



Lesson 1

Water Users and Uses



Learning Standards & Assessment Tools



Time



Resources



Activities



Handouts



Letters to Parents/Guardians





Lessons address a number of curriculum topics and learning standards. Examples of curriculum links are listed below. It is expected that learning standards will be developed throughout the units.

Science

Big Ideas

- ▶ Water is essential to all living things, and it cycles through the environment.

Content

- ▶ Water sources including local watersheds

English Language Arts

Big Ideas

- ▶ Through listening and speaking, we connect with others and share our world.
- ▶ Curiosity and wonder lead us to new discoveries about ourselves and the world around us.

Content

- ▶ Strategies and processes
 - oral language strategies



60 minutes

Lesson 1:

Water Users and Uses

Purpose

In this lesson, students are introduced to the unit topic of water, water conservation, and the importance of water in their everyday lives. They begin a class Know-Wonder-Learn (KWL) chart that will be developed throughout the unit.

Preparation

- ▶ “Water use display” download OR collect items listed under Materials.
(https://www.crd.bc.ca/docs/default-source/Partnerships-PDF/every-drop-counts/water-use-images-.pdf?sfvrsn=a5dc8bc9_0)
- ▶ “KWL” Chart OR Rethink Web - download or prepare your own (can be used throughout unit).
- ▶ Computer and projector- prepare if using the electronic “Water use display” and/or electronic KWL chart
- ▶ Photocopy “How I Use Water” student activity sheet (1/ student) (double sided blank and interlined for written and visual representation)
- ▶ Photocopy Performance Grid (1/ student)
- ▶ Prepare materials for Water Portfolios (envelope, folder or cereal box- 1/student)
- ▶ Optional: Parent Handout/email: Introduction

Procedure



Warm-Up Activity

“Water use display” - What do you think is the one thing these images/ items have in common? Why?

Explain that students...

- ▶ will be put into AB partners (one person is A, the other B)
- ▶ then they will see a slideshow of pictures (OR examine all the items you have set up on display)
- ▶ will guess (silently) the one thing that all of these items have in common.



Educator's Kits, including hardcopy lesson plans and support materials, are available for loan through the CRD. For pickup locations, print-friendly materials and multimedia tools see www.crd.bc.ca/teacher or contact the CRD at 250.360.3133.

Lesson Resources

- ▶ KWL chart (Know Wonder Learn)

Note that this chart will be developed throughout the course of the unit, so it should be created in a format that will last.

- ▶ computer and projector (if using electronic version)
- ▶ "Water use display" slideshow or collect images and items such as:
 - Map of the Greater Victoria Drinking Water Supply System (included in kit)
 - "I Can Help Save Water" book (included in kit)
 - bodies of water (e.g., ocean, lake, aquifer, river, stream, pond, marsh, wetland)
 - animals using water (e.g., animals at a watering hole, farm animals at a trough, fish swimming in water, ducks floating on water)
 - people using water (e.g., swimming, boating, skiing, washing clothes)
 - a glass of juice or milk
 - an assortment of fresh fruits and vegetables
 - a houseplant
 - an umbrella
 - a bottle of shampoo or dishwashing liquid
- ▶ Poster Board- "All living things need water to survive"
- ▶ Large paper cloud (or tap) cut out and string (optional)
- ▶ "How I Use Water", 1/student
- ▶ Performance Grid (optional)
- ▶ Portfolio (Folder, envelope, cereal box or other)

- ▶ A and then B will have 1 minute each to share "What do you think is the one thing these items have in common? Do you agree?" (it can be helpful to write the question on the board for reference)
- ▶ A (or B, or a volunteer) from each group will be invited to share their combined guess and reasons with the class.
- ▶ Review listening and speaking strategies for sharing information, then proceed with above steps.
- ▶ Did they agree? Did anyone guess the answer was water?

Transition: Explain to students that over the next several weeks they will be engaging in a number of activities to learn about water and that together you will track what they know, what they are curious about and what they learn using a KWL or Rethink Web.



Know Wonder Learn (KWL) chart

Ask students what they know about water and how it is used.

Record their responses in the Know column, even if it is incorrect. Have students revisit these and alter statements as needed, recording changes in the "Learned" column.

Allow discussion of facts suggested; if anyone disagrees with a particular item, record it in the Wonder column with a question mark.

Ask students to suggest what else they want to learn about water and record their responses in the Wonder column.

Transition: After ideas have been exhausted (although more will be generated throughout the unit), read the Know column aloud. Ask students if they can make any generalizations about the information they've gathered. Can the information be grouped into themes? Use prompts ("Who uses water?", "How is water used?", "Can anything living survive without water?") to guide the discussion until students begin to understand that all living things need water to survive.

Write "**Water is essential to all living things**" on a piece of paper or poster board, and post in the classroom.

Throughout the unit, add learned information, answer previous questions, correct misinformation and add new questions.



"How I use water" Activity

(Drawing, simple poem, other representation)

1. Tell the students a story about how you use water.
2. Display the student activity sheet "How I use water" (copy on to the board or display electronically)
3. Fill in the "How I use water" template displayed with the style of representation you would like students to use (drawing, simple poem or other).
4. Using the Performance Grid, set up and demonstrate the steps and criteria for successful completion.
5. Explain that students will "fill in" their own water drop of one way they use water.
6. Ask students to think about the different ways they use water at home, at school, and in the community.



Teacher Resources

- ▶ “Did You Know? Facts and stats about water”
- ▶ “Questions students ask about water”
- ▶ Letter or email “Introduction”

7. Have them talk about some of these water uses with their partner and share some of their responses with the class.
8. Distribute the student handout, “How I Use Water” reminding students to refer to the criteria.



Assessment Opportunity

Students can:

- fill-in the performance grid as a self-assessment or peer-assessment exercise using predetermined criteria
- present their activity sheet by completing the following stem: “All living things need water. One way I use water is...”
- include their activity sheet “How I use water” in their Water Portfolios.



Curricular Competencies

Look for evidence that students are able to:

English Language Arts

- ▶ Comprehend and connect (reading, listening, viewing)
 - Use sources of information and prior knowledge to make meaning
 - Use developmentally appropriate reading, listening and viewing strategies to make meaning
 - Engage actively as listeners, viewers, and readers, as appropriate, to develop understanding of self, identity, and community
- ▶ Create and communicate (writing, speaking, representing)
 - Exchange ideas and perspectives to build shared understanding

Science

- ▶ Questioning and predicting
 - Observe objects and events in familiar context
 - Ask questions about familiar objects and events
 - Make simple predictions about familiar objects and events
- ▶ Processing and Analyzing
 - Identify simple patterns and connections
- ▶ Evaluating
 - Compare observations with those of others
- ▶ Communicating
 - Communicate observations and ideas using oral or written language, drawing, or role-play



Extensions and Adaptations

- ▶ Post students' completed "How I Use Water" activity sheets on a bulletin board in the classroom or school hallway. Or cut out a large paper cloud (or tap) and string students' "How I use water" activity sheet raindrops from it.
- ▶ Have students group the completed "How I Use Water" activity sheets into categories such as "for survival", "for fun", "for transportation"...
- ▶ Student activity "How I use water"- Tailor criteria appropriate to student level. The blank and interlined sheets allow for flexibility of assignment.
- ▶ KWL and/or Rethink Webs can be completed individually (graphically or with text)
- ▶ Optional: Distribute the parent handout "Introduction" for students to take home or copy and paste into an email.

"KWL" Chart or Rethink Web

Follow same format as above, however, each time you revisit the chart or web, use a different colour pen. Keep a legend of the pen colour relative to the date or lesson to track evolution of learning.



Curricular Integration

English Language Arts: Use this lesson as the basis for developing students' oral presentation skills (i.e. in presenting their completed student handouts).

Science: Have students make connections between how they use water and how plants and animals use water. Discuss how different plants and animals are adapted to living in water.



Facts and Stats About Water

Use the following information to answer students' questions or as daily trivia. Look for these symbols for:

-  Regional/Provincial information
-  Canadian information
-  Global information

Human Water Use

-  Each person in the Capital Regional District (CRD) uses an average of 232 litres of water per day (based on 2015-2017 averages).
-  The average residential water use for Canada (2013) is 250 litres per day.
<https://www150.statcan.gc.ca/n1/daily-quotidien/170321/dq170321b-eng.htm>
-  Water makes up about 65% of human bodies.
www.ec.gc.ca/eau-water/default.asp?lang=En&n=2AE761EC-1
<https://water.usgs.gov/edu/propertyyou.html>
-  About 83% of our lungs are water.
<https://water.usgs.gov/edu/propertyyou.html>
-  About 65% of indoor home water use occurs in our bathrooms. Toilets are the single greatest water user inside the home. Showers and baths are the greatest water use in the home - 35% of indoor water use.
<https://www.ec.gc.ca/eau-water/default.asp?lang=en&n=00EEE0E6-1>
-  A water-efficient toilet uses only 4.8 L or less per flush. BC Building Code requires the installation of 4.8 L/flush toilets or dual-flush toilets in new residential buildings and for renovations involving plumbing fixtures.
<https://www.crd.bc.ca/education/water-conservation/at-home/household-water-use>
-  A five-minute shower with a standard showerhead (20 L/min) uses 100 L of water. A five-minute shower with a low-flow (7.6 L/min) showerhead uses only 38 L of water.
-  Astronauts on the International Space Station use less than 4L of water to bathe.
https://science.nasa.gov/science-news/science-at-nasa/2000/ast02nov_1
-  Five main water users (water that is taken out of rivers, lakes, etc. before use) in Canada are Agriculture 5% , Municipal (including household) 9%, Manufacturing 10%, Mining is 3% and the largest percentage goes to generating electricity - 68%.
<https://www150.statcan.gc.ca/n1/daily-quotidien/170321/dq170321b-eng.htm>
-  Only 10% of the tap water used at home is used in the kitchen for drinking and cooking purposes. The rest is used for washing ourselves, our dishes, our clothes, our vehicles, and for flushing toilets and watering our gardens.
<https://www.ec.gc.ca/eau-water/default.asp?lang=en&n=00EEE0E6-1>
-  During the summer, 50% of all treated municipal water is used for watering lawns and gardens.
<https://www.crd.bc.ca/education/water-conservation/at-home/outdoor-water-use>
-  Half of the water use in Canada is unnecessary and wasteful- commonly caused by leaks and overwatering lawns.
<https://www.ec.gc.ca/eau-water/default.asp?lang=en&n=00EEE0E6-1>
-  Globally, approximately 3.575 million people die each year from water-related diseases. The majority of these deaths are children.
<http://static.water.org/pdfs/WaterCrisis09.pdf>
-  98% of water-related deaths occur in developing countries.
<http://static.water.org/pdfs/WaterCrisis09.pdf>
-  Globally, one in eight people do not have access to clean drinking water.
<http://static.water.org/pdfs/WaterCrisis09.pdf>



Facts and Stats About Water

Plant and Animal Water Use

- Water makes up about 70% of the weight of most plants and animals.
- A cow drinks about 45-136 litres of water a day.
- A chicken is about 75% water.
- A tomato is about 95% water.
- Many carnivorous animals can get all the water they need by drinking the blood of the prey they eat.
- Native plants need little or no watering other than rainfall once they are established.
<https://www.crd.bc.ca/education/natural-gardening>

Water in Manufacturing and Agriculture

- Approximately 10 litres of water is required to manufacture 1 litre of gasoline.
- Approximately 140 litres of water is required to grow and process 1kg of potatoes.
www.smallholder.co.uk/news/8857744.How_much_water_do_potatoes_use_from_growing_to_processing_/
- It takes 10 litres of water to make a sheet of paper. However, there are paper factories that reuse and re-circulate the water used to make paper.
<https://www.theatlantic.com/technology/archive/2012/06/it-takes-more-than-3-gallons-of-water-to-make-a-single-sheet-of-paper/258838/>
- Approximately 80,000 litres of water is required to produce 1000kg of steel.

Water and the Environment

- About 75% of the Earth's surface is covered in water. However, 97% of the planet's water is too salty for humans and most animals and plants. Another 2% of the water is held as glacial ice at the north and south poles. Only 1% of the Earth's water is fresh water.
- Although much of coastal BC is considered "rain forest," the Greater Victoria area is a "rain shadow" region thanks to the Olympic mountains which receive the bulk of the precipitation. Victoria receives only half the rainfall annually that Vancouver does.
www.bing.com/images/search?q=olympic+mountain+rain+shadow&view=detail&id=55CC975DC479BF8B5B2ADA00197B67D84F4709F4&first=31&FORM=IDFRIR
- Approximately 8% of British Columbians rely on private wells (groundwater) as their sole source of drinking water.
www.ec.gc.ca/Publications/B77CE4D0-80D4-4FEB-AFFA-0201BE6FB37B/2011-Municipal-Water-Use-Report-2009-Stats_Eng.pdf
- The Great Lakes, straddling the Canada-US border, contain 21% of the world's fresh water.
- The highest waterfall in Canada is Della Falls in Strathcona Provincial Park, Vancouver Island, BC at 440 metres.
<https://www.thecanadianencyclopedia.ca/en/article/waterfall/>
- Canada has 20% of the world's total freshwater resources. However, less than half of this water is accessible (not underground in aquifers or frozen in glaciers)
www.ec.gc.ca/eau-water/default.asp?lang=En&n=1C100657-1#ws46B1DCCC¹

¹ In this resource "accessible" replaces Environment Canada's term "renewable" to describe fresh water that is readily available for consumption. This is to avoid the confusion with "renewable resources" which can be replaced over time through natural processes. Water cannot be grown, made or created.



Facts and Stats About Water

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 Canada has 7% of the world's accessible freshwater, with less than 1% of the world's population.
www.ec.gc.ca/eau-water/default.asp?lang=En&n=1C100657-1#ws46B1DCCC
- 
 Half of the freshwater in Canada flows into the Arctic Ocean and Hudson Bay, and is therefore unavailable to 85% of the population.
www.ec.gc.ca/eau-water/default.asp?lang=En&n=1C100657-1#ws46B1DCCC
- 
 The wettest place in Canada, on average, is Henderson Lake, BC, almost 6,700 mm precipitation per year. The wettest community is Prince Rupert, BC. Explore Canada's mean annual precipitation:
<https://www.nrcan.gc.ca/earth-sciences/geography/atlas-canada/selected-thematic-maps/16888#distributionofwater>
- 
 The driest place in Canada (with the least amount of precipitation) is Arctic Bay, Nunavut, with an average 12.7 mm of precipitation per year.
- 
 The largest lake entirely in Canada is Great Bear Lake in the NWT at 31,328 square kilometres.
<https://www.canadiangeographic.ca/article/infographic-canadas-10-largest-lakes-volume>
- 
 The longest Canadian river is the Mackenzie River in the NWT at 4,241 kilometres.
- 
 One drop of oil can contaminate 25 litres of drinking water.
<https://www.canada.ca/en/environment-climate-change/services/water-overview/quality.html>
- 
 For additional Canadian water stats and facts visit
https://www.statcan.gc.ca/eng/dai/smr08/2017/smr08_215_2017

Water Science

- 
 Water boils at 100°C (212°F). Water freezes at 0°C (32°F).
- 
 Water expands when it freezes.
- 
 Once evaporated, a water molecule spends about 10 days in the air.
- 
 Water forms the basis of many metric measurements. 1 ml or 1 cm³ of water weighs 1 gram. 1 calorie (4.187 joules) is the amount of energy required to raise the temperature of 1 mL of water by 1°C.
- 
 Most water is returned to the atmosphere by evaporation from the oceans, lakes, and ponds. However, water vapour also returns to the atmosphere via the respiration of animals, through the pores of plants, and from soil surfaces by drying winds.
- 
 Water can neither be created nor destroyed. It is reused. The water that we use today has been on Earth since before the time of the dinosaurs.
- 
 Water is the only matter that occurs naturally on Earth in all three physical states - liquid, solid, and gas.



Common Questions Students Ask About Water

HUMANS: Water and our bodies

-  *How much water do we need to replace in our bodies per day?* Health Canada does not recommend a specific intake of water. However, people who are very active or exposed to hot environments require more water.
http://hc-sc.gc.ca/fn-an/food-guide-aliment/educ-comm/faq_educat-eng.php#14
-  *Why is water good for you?* Flushes toxins out of the body, improves skin texture, helps with headaches and improves stomach and heart health - many more!
-  *How much water is in our bodies?* Water makes up about 65% of our bodies.
<https://water.usgs.gov/edu/propertyyou.html>
-  *How do we get water in our bodies?* By drinking water and through foods we eat.
-  *Why are tears salty?* Because your body has a lot of salt in it, so therefore things that come out of it, like sweat and tears, tend to be a bit salty too.
www.whyzz.com/why-are-tears-salty
-  *Why does blood come out of your body instead of water?* Blood runs through your body and supplies oxygen to your muscles and organs and helps to remove toxins from your body as well as healing wounds. Blood is 83% water.
-  *How does water get out of your body when you sweat?* Sweat is mainly water. The brain senses that your body is getting hot and sends a message to your sweat glands which secrete sweat to cool your body down.

HUMANS: Water in our homes

-  *How much water do we use per day?* CRD residents use an average of 232 L/day (2015-2017 averages). Residents of B.C. use 296L/day (2013) down from 312L/day in 2011.
<http://www.wpl.scarp.ubc.ca/bc-municipal-water-survey-2016/>
-  The average residential water use for Canada was 251L/day (2011) and down to 223L/day in 2013.
<https://www.ec.gc.ca/indicateurs-indicators/default.asp?%20lang=en&n=7E808512-1>
<https://www150.statcan.gc.ca/n1/pub/12-581-x/2017001/sec-1-eng.htm>
-  *At home, where to do we use the most water?* The majority of indoor water use occurs in the washroom. Toilets account for 24% of water use while showers account for 20%.
<https://www.crd.bc.ca/education/water-conservation/at-home/household-water-use/water-savings-tips>
-  *How much water is used using a non-low flow showerhead?* 20L/min
-  *Which uses less water, a bath or a shower?* A shower. A five minute shower with a low flow (9.5L/min) showerhead uses 47.5L.
-  *How much water does a water efficient toilet use?* 4.8 litres (or less) per flush, also BC Building Code requires the installation of 4.8 L/flush toilets or dual-flush toilets in new residential buildings and for renovations involving plumbing fixtures.
-  *How does water get to our homes?* In the Greater Victoria area many of us receive our drinking water from the Sooke Reservoir through large underground pipes which are split into many smaller pipes which are then connected to your home. Some homes get their water from their own well.
<http://crdatlas.ca/printable-maps/water-service-areas.aspx>
-  *How does the water we drink get back into the water cycle?* Eventually the water we drink is expelled from our bodies, flushed through wastewater treatment works (sanitary sewer) and into the ocean or groundwater (septic systems) where it evaporates into the air and joins the water cycle. Some water vapour is also expelled through breathing and sweating.



Common Questions Students Ask About Water

-  *How does water make electricity?* Water stored in dams is released through a turbine (like an airplane propeller). The water spins the turbine to create electricity, which is then put into power lines that run to your house.
-  *Why do we have a drain in our driveway?* To drain water off the driveway and streets. These drains can lead directly into local rivers and streams, that's why it is important not to use harsh chemicals on our property as it could harm fish, plants and wildlife. To help replenish the groundwater and protect our streams from gushes of stormwater, we can replace waterproof driveways and patios (e.g. concrete) with absorbent surfaces (e.g. gravel) which allow water to seep back into the ground.
-  *What would happen if we cooked with ocean water?* Your food would be very salty! (Also there is a chance it could be polluted.)

Plant and Animal Water Use

-  *Do all plants and animals need water?* Both plants and animals use water to transport nutrition throughout them and regulate their temperatures. Some can go without water for lengthy periods of time but all plants and animals need water to survive.
<http://science.howstuffworks.com/environmental/earth/geophysics/h2o5.htm>
-  *How do fish breathe in water?* Water contains 2 hydrogen atoms and 1 oxygen atom; fish have gills which can absorb the oxygen from water into their bloodstream to keep them alive. Their gills are just like human lungs which absorb oxygen from the air we breathe.

Water and the Environment

-  *Why is the earth mostly water?*
<https://water.usgs.gov/edu/earthwherewater.html>
-  *Why is the sea salty and not the other water?* The materials surrounding lakes and oceans dissolve into water making it salty. When water evaporates from the ocean the salt is left behind. Some lakes are salty as well, but in most lakes there is constant addition and removal of water from streams, therefore, limiting the amount of salt contained in them.
<http://chemistry.about.com/od/waterchemistry/f/why-is-the-ocean-salty.htm>
-  *Where does the salt go when water evaporates?* It stays in the water or in the container it is held in. Try an experiment, put some salt in water and put the glass on the window sill until the water is evaporated.
-  *How deep is the ocean?* On average is it 4.3km deep or 4300 meters, however the deepest point is approximately 11 km deep.
<http://oceanservice.noaa.gov/facts/oceandepth.html>
-  *Why is there no water on other planets and the Sun?* Some planets are too close to the Sun and, therefore, too hot to contain water and other planets have less magnetic attraction than the Earth, meaning that water can be stripped from them via solar winds from the sun.
-  *How does the water get into streams and rivers?* Most water you see flowing in rivers comes from rain or the melting of snow or glaciers. Other sources of water in rivers can be from water held below the surface of land called groundwater; this water seeps out of the land into the river.
-  *Why can't you see the water in the air?* Because water in the air is in a gas form and the water molecules are so small you can't see them.
-  *Why does it rain?* Warm air turns the water from rivers, lakes, and oceans into water vapor that rises into the air. That water vapor forms clouds, which contain small drops of water or ice crystals (depending on how high the cloud is and how cold it is). As clouds rise higher and higher, the air gets colder and colder. When the water vapor in the cloud becomes too heavy, it falls back to the ground as rain or snow.



Common Questions Students Ask About Water

-  *How does water make snow and hail?* When the air is cold like it is in fall and winter, water that would have fallen as rain freezes and falls as snow.
<http://www.abc.net.au/science/articles/2008/09/18/2367819.htm>
-  *Why are clouds grey?* The colour of the cloud is actually created by the light passing through the water molecules
www.abc.net.au/science/articles/2011/04/21/3196689.htm
-  *Why and how does water freeze?* All molecules, including water molecules (even those in a glassful of still water) are constantly moving. Heat makes them move faster, cooling slows them down. When water gets cool enough, molecular movement is slowed enough that the molecules stick to each other and form ice crystals.
<https://www.sciencelearn.org.nz/resources/1008-water-and-ice>
-  *How does water evaporate?* When it is heated it turns into water vapour and rises up into the air.
<https://www.nationalgeographic.org/encyclopedia/evaporation/>
-  *Is rain water clean enough to drink?* When it comes from the sky it is, however once the rains has hit your roof and other surfaces it can pick up contaminants that could harm you if you drink it.
-  *How does water move?* (waves, tide, running rivers) Either by gravity pulling water downhill, or wind pushing the water or tides. Tides are periodic rises and falls of large bodies of water. Tides are caused by the gravitational interaction between the Earth and the Moon. The gravitational attraction of the Moon causes the oceans to bulge out in the direction of the moon.
www.enchantedlearning.com/subjects/ocean/Tides.shtml
-  *Where does the water on leaves (dew) come from?* On a clear day, water evaporates from the warm ground into the atmosphere. When night falls, the ground radiates the day's warmth into the skies. The ground becomes much cooler, causing the water vapour to condense. This condensed vapour is dew. On a cloudy night, the clouds send the heat back to the ground so the ground never gets cold enough for the dew to be formed.
-  *Why does water foam when it splashes against the rocks?* Sea foam is formed when water containing high amounts of algae collides with the shore and traps air in the form of bubbles which stick to each other forming foam.
-  *Why is there not enough water for the summer?* The reason the Sooke Reservoir water levels drop in the summer is because we use more water than is replenished by rainfall that time. In the Greater Victoria area, we receive the majority of our water in the form of rain during the winter. In the summer, we use much more water, often outdoors watering lawns and gardens. We need to be especially careful using tap water during the summer to ensure we have enough to supply everyone in the region with drinking water until the rain falls again.

Water Science

-  *What is water made of?* Hydrogen and Oxygen
-  *How is water made?* Water can be neither created nor destroyed; therefore it is not a renewable resource. The water that we use today has been on Earth since before the time of the dinosaurs. Water on earth continually moves through the water cycle. eg. It rains onto land, flows down rivers and streams, into the lakes and the ocean and then evaporates back into the air where it condenses and falls again.
-  *What does H₂O mean?* 2 Hydrogen atoms and one oxygen atom form a water molecule. Why is it clear? When we see colour we are actually seeing the energy of light that bounces off an object. Water is pretty interesting because it doesn't really absorb or reflect much color at all! Light passes through it pretty easily giving it no real colour in a pure form.
www.whyyz.com/why-is-water-clear



Common Questions Students Ask About Water

-  *Why does water taste so plain?* Because it has very few elements in it that give it flavour.
-  *Does water leak through glass?* (Condensation on windows or drinking glasses) No, what you are witnessing is condensation. The cooling of the air around the glass causes the water molecules in the air to condense and form water droplets on the glass.

Water and Climate Change

-  *Is “climate” the same as “weather”?* No, but they are related. Weather describes moment- to- moment changes (minutes to weeks) in precipitation, sunshine, clouds, temperature etc. Climate describes weather over longer periods of time, the average weather, for a specific area. When we say that today is colder than yesterday, we are talking about a change in the weather. When we say our winters are becoming warmer, we are talking about climate.

 *How will climate change affect our water?* Greenhouse gas (GHG) emissions are impacting the natural way temperatures are controlled on Earth, changing the atmosphere, water cycle and natural ecosystems. We create GHG’s when we burn wood, coal, oil and natural gas (to generate electricity, to power vehicles, planes, boats and machines). Our actions are causing our climate to warm up. In our region, it is expected that climate change will lead to:

- more extreme weather (flooding, droughts, storms and erosion)
- changes to when and how much rain, snow and hail falls (e.g. wetter winters and drier summers)
- rising sea levels (which may erode land and seep into freshwater aquifers)
- long-term warming (all seasons will be warmer, river temperatures will increase)
<https://www150.statcan.gc.ca/n1/pub/16-201-x/2007000/10542-eng.htm>
<https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-effect.html>

 *Why does taking a shorter shower save energy?* By taking shorter showers, you are not only saving water but energy too. It takes energy to heat water and to pump it uphill. You save both by using less.

 *Will climate change mean we have more or less fresh water?* Both. Spring and winter are expected to be wetter, but summer will be longer and drier.

 *Will there be enough water for plants?* Not for all plants. Likely we will see more drought-tolerant plants.

 *Can drinking tap water from the Sooke Reservoir really make a difference to climate change?*
 Yes, in our region, one bottle of water uses as much energy as 1,333 cups of tap water (gravity rather than electricity moves the drinking water from the Sooke Reservoir through many pipes). Efforts to reduce GHG emissions will help influence long-term climate change and its impacts. However, as a result of our historical emissions the Earth will continue to warm for decades to come.



Common Questions Students Ask About Water

Drinking water in our region

 *Where does our drinking water come from?* The Greater Victoria Drinking Water System is supplied with water primarily from Sooke Lake Reservoir, in the Sooke Hills. Sooke Lake Reservoir land is owned and protected by the Capital Regional District.

<https://www.crd.bc.ca/service/drinking-water/watershed-protection/greater-victoria-water-supply-area>

 *What is the maximum water level in the Sooke Lake Reservoir?* The concrete spillway elevation level is 186.75m above sea level.

 *How much water can the reservoir hold?* Sooke Lake Reservoir holds 160.32 million m³ of water (92.7 million m³ is accessible for drinking water) .

 *How much water is in the Sooke Lake Reservoir now?* Visit us online for weekly updates.

<https://www.crd.bc.ca/about/data/sooke-lake-reservoir/sooke-lake-reservoir-photos>

<https://www.crd.bc.ca/about/data/sooke-lake-reservoir/weekly-water-watch>

 *How can I help keep our drinking water clean?* Add a backflow preventer on your hose bib and when filling a swimming or wading pool, keep the nozzle of the hose out of the water filling the pool.

 *How can we conserve drinking water?*

- Turn off the taps while brushing your teeth
- Have a 5 minute or less shower instead of a bath
- Take shorter showers (less than 5 minutes)
- Wash fruit and veggies in a bowl of water instead of under a running tap
- If you have a wading pool, place it in the shade to save water from evaporating
- If having water fights, don't use a hose
- Only run a dishwasher with a full load. Read more water saving tips
- Ask your parents/guardians about
- Replacing old bathroom fixtures to more efficient model
- Replacing old clothes washing machine for a high-efficiency model
- Regularly checking your home for leaks.
- Let the lawn go golden and be water wise outside
- Plant a native plant garden or drought tolerant garden
- Install a rain garden
- Using rainbarrels

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

 *How long will the reservoir last?* That depends on how much water we use. In 2002, the Sooke Lake Reservoir dam was raised by 6 meters, almost doubling its capacity. Earliest projections suggest 2060 or beyond, but the more we save, the longer it will last. The hope is to not draw from the Leech River watershed until 2060 or beyond.

 *Does everyone in the region have drinking water from the Sooke Lake Reservoir?*

No. Some people in the western communities, Saanich Peninsula and on the Southern Gulf Islands use well water or other reservoirs for their drinking water, with the exception of Piers Island, which does receive drinking water from the Sooke Lake Reservoir.

 *How many homes use wells for drinking water?* More than 9% of British Columbians use groundwater as their main drinking source.

<https://www150.statcan.gc.ca/n1/pub/11-526-x/2007001/5100146-eng.htm>



Common Questions Students Ask About Water

 *Why should we conserve drinking water?*

- To enhance drinking water quality by maintaining water levels in the Sooke Lake Reservoir.
- To reduce the environmental impact by deferring the need to supply drinking water from new sources.
- To differ and save costs related to the expansion of the infrastructure (pipes and plants) needed to supply more drinking water and discharge extra wastewater.
- To reduce the energy and materials required to treat and deliver water, lower water and energy bills and to ensure there is enough for everyone during times of drought. (two (2) years out of ten (10) the Sooke Lake Reservoir is not filled).

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

 *When reservoir is full and overflowing, why should we conserve?*

- Two (2) years out of ten (10) we run the risk of drought.
- Less negative environmental impact
- To preserve the habitats for fish, animals and plants downstream from Sooke Lake which also rely on this fresh water.
- To preserve the fisheries and traditional and cultural customs of the T'souke First Nations that rely on the Sooke River.



How I Use Water

Name: _____ Date: _____



***All living things
need water.
One way I use water is...***

Name: _____

Date: _____



How I Use Water

Name: _____ Date: _____

***All living things
need water.
One way I use water is...***

Name: _____

Date: _____



“How I Use Water” Performance Grid

Name: _____ Date: _____

| CRITERIA | I show this in my work | | |
|----------|------------------------|-----------|----|
| | Yes | Sometimes | No |
| | | | |
| | | | |
| | | | |



“How I Use Water” Performance Grid

Name: _____ Date: _____

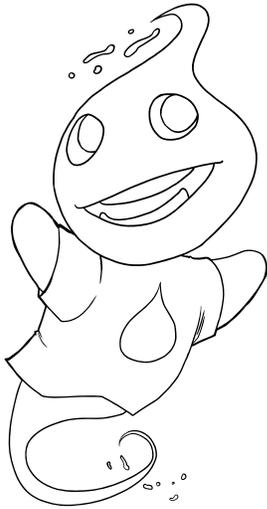
| CRITERIA | I show this in my work | | |
|----------|------------------------|-----------|----|
| | Yes | Sometimes | No |
| | | | |
| | | | |
| | | | |



Learning and sharing knowledge at home.

Here are some ways that your family can explore water at home and in your community:

- ▶ Join a CRD Parks event.
<https://www.crd.bc.ca/parks-recreation-culture/parks-trails/crd-regional-parks/events>
- ▶ Visit the public library to find books, films or music about water and water conservation.
- ▶ Watch television programs that address water conservation and environmental issues.
- ▶ Collect water-related pictures from magazines and the internet, and talk about them as a family.
- ▶ Clip articles from the newspaper and create a water scrapbook.



FACTOID: *About 75% of the Earth's surface is covered in water. However, 97% of the planet's water is too salty for humans and most animals and plants. Another 2% of the water is held as glacial ice at the north and south poles. Only 1% of the Earth's water is fresh water.*



Introduction

Dear Parent or Guardian:

Today your child's class began a water unit called Every Drop Counts. The unit focuses on the importance of freshwater for all living things and the need to use it wisely.

Through this unit students will:

- ▶ discover the properties of water in science experiments
- ▶ investigate and calculate how and how freshwater is used
- ▶ learn about the water cycle and the Sooke drinking water reservoir
- ▶ identify actions to help save and protect our precious freshwater resource

This is a newly revised version of the unit developed by the Capital Regional District (CRD), in co-operation with School District No. 61 (Victoria), School District No. 62 (Sooke), and School District No. 63 (Saanich). The CRD is committed to sustaining the health and lifestyles of the residents of Greater Victoria by providing an adequate quantity of safe, clean drinking water.

Over the course of this unit, your child will be bringing home a number of resources to share. These resources are designed to help your child extend her or his learning at home.

Would you like to learn and share your water knowledge as a family at home? Attached is a schedule of topics to be covered in class and a list of local events and resources to help your child build on what he or she has learned in class.

Please feel free to contact me if you have any questions.