of tag have to do with water and this picture? You may wish to incorporate the following ideas into their conversation:

- Demand (thirst) increases when energy is used (running for tag) how does this impact supply (water available)
- Water quenches thirst
- Where did you get your water from - water bottle, tap, school fountain

Water Conservation

ACTIVITY: GRAPHING WATER DATA

In this activity have students graph water data to compare precipitation and water usage over the course of a year. When seen on a graph, this demonstrates the mismatch which occurs – that most water usage in the Comox Valley happens when there is low precipitation.

Materials:

- Graphing paper or ability to create graphs on computer
- Pencils
- Coloured Pencils
- Chalkboard or whiteboard for recording and brainstorming
- Internet access for students to access data

Instructions:

Step One – Precipitation Graph

Have students create a bar graph, tracking precipitation data month by month. Use averaged precipitation data from this table provided.

Monthly Total Precipitation for 2017:

Month	Total Precipitation (in mm)
January	60
February	159
March	119
April	110
May	50
June	29
July	10
August	4
September	38
October	91
November	290
December	65

Credit: Cumberland Community School weather station, School Based Weather Station Network, University of Victoria

Water Conservation

Step Two – Water Consumption graph

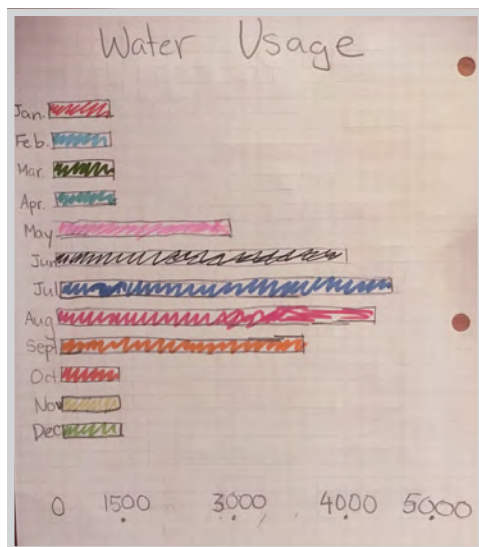
Have students create a second bar graph, tracking water consumption data month by month.

Water usage data for 2017, Comox Lake watershed

Month	Approximate Average Water Usage In Cubic Metres
January	15,000
February	15,000
March	15,000
April	15,000
May	30,000
June	40,000
July	45,000
August	44,000
September	35,000
October	15,000
November	15,000
December	15,000

Credit: 2017 Water Quality Report, Comox Valley Water System, Comox Valley Regional District

Example of a completed graph by Grade 6/7 student.



Credit: Grade 6/7 Mrs. Collins' class at the Cumberland Community School, Cumberland, BC

Water Conservation

Observing and Supporting Learning

Prompting Questions for Inquiry:

Once both of the graphs are complete, encourage conversation about water availability and water consumption.

- How much water do we have?
- Do we have enough water for the things we need it for?
- What part of this are we responsible for?
- When do we use the most water?
- What do you notice about how the precipitation and consumption are related to each other?
- What are some things that we can do in our own lives to bridge this ‘mismatch’?
- What are some things that could be done with water management to bridge this ‘mismatch’?

Additional Inquiry Opportunities:

The following links provide additional sources of data for precipitation and water usage.

Island Weather Sources:

<http://www.islandweather.com> is a school based weather station network across BC managed by University of Victoria

Cumberland Community School weather station is the closest weather station to Comox Lake. This data shows the temperature, average rainfall in mm, daily weather and wind speeds:

<http://www.islandweather.ca/station.php?id=191>

Direct link to Cumberland Community School weekly rainfall amounts.

<http://www.islandweather.ca/weeklyrain.php/?id=191>

Government of Canada Sources:

Historical precipitation numbers are available through Government of Canada website.

http://www.climate.weather.gc.ca/historical_data/search_historic_data_e.html

General weather data from the Government of Canada.

https://weather.gc.ca/mainmenu/weather_menu_e.html

Water Quality Report for the Comox Valley Water System

Annual water quality reports are posted on the Comox Valley Regional District website.

<https://www.comoxvalleyrd.ca/report-study>

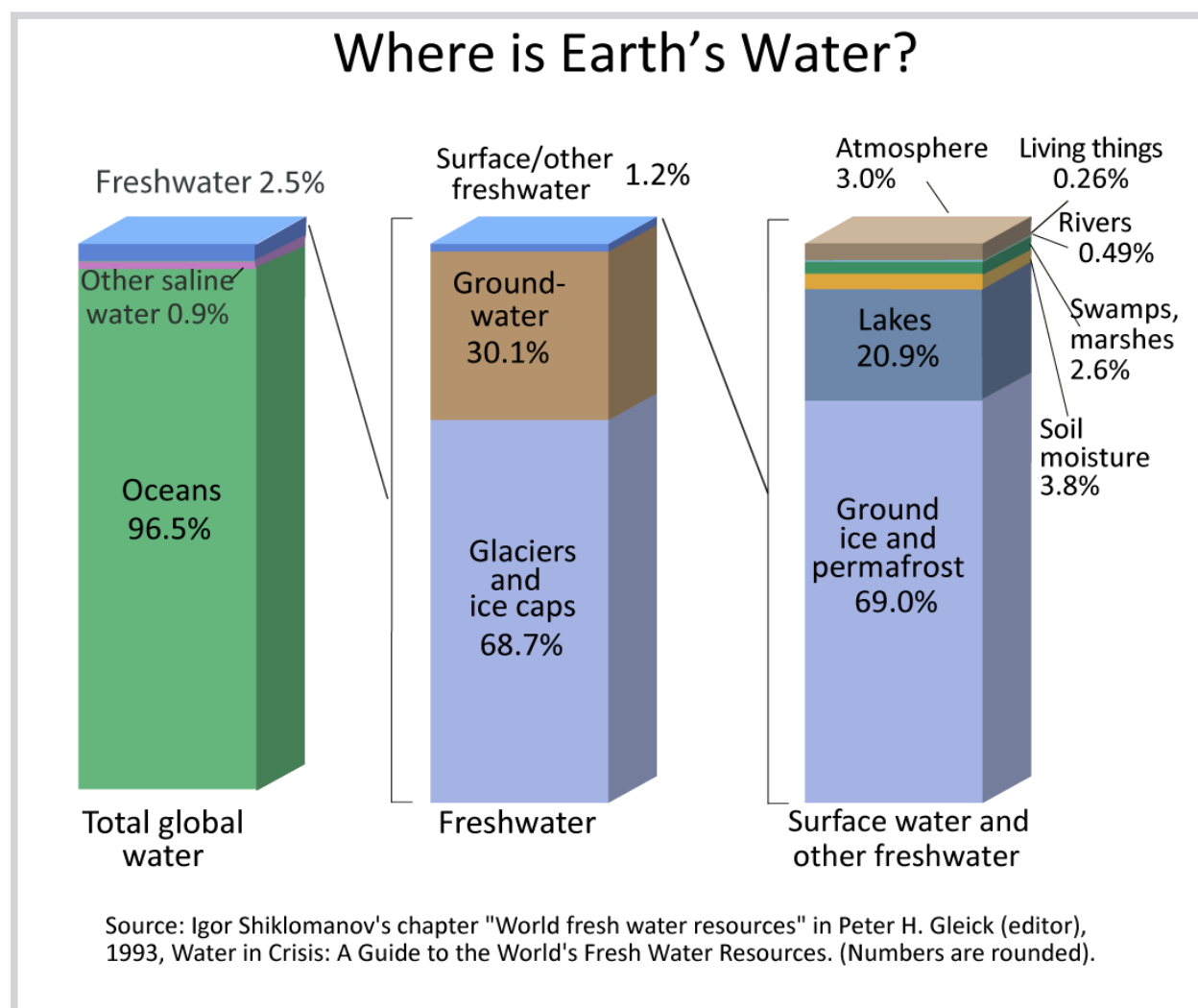
Water Conservation

ACTIVITY:

WATER ON EARTH - WHERE IS IT?

Water on Earth is composed of 2.5% fresh water. Only 1% of the fresh water is accessible for human consumption and the rest is found in ice caps, air, soil, and underground water. With only 1% of fresh water available for all human consumption, it is a critical issue that needs to be addressed. The average use in the Comox Valley is 533 litres per day. The average Canadian's daily consumption is 251 litres per day.

The purpose of this activity is to show students how much water is actually available on earth for human consumption and how important it is for us to conserve it.



Water Conservation

Materials:

- 4 plastic tubs
- 4 small buckets or pails
- 4 labels
- 1 permanent marker
- 1 to 4 measuring cups or graduated cylinders that shows the mililitres
- 1 teaspoon and 1 tablespoon

Observing and Supporting Learning

Prompting Questions for Inquiry:

What percentage of the water on Earth is available for humans to use? Have a discussion about this without telling them the answer as it will be demonstrated later on in the activity.

How much water do you use a day? Explain how we use more water each day than we really should.

Identify as many places as possible where we can find water on Earth and give examples of where we can find fresh drinking water here in the Comox Valley.

Instructions:

1. Label 4 different small tubs: Salt Water (Oceans), Fresh Water (Lakes & Rivers), Fresh Water (Glaciers, Air & Groundwater), and Fresh Water (For Human Use).

Place each container a metre apart from each other.

2. Split the class into 4 groups and give each group a bucket of water. Ask them to discuss within their groups how much water should go into each labelled tub.

Then allow each group, one group at a time, to pour the amount of water from their bucket into the 4 labelled tubs that they chose. After each group does this, ask them why they chose the amount they did for each labelled tub. Do this for all 4 groups.

3. After each group has gone, pour the water from the tubs back into the buckets.

4. Using a measuring cup, measure 970 ml of water and pour it into the Salt Water Tub. This represents 97% of the Earth's water being salt water. Measure 30 ml of water and pour it into the Fresh Water (Lakes and Rivers) tub. From the Fresh Water (Lakes and Rivers) tub take 10 ml and pour it into the Fresh Water (Glaciers, Air & Groundwater) tub, and take 1ml from this tub and pour it into the Fresh Water (For Human Use) tub.

5. Explain to the kids that each amount of water in the tubs represents a percentage of water, and all the tubs added together represent all the water on Earth.

Water Conservation

Our bodies are approximately two-thirds water and all living things need water. A nonrenewable resource is something that could one day be gone forever with no way of bringing it back. The fresh water on Earth could be seen as a non-renewable resource. This is why we need to use the small amount of water we do have available to us very wisely. There are many ways we can conserve water and it all starts in our everyday lives.

Additional Inquiry Opportunities:

After a discussion, have the students use the water to water plants or trees in the school yard. This will help connect them to water conservation by using that water for something useful rather than pouring it down the drain. This could also be used as a brainstorming idea for reusing water.



Watershed Protection

ACTIVITY: **FOUND POETRY**

Have students compose found poems based on passages they have read.

Appendix 4 is an introduction to the Government of British Columbia's vision for sustainable water stewardship. These changes are crucial for adapting to climate change impacts and to the pressures placed on water resources from a growing population and economy.

By having students create a 'found poem' from this document, they are able to share their own understanding as they extract words that are meaningful to them.

Materials:

- A copy of Living Water Smart (Appendix 4)
- Markers
- White paint and brushes
- Additional paint colours and brushes

Instructions:

Have the students read the excerpt.

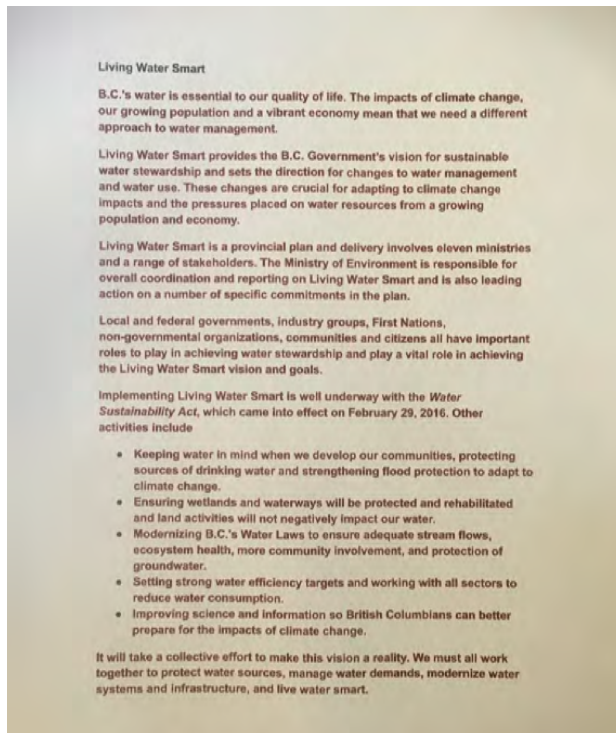
Invite them then to pick out and circle descriptive words, phrases and lines that mean something to them with regards to watershed protection. Students then paint over the entire document except the words that they have circled, with the white paint, blocking out all text except their circled words.

Once the paint is dry, invite students to create a water-inspired art piece using the white painted area as a canvas, leaving their words exposed (see below for example of process).

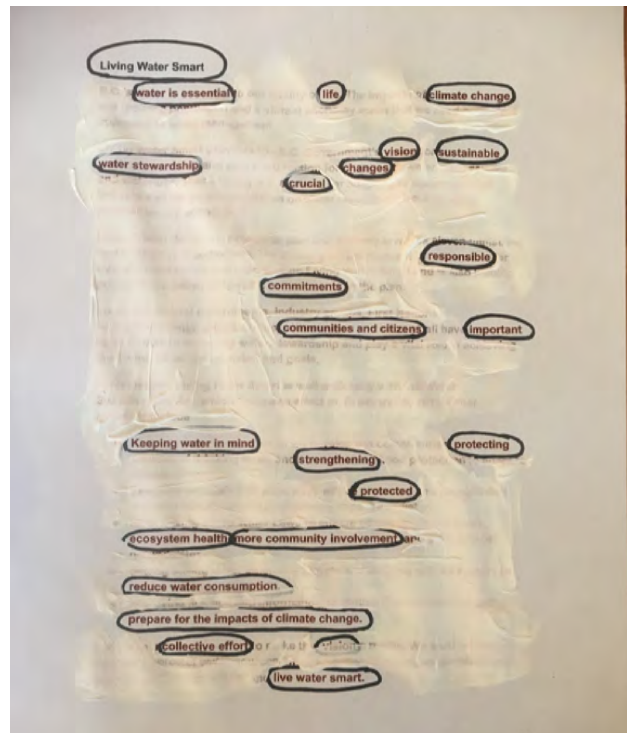
This creates a found poem piece and the process of recasting the text they are reading in a different genre helps students become more insightful readers. Since students are primarily identifying nouns and verbs for use in their poems, the lesson also provides a relevant opportunity for a grammar review of these two parts of speech.

Watershed Protection

Step 1:



Step 2:



Step 3:



Connected by Water Legacy: Connecting to Heart and Community

ACTIVITY:

BRINGING IT ALL TOGETHER - CULMINATING PROJECT

Revisiting our inquiry question - What allows me to have safe water that I can drink?

In groups, or on their own, invite students to create an answer to this question, emphasizing what has stood out to them and what they are interested in doing to protect this important resource - in a play, through art, through story, video or dance.

ACTIVITY:

TAKING IT HOME

Support students in transferring their new knowledge into behaviors at home, this suggested activity.

Materials:

- Flip chart, whiteboard or chalkboard
- Ability to create chart (sample below) and photocopy for taking home

Instructions:

Create large chart together and populate it with these ideas that are co-created from your learning together. Create a mini version for them to take home as a challenge for the whole family. Revisit after a week with a discussion on how this went. What went well? What did not? Did they think of anything else they could do?

Here is an example:

LOVING OUR WATER	MON	TUES	WED	THURS	FRI	SAT	SUN
Turn off tap while brushing teeth							
Have shorter showers							
Be careful about what we put down the drain							
Don't wear sunscreen or creams while swimming							
Don't litter							

Connected by Water Legacy: Connecting to Heart and Community

ACTIVITY: SERVICE LEARNING

As our inquiry unit winds down, it's important to reflect back on our original driving question: "What allows me to have safe water that I can drink?" and to support students in connecting their learning out into their world. With this in mind, we suggest pursuing a service learning project in your community.

Service-learning activities are ones that combine learning goals and community service in ways that can enhance both student growth and the common good. It is a teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach social responsibility, and strengthen communities.

It is:

"a form of experiential education where learning occurs through a cycle of action and reflection as students... seek to achieve real objectives for the community and deeper understanding and skills for themselves. In the process, students link personal and social development with academic and cognitive development... experience enhances understanding; understanding leads to more effective action."

—Janet S. Eyler, Vanderbilt University (winner of the 2003 Thomas Ehrlich Faculty Award for Service Learning)

Service learning can create the following outcomes:

- Positive impact on students' academic learning
- Improves students' ability to apply what they have learned in "the real world"
- Greater sense of personal efficacy, personal identity, and moral development
- Greater ability to work well with others, and build leadership and communication skills
- Improved social responsibility and citizenship skills
- Connections with community members for learning and future work and career opportunities

Below are opportunities for your class/students to connect more deeply with their relationship to water as it relates to larger community causes.

The Great Canadian Shoreline Cleanup

Small groups, individual classes or whole schools can sign up and coordinate a cleanup along the shore in our area.



<https://www.shorelinecleanup.ca/>

Connected by Water Legacy: Connecting to Heart and Community

BC green Games

BC Green Games is a digital eco-storytelling contest designed to closely link with BC's new curriculum while supporting teachers and promoting place-based environmental education. Projects can be submitted as a photo series or a short video, with an accompanying written essay. The photos/video and essay should explain the cause your team has taken on, how they took action, and the final results.



<https://www.bcgreengames.ca/>

Safe Water Drinking Foundation

SWDF provides resources, water testing kits, and holds student action competitions throughout their network to encourage student action around safe drinking water



<https://www.safewater.org/school-programs-overview/>

Local, Placed-Based Service

Lastly, please see Appendix 6 of this document for a comprehensive list of Comox Valley not-for-profit organizations working to protect our local environment. Most will arrange field trips, and many will support your students volunteering with them in some capacity.





Appendix 1: The Legend of Queneesh

Queneesh is the K'ómoks name for the gleaming white glacier which can be seen from all over the Comox Valley. The Legend of Queneesh tells us how a great white whale saved the K'ómoks people. It began long ago when the K'ómoks people still lived in big cedar plank houses along the shores of Puntledge River estuary.

One night an elder of the village, Quoi qwa lak, had a powerful dream. It warned him of a coming time when the rain would fall for many days and nights. In his dream he was told that this rain would cause a great flood and the K'ómoks people would be in danger.

In order for them to survive the flood, they would have to make canoes, cedar bark rope and clothing and preserve food for the coming disaster. Gye gya janook, Chief of the K'ómoks, directed all of the people of the village to work together so that they would be ready when the rain began to fall.

Quoi qwa lak himself supervised the making of a strong cedar bark rope that was many miles in length. The rope had to be long enough to reach from the village to the top of the glacier.

As foretold, the rains began to fall just as everything was ready. The river rose rapidly to flood stage. Young men carried the long cedar rope from the village to the mountains and attached it securely to the glacier. The people tied their loaded canoes to the rope so they wouldn't get swept away to sea by the flood waters.

Soon the land was covered with water and still it continued to rain. The people were afraid as the water continued to rise up to the glacier where they had anchored their canoes. Suddenly the glacier began to float, breaking up through the rising waters like a giant grey whale breaching. The people were awestruck as they watched the glacier become a huge white whale.

"Queneesh, Queneesh!" they called. Queneesh almost floated free of the mountain, but the rain stopped and the flood waters began to recede. The K'ómoks people were saved. Some are still heard to whisper to him "Kwo la whee gai, Queneesh". "Thank you, thank you."



Appendix 2: Water Cycle Terms for Word Match Activity

Condensation	Precipitation
Evaporation	Transpiration
Snow Melt	Run-off
Atmosphere	Dew
Groundwater	Water Vapour
Particulates	Turbidity
Boil Water Advisory	Weather Event
Hydrologic Cycle	Sunny
Collection	Sublimation
Infiltration	Lake

Appendix 3: Earth Tap -Concept Map





Appendix 4: Living Water Smart

B.C.'s water is essential to our quality of life. The impacts of climate change, our growing population and a vibrant economy mean that we need a different approach to water management.

Living Water Smart provides the B.C. Government's vision for sustainable water stewardship and sets the direction for changes to water management and water use. These changes are crucial for adapting to climate change impacts and the pressures placed on water resources from a growing population and economy.

Living Water Smart is a provincial plan and delivery involves eleven ministries and a range of stakeholders. The Ministry of Environment is responsible for overall coordination and reporting on Living Water Smart and is also leading action on a number of specific commitments in the plan.

Local and federal governments, industry groups, First Nations, non-governmental organizations, communities and citizens all have important roles to play in achieving water stewardship and play a vital role in achieving the Living Water Smart vision and goals.

Implementing Living Water Smart is well underway with the Water Sustainability Act, which came into effect on February 29, 2016. Other activities include

- Keeping water in mind when we develop our communities, protecting sources of drinking water and strengthening flood protection to adapt to climate change.
- Ensuring wetlands and waterways will be protected and rehabilitated and land activities will not negatively impact our water.
- Modernizing B.C.'s Water Laws to ensure adequate stream flows, ecosystem health, more community involvement, and protection of groundwater.
- Setting strong water efficiency targets and working with all sectors to reduce water consumption.
- Improving science and information so British Columbians can better prepare for the impacts of climate change.

It will take a collective effort to make this vision a reality. We must all work together to protect water sources, manage water demands, modernize water systems and infrastructure, and live water smart.

Appendix 5: You Are Recreating in a Watershed

You are Recreating in a Watershed

The Comox Lake watershed is a beautiful and complex system of mountains, lakes, rivers, and creeks. The water within this watershed - the snowmelt and rain - runs over land and into small streams and larger waterways such as the Upper Puntledge River, the Cruikshank River, and Perseverance Creek. Some of this water soaks into the ground but much of it flows into Comox Lake. In Comox Lake, the water is available for fish and wildlife habitat as well as being used for power generation and stored as drinking water for the Comox Valley.

The Comox Lake watershed supplies drinking water to over 45,000 people in Comox and Courtenay via the Comox Lake Drinking Water System and to 3700 people in Cumberland. Have you ever wondered "What allows me to have safe water I can drink?" By helping to protect the Comox Lake watershed you can help ensure that we have safe drinking water.

How do we protect this shared resource?

Stay on existing roads and trails

The land around waterways provides important ecological functions. Streamside vegetation and soils moderate stream flow, preventing erosion and flooding. They also reduce or remove suspended sediments, bacteria, viruses, parasites, and excess nutrients from the water before it reaches Comox Lake. It is important to leave these areas undisturbed to maintain high quality drinking water and to reduce the cost of water filtration and treatment.

Do not build new trails without permission

Trails built within the watershed should follow a standard from the International Mountain Biking Association or the Whistler Trail Standards that consider the important ecological function of streamside areas. Trail building should only be done in consultation with landowners and trail stewardship groups.

Keep poop and pee away from the water

Poop can carry bacteria, viruses, and parasites. Using the designated bathrooms and picking up dog poop at beaches and campgrounds reduces the risk of these pathogens entering our drinking water system. Empty the holding tanks of boats and recreation vehicles only at designated stations. If you are in the backcountry, pack out your poop and do not pee in waterways. Peeing on rocks, pine needles, and gravel in the backcountry is less likely to attract wildlife that can cause damage to sensitive and important ecosystems along waterways.

Camp at designated campgrounds

Camping outside designated areas increases the risk of streams being contaminated by bacteria from human poop and increases the risk of damage to ecosystems from fires.

Do not have a campfire outside of designated campgrounds

A small fire can quickly get out of control and destroy large tracts of forest within the watershed. Healthy forests are critical to moderate and remove suspended sediments, bacteria, viruses, parasites, and excess nutrients from the water as well as prevent flooding. A loss of healthy forests due to wildfire could significantly increase the cost of water treatment.

Get informed

There is so much more you and others can do to protect the Comox Lake watershed. Learn more on the Comox Valley Regional District Website.

We are all connected by water.

CONNECTED  BY WATER

For more information, visit: comoxvalleyrd.ca
f @WEARECONNECTEDBYWATER #CONNECTEDBYWATER

 Comox Valley
REGIONAL DISTRICT



Appendix 6: Additional Resources

CULMINATING PROJECT OR DEEPER LEARNING OPPORTUNITIES

Safe Drinking Water Foundation

Take action on water issues and submit to the Canada wide Student Action competition.

safewater.org

Connecting Students With Their Watershed Manual

A workbook for community leaders to inspire volunteers and develop local watershed stewardship project plans. Each module guides you through creating a personal project. The manual includes self-evaluation tools, checklists, examples, teaching tools, background information, and lots of great illustrations and ideas.

<https://hctfeducation.ca/product/connecting-students-with-their-watersheds/>

VIDEOS

Connected by Water

<https://www.youtube.com/watch?v=pcmEhHGVYes>

Local video filmed in the Comox Lake watershed.

Love Your Raindrop

Funny video describing how our fresh water gets to us through the story of a raindrop - snow to sea in the Comox Valley Regional District infrastructure.

https://www.youtube.com/watch?v=8zg2cWtXb-4&feature=player_embedded

Fresh Water Scarcity:An Introduction

A video about conservation and sharing the earth's water source. Three minutes.

<https://www.youtube.com/watch?v=otrpxtAmDAk>

Appendix 6: Additional Resources

FIELD TRIPS AND LOCAL COMOX VALLEY KNOWLEDGE

The Connected By Water Team would like to extend a special thank you to those who participated in Environmental Educators meeting in Aug 2018 and the online educators discussion that followed. Shared at that meeting were what role groups are currently playing in providing water-related education to children in the Comox Valley. Resources were shared and ideas exchanged about how to work together to sustain environmental education in the Comox Valley. Many of those resources are included below.

Go Grants

The Habitat Conservation Trust Foundation provides grants that can assist with covering costs like transportation for place-based outdoor learning.

<https://www.hctfeducation.ca/go-grants/>

Morrison Creek Streamkeepers

Offer walking tours.

<http://morrisoncreek.org/>

Tsolum River Restoration Society

Excellent group of volunteers working to restore and build awareness about the Tsolum River. Offer education and outreach programs at your school's closest creek.

<https://www.tsolumriver.org/>

Project Watershed

Excellent resources for Grades K - 7 with links to lesson plans, field trip options, information sheets and colouring pages.

<https://projectwatershed.ca/glacier-to-estuary/#upper>

Cumberland Community Forest Society

Walking tours of the Cumberland Forest available.

<http://www.cumberlandforest.com/>

Strathcona Wilderness Institute

Guided walking tours.

<http://strathconapark.org/wilderness-centre/>

United Riders of Cumberland

Mountain Bike Clubs and trail building.

<https://unitedridersofcumberland.com/>

Wild Schools Program - Habitat Conservation Trust Foundation

School programs available. Schools need to apply by March 31st.

<https://hctfeducation.ca/school-programs/>

Appendix 6: Additional Resources

MARS - Wildlife Rescue Center

School tours and guest speakers available.

<http://www.marswildliferescue.com/education/>

Comox Valley Nature Kids

Kid friendly outdoor learning opportunities.

<https://comoxvalleynaturalist.bc.ca/young-naturalists-families/>

DV8 Education

Available to support and plan local Environmental Education activities and field trips.

<https://www.dv8education.com/>

North Island Wildlife Recovery Centre

School visits can be arranged.

<https://www.niwra.org/visit/>

Cumberland Wilderness Society

School programs available.

<https://www.cumberlandlakepark.ca/programs>

CLIMATE CHANGE IN THE COMOX VALLEY - COMOX GLACIER

Powerpoint presentation created by Project Watershed

(link must be typed directly into search engine)

https://docs.google.com/presentation/d/1qjpbNb3CHmMBI4I5hTFK9hKEI9m7x2a5daeDim_dOMQ/edit#slide=id.g411d3e4ca3_0_22

MAPS

Local Watershed Map

Fantastic map of the local watershed from Project Watershed

<https://drive.google.com/file/d/1w262zg5ph-LQihEMYuhKNxDDjqpBaP0P/view>

Comox Lake Watershed Maps

<https://www.comoxvalleyrd.ca/watershed>

WATERSHED PROTECTION

Comox Lake Watershed Protection Plan

<https://www.comoxvalleyrd.ca/watershed>

Think Like a Watershed brochure

<http://brooklyncreek.ca/wp-content/uploads/2018/09/Watershed-Brochure-Outside1sm.pdf>

Appendix 6: Additional Resources

WATER CONSERVATION

Comox Valley Regional District

<https://www.comoxvalleyrd.ca/conservation>

City of Nanaimo - Team Watersmart

<https://www.rdn.bc.ca/team-watersmart>

Water conservation fact sheets offering tips to save water indoors and out.

<https://www.crd.bc.ca/education/water-conservation/at-home/water-conservation-facts>

Did a Dinosaur Drink This Water - Robert E. Wells

Grade 1-2 and 3-5 Paperback book explaining the water cycle

<https://www.amazon.com/Dinosaur-Drink-Water-Knowledge-Science/dp/0807588407>

Green Facts

Provides scientific facts about water as a resource.

<https://www.greenfacts.org/en/water-resources/index.htm>

Safe Drinking Water Foundation

Fact sheets on a wide variety of topics related to drinking water

<https://www.safewater.org/fact-sheets>

POLICY AND LOCAL GOVERNANCE DOCUMENTATION

Comox Lake Watershed Protection Plan

(link must be typed directly into search engine)

https://www.comoxvalleyrd.ca/sites/default/files/docs/Projects-Initiatives/2-20160603_cvrld_wpp_final.pdf

Water Sustainability Act 2016

<https://engage.gov.bc.ca/watersustainabilityact/>

WATER SAMPLING FOR SAFE DRINKING WATER

Elementary Operation Water Drop Kit for Delivery

Students in grades four to eight can use this kit to test their local water and control water samples for eight different components.

<https://www.safewater.org/school-programs-overview/>

Students will test for alkalinity, ammonia, colour, copper, pH, sulphate, total chlorine and total hardness.

<https://www.safewater.org/order-kits/>

STORAGE AND CONSERVATION - GROUNDWATER

It's Called Ground Water

Groundwater is an important source of fresh water for industries, municipalities, farms, and rural homeowners in British Columbia.

<https://www.youtube.com/watch?v=VtIY4FYWJV8&feature=youtu.be>

Appendix 7:

Indigenous Education Resources Related to Watershed Protection and Water Conservation

Contributed to by: Gail Martindale, Lynn Swift, and Lelaina Jules of School District #71 Indigenous Education Department.

Learn 71 - Teacher Resources Indigenous Education

<http://www3.sd71.bc.ca/School/abed/resources/teacher/Pages/default.aspx>

K - 3

Legend of Queenesh

<http://www3.sd71.bc.ca/School/abed/resources/teacher/Pages/LegendofQueneesh.aspx>

K - 7

Fish Traps

SD71 The Fish Trap Experience

<http://www3.sd71.bc.ca/School/abed/resources/teacher/Pages/FishTraps.aspx>

<https://www.youtube.com/watch?v=fsEnk9ky0f0&feature=youtu.be>

The Komoks Estuary Speaks

<https://youtu.be/uD2hbAlBwKs>

Komoks Estuary a Cultural and Archeological Treasure

<https://youtu.be/csTJLpjCXDQ>

Komoks First Nation Origin Stories

<http://www.komoks.ca/origin-stories>

Water the Sacred Relationship - Video

<https://www.sacredrelationship.ca/documentary/>

<https://www.youtube.com/watch?v=tyuVWksDJmA&feature=youtu.be>

Honour Water

A singing game for healing water available for ipads

<http://www.honourwater.com/#intro>

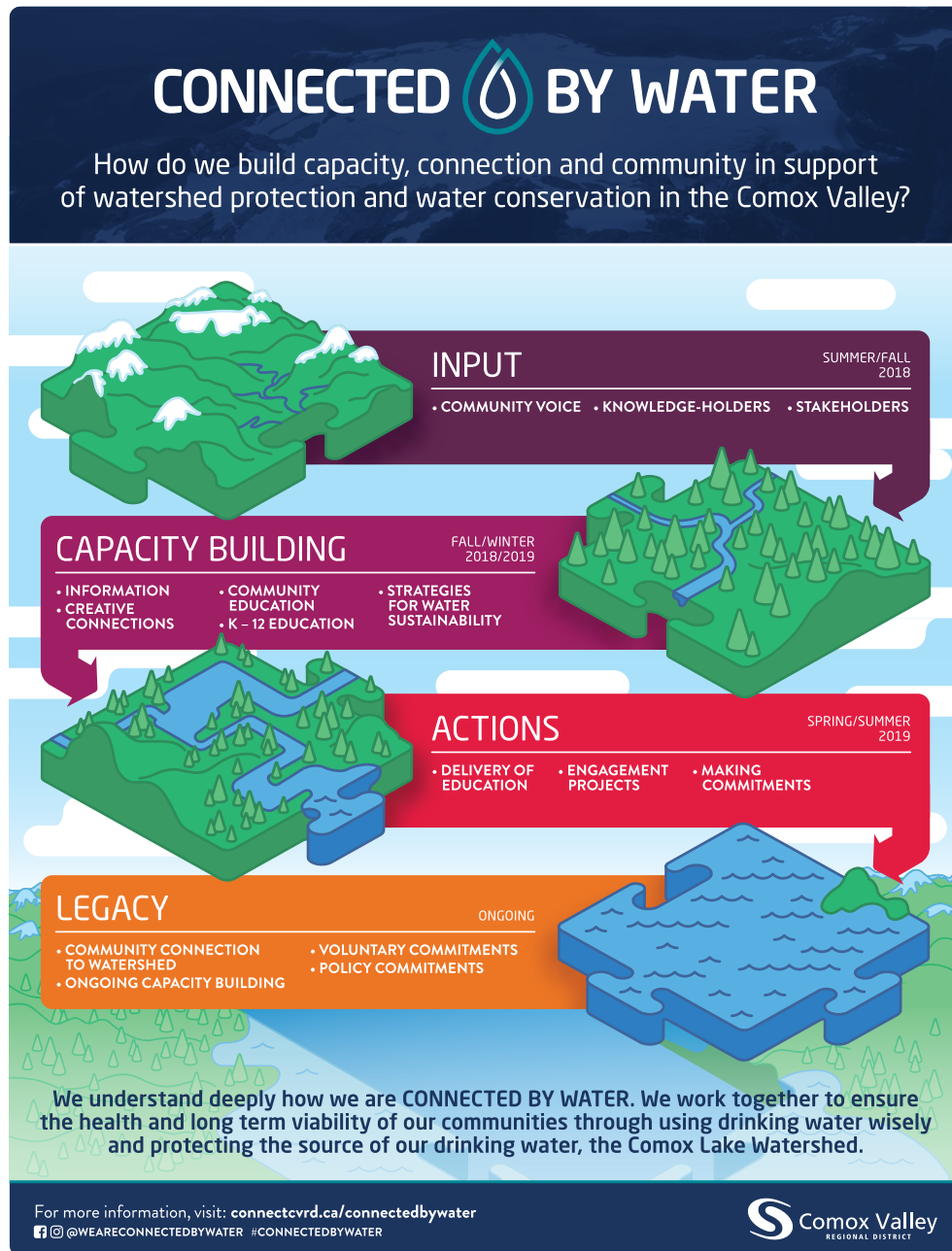
Indigenous Ways of Knowing:

Components of an Indigenous Science Education Model Page 42

Suggestions for Teaching on pg. 49 and 50

<https://pressbooks.bccampus.ca/knownhome/>

Appendix 8: Connected By Water Project Vision



Full version available at: www.comoxvalleyrd.ca/watershed