Regional District of Nanaimo

Freshwater Connections

4–7 TEACHER'S GUIDE

WATER WHERE WE LIVE

DIGITAL TOOLKIT

This toolkit addresses big ideas, content and curricula competencies in the following subjects:

Science, Socials, Applied Skills and Technologies, English language Arts, Career Education,

Physical and Health Education, Arts Education.

This toolkit also addresses BC Curriculum core competencies.

Part 1 Importance of WATER

SLIDES 1-22
75 MINUTES

MATERIALS NEEDED

- Small paper cups (i.e., mini paper cups or paper condiment containers), two per student
- **"Water scientist"** handout, print one copy per student
- Felt pens and/or pencils
- Three 1-litre bottles; fill with tap water, label "sample A", "sample B" and "sample C". Add nothing to sample A, add 1/2 tsp. salt to sample B and add 2 tsp. salt to sample C

TEACHER NOTES

Introduction

a. At slide 3, start by sharing the land acknowledgement and introduce that people live, learn and play near water. And that the Snuneymuxw people have been here for thousands of years and chose to continue living here partly because of the water (ocean and fresh) that was nearby
b. On slide 4, share the video story of Xeʔes the Creator. This story is shared by Sq'utxulenuxw (George Seymour) about how Xeʔes creates animals, people and islands from the lake water. https://www.youtube.com/watch?v=Ap9tx7p3jww
c. On slide 5, ask students to either draw a picture or write a paragraph describing at least 3 ways that humans benefit from living near freshwater, other than using it for a source of drinking water. Encourage them to think about not only how we use water when we take it out of the river, but also how the river itself is beneficial. Ask students to share ideas.
d. On slide 6, show examples of ways humans benefit from living near freshwater, like crop growing, transportation, fishing, hunting, trading, cooking, bathing and washing clothes. Discuss how these might be accomplished if the community was not near water, and whether other methods would be easier or more difficult.

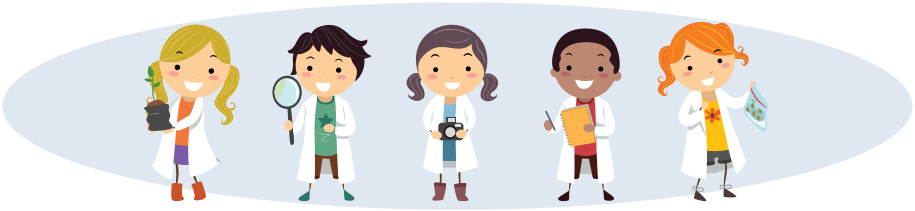
Water Scientists

e. At slide 7, explain that students will be water scientists and test water samples A, B and C by looking, smelling and tasting the water samples.

f. Provide each student with 3 paper cups labeling them A, B and C, and a copy of the **"Water scientist"** handout. Students can work through the experiment recording their findings on the handout.

g. After the experiment share with students that **sample A** is tap water from the school. Have students discuss if the water in their homes tastes similar. The school or home water might be from a well and taste different as the minerals in the ground flavour the water. **Sample B** had a small amount of salt added. In some parts of the world (like Yemen) the drinking water tastes like this. The minerals in the ground flavour their water salty, but it's a small percentage of salt and still healthy to drink. **Sample C** had more salt added, about 1%, and tastes very salty to us. Ocean water is even saltier, about 3.5% salt and would not be suitable to drink as it does not hydrate our bodies. Our bodies need freshwater to stay hydrated and healthy. We can process small amounts of salt in the kidneys, but ocean water contains too much salt, so we become thirstier and dehydrated. Show this video to understand why the water in the ocean is salty: **https://www.youtube.com/watch?v=_FIh5_CQ2R0**.

h. Share with students that water quality testing in the RDN water service areas is carried out on a regular basis to ensure a safe source of water for our residents. The Vancouver Island Health Authority (VIHA) establishes the frequency of testing for each water system with test samples being analyzed by the provincial laboratory. In addition, RDN staff perform weekly testing to afford an early indication of any water quality problems, should they occur. Annually, both tap and a raw water samples for each water system are analyzed based on the Canadian Drinking Water Guidelines by an independent laboratory. Property owners with private domestic wells are their own water managers, responsible for the quality of their drinking water supply. By regularly testing your water, you can ensure your well water is safe to consume and that it is not a conduit for contamination to the shared groundwater supply.



Understanding Freshwater

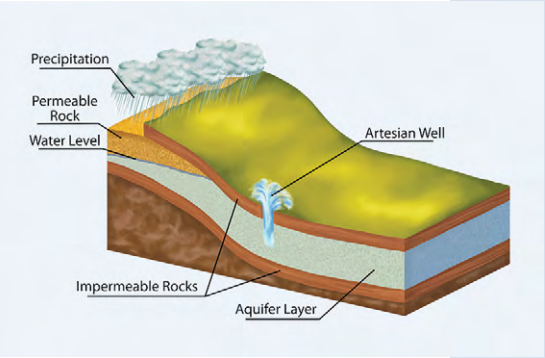
i. On slide 8, show students a picture of people living by the ocean. Discuss options these communities have to access freshwater.

j. Slide 9 shows an image in California. Ask students to consider where California gets its drinking water. Most of the drinking water comes from surface water like rivers and lakes, and groundwater. However due to frequent severe droughts there is a growing industry to desalinate water to drink. Slide 10 shows an image of the desalination plant at Huntington Beach in California. Have students suggest advantages and disadvantages of desalination. Slide 11 shows some ideas. Challenge students to consider that water conservation is key to future water security, and that by using less we may not need to desalinate oceanwater.

k. Slide 12 shows a map of Vancouver Island, which is a fairly large island. Ask students to consider where Vancouver Island gets their drinking water. At slide 13 share that most of the drinking water is sourced from surface water like mountain snowpack, lakes, rivers, and groundwater from large underground aquifers. Some of the groundwater is accessed via wells on individual properties. Some groundwater in places like the Town of Qualicum Beach, Lantzville, Parksville, Nanoose, North Cedar, Bowser, Deep Bay, and French Creek get their water from community wells. These are large diameter wells that provide drinking water for many houses connected to the distribution system.

l. Slide 14 shows a picture of Gabriola Island. Residents rely predominantly on groundwater stored in aquifers that are recharged from rainwater. Gabriola has a few surface water lakes, but no mountains for snow to provide extra water in the summer. Rainfall and rainwater harvesting also supplement water supply. Slide 15 has examples of rainwater collection. Some residents of Gabriola (and other Electoral Area B islands: Mudge and DeCourcy) use harvested and treated rainwater as a drinking water source, sometimes in combination with groundwater well sourcing. Many others on Gabriola capture rainwater for outdoor water needs, so as not to draw heavily from the groundwater. Discuss who has a rainwater collection system at home or school. Ask students to consider what happens if it doesn't rain.

m. At slides 16-22, play trivia and learn how little freshwater we have on earth, that salmon live in freshwater and saltwater, and that there is the same amount of water on earth now as there was billions of years ago.



LEARNING OBJECTIVES

- To learn that water is vital to life, and how communities would live near water for drinking, cooking, cleaning, growing food, and fishing.
- To experience drinking salty and freshwater, learning we need freshwater to drink and there is a limited supply of freshwater on Earth.
- To explore ways people around the world access drinking water and engage in trivia on water.

EXTENSIONS

- Conduct an experiment to desalinate water using evaporation. Check out **https://www.youtube.com/watch?v=3h49i1iDNP4 or https://www.youtube.com/watch?v=iWKUed1u87E**.
- Check out the RDN Educational Materials Lending library to borrow the *"Drop in the Bucket"* activity for your classroom: **https://www.rdn.bc.ca/educational-materials-lending-library**.
- To address the question, how did water get to earth in the first place, view the National Geographic series "One Strange Rock" where one episode describes how asteroids made of ice bombarded the earth and due to the goldilocks effect the incoming ice could become liquid once on the earth's surface.
- Access the 3-minute video to learn more about drinking water sources from the Drinking Water and Watershed Protection (DWWP) Educational Video Series: **LINK**

Part 2 Movement of WATER

SLIDES 23 - 39
90 MINUTES

MATERIALS NEEDED

- **"Water cycle"** activity supplies
  - **"Water cycle words"** student handout, print one set per group, plan for 2-3 students per group
  - **"Water cycle"** teacher story
- **"Runoff walk"** activity supplies
  - **"Runoff walk"** handout, print one per student or pair of students
  - Clipboard and pen/pencil for each student or pair of students
  - Water bottle and food colouring

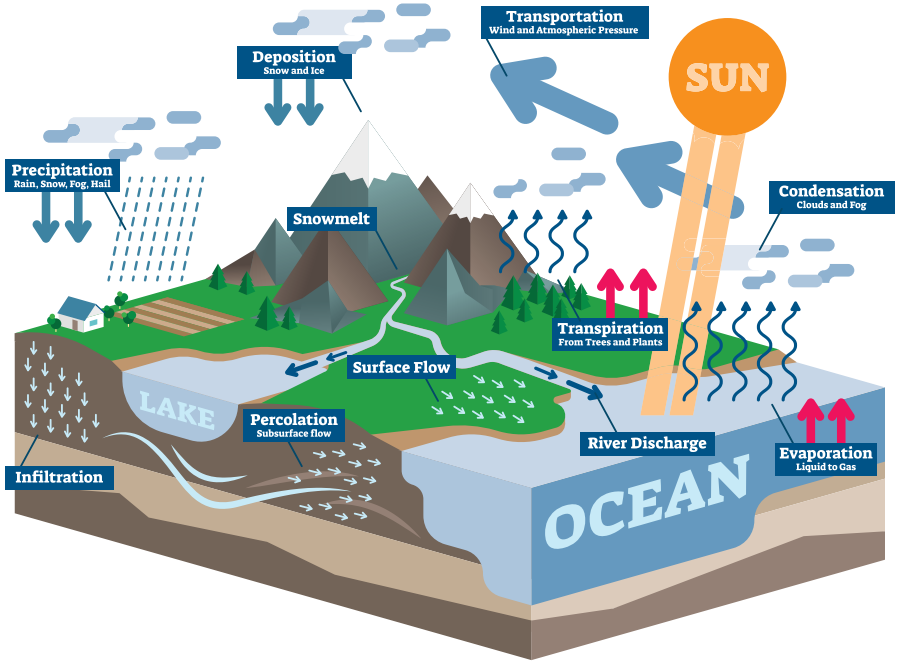
- **"Watershed model"** experiment supplies
  - Paper, two pieces per student
  - Coloured *washable* markers for each student (blue, brown, green, red) Note: permanent markers are not as effective
  - Spray bottle full of water for each group, plan for 4-6 students per group
  - Tray and towel for each group

Water Cycle

a. At slide 24 start with a drawing game with elements in the water cycle. Tell students they will have about 10 seconds to draw each image and create a picture. As you click on the slide the next image for students to draw will appear. After pictures are complete, ask students to share what they have drawn and what happens in this simple water cycle using the scientific words like evaporation, precipitation and condensation. Slide 31 shows a water cycle image. Tell students that this is a simplified diagram of the water cycle but there are more elements involved.

b. Organize students in small groups of 2-3 students providing them with a copy of the **"Water cycle words"** handout. Ask students to cut out the words and lay them out visible on a desk. Ask students to share the definitions of the words. Tell them that you will read a story, and that each time you pause and point to the class, they will hold up the missing word. At slide 32 read the interactive **"Water cycle"** story.

c. At slide 33, show students the more complex version of the water cycle, and review the different components described in the story like snowmelt, infiltration, surface flow, transpiration, river discharge, freshwater storage, transportation, evaporation, condensation and precipitation.



Runoff Walk

d. Gather the **"Runoff walk"** student handouts, clipboards, and pens/pencils, water bottle and food colouring in preparation to head outside. Provide each student (or pair of students) with the **"Runoff walk"** student handout, clipboard, and pen/pencil. Head outside to explore how different components of the water cycle are visible. Students will record their findings on the handout.

e. Gather students together to discuss what they observed. Ask them to envision water running to these areas. What happens? Where does the water go? Is it moving uphill or downhill? Where are the storm drains, and why are they in that location? Where does the water go when it goes down the storm drain? What happens when there is so much water? If there are no storm drains, where does the water go?

f. Discuss the difference between upstream and downstream. Find an area where there is already flowing water on the ground or bring a water bottle and pour water on the ground in an area where it will flow and tell students to point upstream and then downstream. Add a few drops of food colouring to the water and watch how it flows. Discuss how water contamination like weed killers, fertilizers, oil leaks, cleaning products can affect plants, animals and drinking water downstream.

Watershed Model

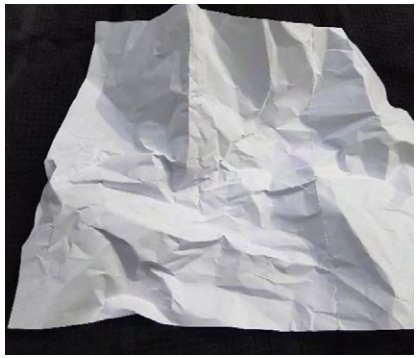
g. Challenge students to create a watershed model to explore what happens in watersheds. Set up “waterproof” areas with a tray, towel, and spray bottle for groups of 4-6 students to access. This activity could be done outside.

h. At slides 35-36, provide each student with a piece of paper and ask them to crumple it up as much as they want to. Then uncrumple the paper without flattening it.

i. Tell students to imagine that this paper is the land, and the bumps are the mountains and hills. Students then use a blue marker to draw on the paper where they think the rivers, streams and lakes might be. Show students slide 37 an example of possible water courses they could draw.

j. Each student then brings their paper to the waterproof area and uses the spray bottle to lightly spray the paper. Remind them that the goal is to spray only a fine mist of water. Water will run down the “hills” to the rivers, streams and lakes. Slide 38 depicts our spray bottle and model. Ask students to examine their papers. Did they predict correctly what would happen to the water?

k. Using the second piece of paper repeat the experiment, but this time, use different colours to identify different landmarks on the paper. They may use blue for rivers, lakes and streams; brown to colour the tops of the hills; green for forests, lawns and farms; red for towns, houses and businesses. Slide 39 shows our example with everything coloured. Ask students to again lightly spray water on the maps predicting what happened first.

TEACHERS NOTES

l. Discuss what students noticed about how the colours ran with the water. Some debrief questions may include:

- What does this teach us about what happens in our watersheds?
- What might end up in the rivers, lakes and streams because of the way water moves? (i.e., dirt and leaves, garbage, fertilizers/ pesticides on grass and gardens, other pollutants spilled on the ground like oil)
- What areas on the map were the most affected by contamination?
- If water moves downstream, how do pollutants move?
- Who is affected by contamination in the water?
- What are ways we can help keep our watershed clean?
- Where does water from our neighbourhood go? Who else lives downstream (human and non-human)?

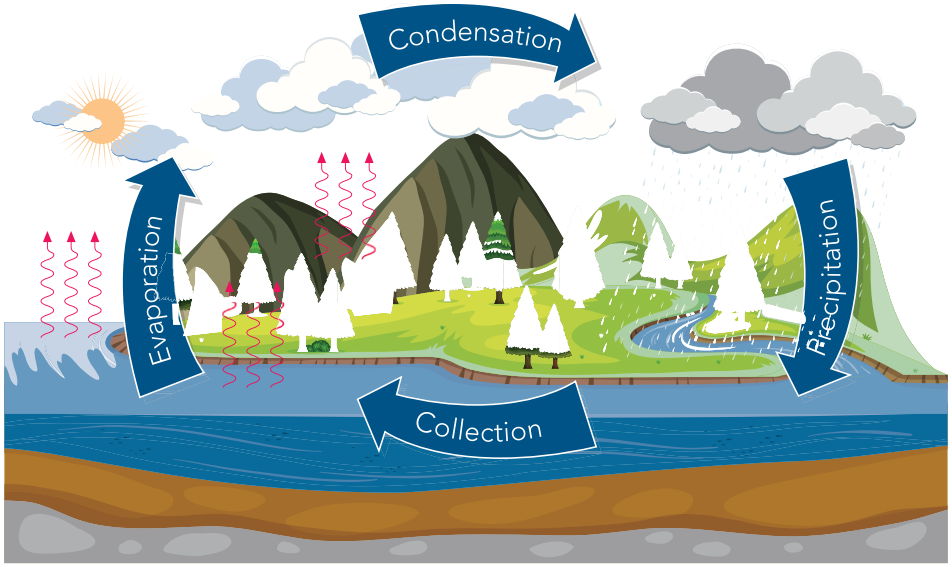
m. Conclude by sharing that water is always on the move, and we live in a watershed, meaning that water around us is upstream and downstream; we should always be mindful of our activities, and how we can affect the water that we all depend on. What we do on the land impacts our water; what we do in our homes, on our farms, in our forests affects our water. Water connects far away places because of how it moves and how it can transport what it comes into contact with.

LEARNING OBJECTIVES

- To learn about the water cycle, and how water moves around the earth.
- To go outside and investigate how water moves.
- To build a watershed model to learn how water moves and how various actions affect water quality.

EXTENSIONS

- Check out the RDN Educational Materials Lending library to borrow the watershed model for your classroom: **https://www.rdn.bc.ca/educational-materials-lending-library** and view this video to learn how to use the model in your classroom: (**https://www.youtube.com/watch?v=l8O5Hy4UzJg**).
- Design a simple water cycle game to play with primary buddies or borrow the water cycle race game from the RDN Educational Materials Lending library **https://www.rdn.bc.ca/educational-materials-lending-library**.



Part 3 Water Sources in **OUR REGION**

SLIDES 40-43
75 MINUTES

MATERIALS NEEDED

- ☐ **"Groundwater or surface water"** signs, print one
- ☐ Computers or tablets for students to work on
- ☐ **"Drinking water regional map"** handout, print one per student

TEACHER NOTES

Groundwater or Surface Water Game

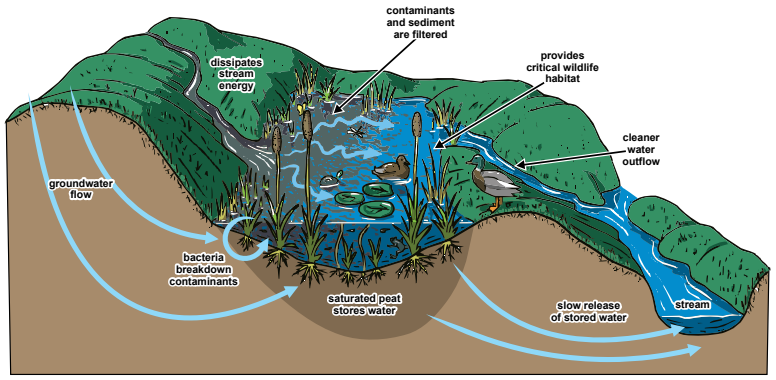
a. Slide 41 shows examples of groundwater and surface water. Ask students to explain the difference: groundwater is water held underground in soil or between rocks, in some cases forming aquifers and surface water is bodies of water on the surface like rivers and lakes.

b. Using the **"Groundwater or surface water"** signs, identify one side of the classroom as "groundwater" and the other side as "surface water." Tell students that you will ask questions and they are to move to the side of the room that they think answers the question. Read the following questions:

i. Some residents get their water from wells - is that surface water or groundwater? **(Groundwater)**
ii. Water is coming from a creek - is that surface water or groundwater? **(Surface water)**
iii. Town of Qualicum Beach is mostly supplied by aquifers - is that surface water or groundwater? **(Groundwater)**
iv. Water stored in fractures in bedrock - is that surface water or groundwater? **(Groundwater)**
v. Water in a ditch - is that surface water or groundwater? **(Surface water)**
vi. Water in the Englishman River/Kixwem'olh - is that surface water or groundwater? **(Surface water)**. Fun fact: there is groundwater that also contributes to the stream flow, coming into the river through the bedrock fractures that intersect the river.
vii. Water in a wetland - is that surface water or groundwater? **(Surface water)** water in a wetland is slowed, captured, filtered, and infiltrated to groundwater, which then may resurface again in the wetland or nearby creek/stream as surface water!
viii. Water stored in the top layer of soil in your garden - is that surface water or groundwater? **(Surface water)**. If it's stored in the top layers of the ground it could evaporate in the hot sun so considered surface water.
ix. Water in Jump lake - is that surface water or groundwater? **(Surface water)**
x. Gabriola Island residents get most of their drinking water from surface water or groundwater? **(Groundwater)**

c. Conclude this activity by having a discussion about how water moves. Sometimes water might start as surface water, but disappear into underground aquifers, or start in a wetland and infiltrate to groundwater. Review some of the terms we learned in the earlier activity about the water cycle: infiltration, surface flow, transpiration, and driver discharge, and consider how they relate to the surface and groundwater in our region. Water is always on the move!

HOW WETLANDS WORK



TEACHER NOTES

Drinking Water Regional Map

d. This activity is best done if each student has access to a computer or tablet but can also be done on a large screen in front of the class.

e. Go to the RDN Watersheds website: **"RDN Watersheds Map"** and help students to identify which region they live in and click on it. Slide 43 shows the image of all the regions, where students will start.

f. Show students how to click and unclick on the 6 topics along the bottom of the map – land use, water supply, aquifers, streams & waterbodies, First Nations significance, community programs – to highlight different information about the region.

g. Provide each student with a **"Drinking water regional map"** handout. Students can explore the RDN watershed site to find the information and answer the questions.

LEARNING OBJECTIVES

- To play a game to learn the differences between ground and surface water.
- To understand how water moves from surface to underground in our region.
- To explore the RDN interactive map to learn about our region including where our water comes.

EXTENSIONS

- Do you want to see where the drinking water for the City of Nanaimo comes from? RDN Team WaterSmart will take you on a virtual field trip in the Nanaimo River Watershed, to learn more about the source water for the City of Nanaimo. Check out the 15-minute video, here: **https://www.youtube.com/watch?v=jqUUIpNpHxs**.
- To learn more about drinking water in your region, click on the "source of your drinking water" video: **LINK**

Part 4 How Water CONNECTS US

SLIDES 44-52
30 MINUTES

MATERIALS NEEDED

- ☐ **"Ecosystem labels"** student handout, print one copy per student (2 versions, in colour or b/w)
- ☐ **"Kwulasulwut"** by Ellen White, a copy can be borrowed from SD68 and SD69 lending libraries
- ☐ **"The Raven and the Raccoon Activity"** handout, page 2, one copy per student
- ☐ Felt pens and/or pencils

TEACHER NOTES

Are We Connected?

a. On slide 45, show the image and review with students what a watershed is, that we live in a watershed, and water moves in the watershed, down mountains, infiltrating the ground into aquifers and on the surface in rivers, streams and lakes.

b. Provide each student with a **"Ecosystem labels"** student handout and ask them to label the image with the words at the bottom of the handout, to identify all the different ways that the ecosystem interacts with water.

c. At slide 46, ask students to share their answers, noting that there might be more than one option for each label. Discuss how different activities might affect the ecosystem and the water, like what happens if there is not enough precipitation? What happens if the trees are cut down in the forest? How does the city impact the water?

d. On slide 47, ask students to choose which of these 4 parts of the ecosystem is the ***most*** important for a healthy ecosystem and clean water, and write it down as a commitment to that choice.

e. At slide 48, ask those who chose precipitation to stand up and mime being precipitation. Then ask them to share why they feel they are most important and considering what would happen if there was no precipitation, like no water for us, or the animals, salmon, and the forest. Tell students that they are important, in fact essential to the ecosystem but not the ***most*** important.

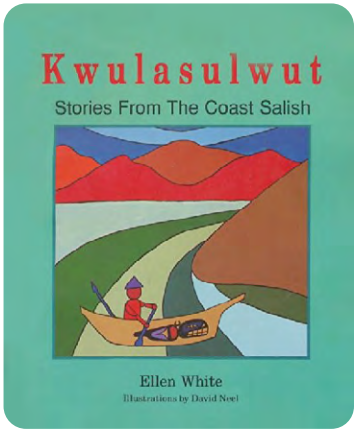
f. At slide 49, ask those who chose salmon to stand up and mime being salmon. Then ask them to share why they feel they are most important and considering what would happen if there were no salmon, like the bears and eagles would go hungry, and the forest would not get the salmon debris, which in turn would affect the water. Tell students that they are important, in fact essential to the ecosystem but not the ***most*** important.

g. At slide 50, ask those who chose forest to stand up and mime being a tree. Then ask them to share why they feel they are most important and considering what would happen if there were no forest, like there would be no habitat for animals, and the soil and rocks would be unstable, eroding into the water courses. Tell students that they are important, in fact essential to the ecosystem but not the ***most*** important.

h. At slide 51, ask those who chose river to stand up and mime being river. Then ask them to share why they feel they are most important and considering what would happen if there were no river, like there would be no habitat for the salmon, and no water for us and the animals and forest. Tell students that they are important, in fact essential to the ecosystem but not the ***most*** important.

i. At slide 52, conclude this game by sharing that ***everything*** in the ecosystem is important, and essential to the ecosystem and that losing one thing affects the health of whole ecosystem and the water. A healthy ecosystem means healthy water for us all to share. Therefore, we equally need the precipitation, salmon, forest and rivers.

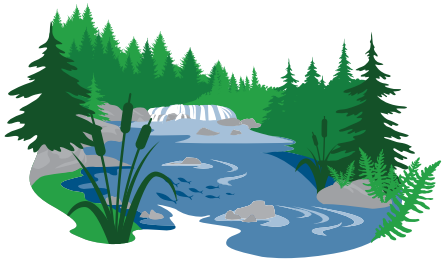
First Peoples Perspective

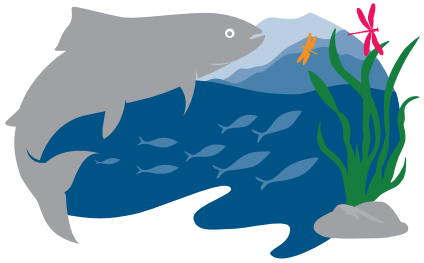


j. Discuss the First People's knowledge of ecosystems and water. If any part of the interconnected system is abused or neglected, the whole system will feel the impact. Based on these concepts, knowledge of the land as well as the plants, animals and even objects that reside on the land, should be the backbone of managing our freshwater sources in the region. A healthy watershed ecosystem means healthy water for everyone and everything. Ask students to consider why Indigenous cultures have such a deep knowledge of ecosystems, land and water? One reason is because their people have been on this land since time immemorial, co-evolving with this place, learning through direct experience and interaction and observation and connection through stories and learnings passed on through generations.

k. Read the "The Raven and the Racoon" from the book "Kwulasulwut" by the late Ellen White from Snuneymuxw. By reading this story, students will learn about how Raven and Racoon interacted with two freshwater sources, staĺuẇ (river) and x̌ax̌ca' (little lake, pond). Share that the First Peoples Principles of Learning show that learning involves recognizing that some knowledge is sacred and only shared with permission and/or in certain circumstances. When we read a Coast Salish story, it is very important to say how you came to know the story. Stories used to only be shared orally (by telling the story out loud), but now we have written and oral stories.

l. Distribute one copy of page 2 of the **"Raven and the Raccoon Activity"** to each student. In the story, there are two types of freshwater so students will explore the role of each freshwater source.





LEARNING OBJECTIVES

- To learn that we are all connected, and equally important to each other and the health of our water.
- To learn a little about First Peoples' perspective on our ecosystems and water.

EXTENSIONS

- Invite a First Nations elder to your class (in person or virtual) to speak about their connection to water.
- Access the Indigenous Learning Resources List developed by SD68 nlpslearns.sd68.bc.ca/indigenous-education/#resources
- Borrow the Macro Mayhem and benthic macroinvertebrates exploration activity kit from the RDN Educational Materials Lending library **https://www.rdn.bc.ca/educational-materials-lending-library**. This activity will further water connectedness learning and bring awareness to the importance of stream insects as indicators of healthy streams and clean water, how aquatic insects are the base of major food webs (eg. salmon), how pollution can impact stream insects, and how species distribution tells a story of stream water quality. Post activity, ask students the following questions:
  i. These stream insects are important food sources for fish and indicators of a healthy stream and clean water: ***aquatic/benthic macroinvertebrates***
  ii. Which of these stream invertebrates is tolerant of pollution, caddis fly nymph or midge larvae?: ***midge larvae***
  iii. Which of these stream invertebrates is an indicator of clean water, stonefly nymph or mosquito larvae?: ***stonefly nymph***
  iv. This is where benthic macroinvertebrates spend some or most of their lives: ***the stream***!
- Share the "Water Connects Us" video with your class to further the conversation: **LINK**
- Check out the Junior Streamkeepers training offered by a local biologist – Dave Clough: **LINK**
- Bring the Macroinvertebrate Exploration and Aquatic Ecosystem Health lesson to your classroom! A Nanaimo & Area Land Trust (NALT) educator provides a hands-on learning experience for your class that will provide a basic understanding of how and why invertebrates are important in aquatic ecosystems and how we can use them as bioindicators of aquatic ecosystem health. Connect with us at stewardship@nalt.bc.ca.

Part 5 Water for a SUSTAINABLE FUTURE

SLIDES 53-60
90 MINUTES

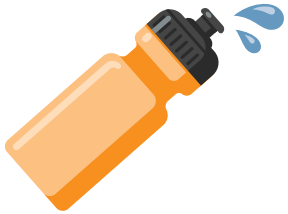
MATERIALS NEEDED

- ☐ **"Permeability survey"** activity supplies
  - **"Permeability survey"** student handout, print one copy per group, plan for 3-4 students per group.
  - Clipboard and pen/pencil for each group
  - Water bottle filled with water, one same sized bottle per student (500ml, 750ml or 1000ml)
  - Something to track time: timer, watch, phone
  - String, to mark an area, about 4 metres per group
- ☐ Computers or tablets for students to work on (optional for "sharing the message" activity)

TEACHER NOTES

Down the Drain

a. At slide 54, discuss what permeability means in terms of water, like the rate water can penetrate or pass through. For example, water will pass through a sieve fast, making it very permeable, but slower through a coffee filter, making it less permeable. Have students consider things that are less or more permeable like a rain jacket versus a sweatshirt, or a rock versus a sponge.



b. At slide 55, put students into groups of 3-4 students and provide each group with the survey supplies: **"Permeability survey"** student handout, clipboard and pen/pencil, water bottle full of water per student and about 4 metres of string. Explain that they will be going outside to predict and test the permeability of various surfaces to see which are the most permeable. Remind students that if a surface is more permeable the water will go through more easily and disappear quicker.

c. Head outside and tell students to follow the instructions in their "Permeability survey" student handout. Find the first area listed (paved surface) and mark off a square experiment area using the string. Describe the area and make a prediction about whether this surface is permeable or not, and what they think will happen. Next pour one bottle of water on the area, observe and using a timer or a watch, time how long, if at all, it takes for the water to disappear from the surface, or if something else happens to the water. Record the results. Then students move to the next surface.

d. After students have completed this experiment on all three surfaces: paved surface, soft ground and hard packed ground, head back inside.

e. Back in the classroom ask students to share their findings. What surfaces were more permeable, and more naturally part of the water cycle? If the surface is more permeable the water can infiltrate recharging underground water, in a more natural cycle. Often in urban environment there are more impermeable surface like roads, surface parking, roofs of buildings and the water from these surfaces flows into storm drains. This can cause issues in heavy rainfall as large amounts of impermeable surfaces mean large amounts of water and the storm drains can overflow causing flooding. So ideally, we want to design our urban areas to have lots of permeable surfaces to get water back into the ground.

f. Slide 56 shows an example of a shopping mall with surface parking. All of the water from the roof of the building and all the parking surface goes to storm drains. Ask students to consider how we might design differently to have more permeable surfaces. Discuss how we can help the water cycle by creating different kinds of outdoor spaces that help the water get back into the ground.
g. Slide 57 shows a bioswale, the water from the parking lot runs into the bioswale which is planted and allows water to infiltrate into the ground.
h. Slide 58 shows permeable paving that is concrete with gaps between to allow water to penetrate the ground. Cars could drive on this surface replacing the impermeable asphalt.
i. Slide 59 shows a green roof which slows down the flow of water. The plants use some of the water and some is evaporated as part of the natural water cycle. Green roofs cool down our cities too, just like forests do, and are beautiful!
j. Slide 60 shows a video on rain gardens, which is another way to slow down water from downspouts of buildings and get water into the ground.
k. Ask students to share their ideas of how to increase permeability and get water into the ground. Watch these videos on bioswales and innovative stormwater management.
https://www.youtube.com/watch?v=oYRtCznZj7k and **https://www.youtube.com/watch?v=bVbiDjxNTM4**

Sharing the Message

l. Ask students to share the message of water-friendly design, by creating a marketing piece highlighting the benefits of one of the strategies shown in the slide or creating their own strategy. They can create a PowerPoint, a video, or a print ad with graphics and messaging to share with RDN residents why this makes sense and what it does to protect freshwater. Direct students to resources, including **https://www.getinvolved.rdn.ca/team-watersmart**, to learn about local rebates like well water testing and rainwater harvesting. Go to the Get Involved page to post your ideas and become a member of Team WaterSmart.

LEARNING OBJECTIVES

- To explore permeability and scientifically test and observe various surfaces outside to compare their permeability.
- To learn about strategies in design to get water back into the ground.
- To share a message on water-friendly design using a variety of media like PowerPoint, video or print ad with graphics.

EXTENSIONS

- Have students research new and emerging careers in water management and sustainable development.
- Watch these videos on watershed scale, neighbourhood scale and property scale stormwater management:
  - **https://www.youtube.com/watch?v=qIsDAewDgT8 Watershed scale**
  - **https://www.youtube.com/watch?v=emQ8p6LGByU Neighbourhood scale**
  - **https://www.youtube.com/watch?v=bVAOOjRoEB4 Property scale**

Part 6 Water WRAP-UP

SLIDES 61-94
30 MINUTES

MATERIALS NEEDED

- ☐ **"Water challenge game"** teacher instructions

TEACHER NOTES

Wrap Up Review

a. Review with the class what we have learned about water:

   i. How early communities lived by water to have access for drinking, washing, cooking, fishing and growing food and that water is an important part of Indigenous spirituality and culture – water is seen as alive and living. We need freshwater to survive, and that freshwater is a very small percentage of the water available to us on earth.

   ii. How the water cycle moves water around the earth with rain, sun, and clouds, that water can be found everywhere and that it's always on the move, going down a hill, up a tree and evaporating with heat from the sun.

   iii. How water is vital to every living thing and discover where our drinking water here is sourced: groundwater, rivers and lakes, and rainwater.

   iv. How in our natural world everything is important and connected, and that we need to work together, and care for everything including water.

   v. How we can design our home and city landscapes to be water-friendly, with permeable surfaces that support the natural water cycle and protect the water.

TEACHER NOTES

Wrap Up

b. Pull up the **"Water challenge game"** teacher instructions to guide you through the game.

c. Arrange students in groups of 4-5 and ask students to make up a team name. Write all of the team names on the board. The game will end when all the questions are answered and the group with the most points wins.

d. At slide 62 open the game . Teams take turns choosing a category and point level (i.e., water cycle for 200 points). Click on that box, and it will take you to the question.

e. The team that chose the question has 10 seconds to provide their answer. If they are correct, they get the points. If they are incorrect, another team can steal the points by raising their hands and, if selected, answering correctly. Each team only gets one guess.

f. Continue until all the questions are answered and the team with the most points wins!

LEARNING OBJECTIVES

- To review what we learned about water.
- To participate in a fun game to test knowledge and understanding of water.

EXTENSIONS

- Challenge students to write their own "bonus" questions to ask and answer for extra points.

REGIONAL DISTRICT OF NANAIMO