

Environmental Education: Drinking Water Conservation

Washroom Water Use (High School)

Background Information

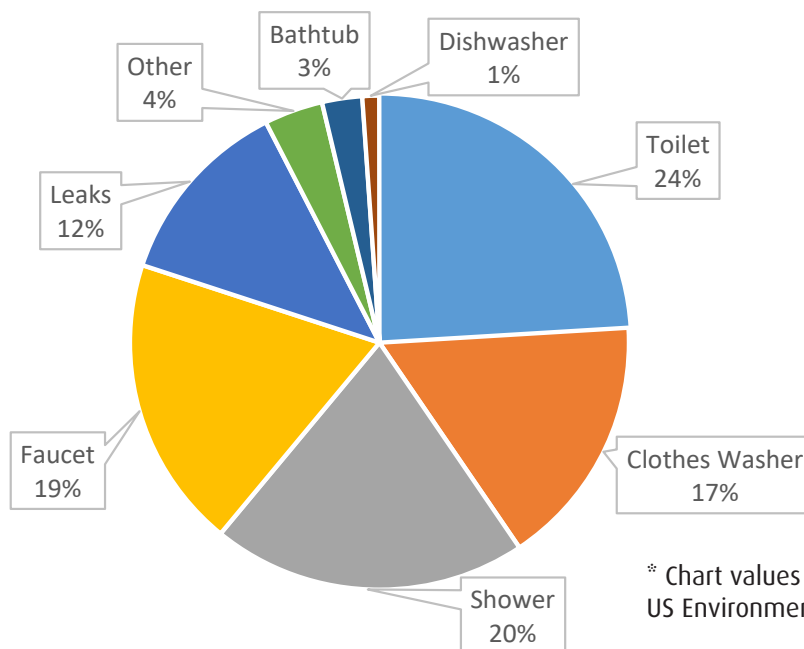
Drinking water for the Greater Victoria Water System is currently provided from the Sooke and Goldstream watersheds. Together these watersheds comprise 10,927 hectares and include five surface reservoirs or lakes. These reservoirs collect and store runoff from precipitation, mostly in the form of rain. Collected water is treated before being distributed to our homes as clean tap water.

In British Columbia, less than 3% of municipal treated water is used for drinking and consumption. The rest, approximately 97%, of clean, treated tap water is flushed down the toilet, flows down the drain, or is used to wash cars and water gardens.

In the capital region, we use an average of **232** litres of water per person, per day. Most of our water use (**72%**) occurs indoors. Of all indoor water use, approximately **65%** occurs in one room — the washroom. That means we are using an average of **151 litres** of clean, treated tap water in the washroom everyday.

With growing populations and a changing climate we need to be prepared ourselves to adapt for new circumstances. The first step to adaptation is to be aware of where and how we use water. Awareness will allow us to better protect and conserve our drinking water.

Indoor Water Use by Fixture*



* Chart values are 2014 estimates from the US Environmental Protection Agency (EPA).

Activity Summary

Use the provided table (or make your own) to record washroom water use throughout the day and week. Every time you use water in the washroom add a tally mark to your chart. Using data recorded, calculate daily totals, weekly totals or both, for individual fixtures. The data will then be used to examine and show examples of how behaviours and efficient fixtures can impact water consumption.

Before recording water use, hypothesize how much water will be used and which fixture will use the most water.

Instructions

1. Record your washroom water use.

Use the provided table, or make your own, to record washroom water use throughout the day and week. Every time you use water in the washroom add a tally mark to your chart. You will use this data to analyze and discussion washroom water use.

2. Determine flow rate and water usage of washroom fixtures.

Do some research to determine the average, low-flow and the actual flow rate for all washroom fixtures (toilet, showerhead and faucet).

Shower

Low-flow: _____

Average: _____

My actual: _____

Toilet

Low-flow: _____

Average: _____

My actual: _____

Faucet

Low-flow: _____

Average: _____

My actual: _____

To calculate **showerhead** flow rate in litres per minute (L/min):

1. Place a bucket under your showerhead.
2. Turn the shower faucet on full and run the water into the bucket for 10 seconds.
3. Turn off the shower and measure the volume of water.
4. Multiply your measurement by six to get the amount of water flow per minute. For example, if you ran your shower for 10 seconds and captured 1.9 litres of water in your bucket, your showerhead would have a flow rate of over 11 L/m.

Older showerheads have flow rates as high as 20 L/min. New showerheads can have as low as 5.6L/min. Current BC Building Code for showerheads is 9.5 L/min.

To calculate volume or litres per flush (LPF) for your **toilet**:

1. Look for a stamp near the hinges of the lid or inside the tank or lid of the tank. There is often a LPF value stamped somewhere on the toilet.
2. Low consumption (LC) or high-efficiency toilets (HET) may be marked with "LC," "LC/4.8," or "4.8LPF"
3. If you cannot find a stamp, use these [instructions](#) from Marin Municipal Water District to manually check your toilet's LPF.

Older toilets have LPFs as high as 20 L. New toilets can use as little as 4.8 LPF. Current BC Building Code for newly installed toilets is 4.8 LPF or less.

To calculate flow rate for your **washroom faucet**, follow the same technique as calculating showerhead flow rate:

1. Place container or measuring cup under faucet.
2. Turn the faucet on full and run the water into the container for 10 seconds.
3. Turn off the water and measure the volume of water collected.
4. Multiply the volume of water by six.

Kitchen faucets and washroom faucets often have different flow rates. Be sure to use washroom faucet flow rates for your calculations. Faucet flow rates can be modified by attaching aerators. You may use a faucet with an aerator for your low-flow rate.

Resource suggestions to research fixture water volumes and flow rates:

CRD [Water conservation at home](#)

Environmental Protection Agency (EPA)- [Water Sense](#) and [Water Efficiency Management Guide](#)

3. Calculate your daily and weekly washrooms water use for each fixture (toilet, shower, faucet) and flow rate (low, average, actual). For example, if you flushed the toilet seven times on Monday, calculate the water use as if you had a low-flow toilet, an average toilet and for your actual toilet. If you have access to Microsoft Excel or a similar program you could set up a spreadsheet to quickly calculate and store the information for you.

Note:

When calculating water use for the shower and faucet you will be using the total minutes the water was running, so you will need to time your showers, teeth brushing, hand washing, etc.

If you need estimates or averages to compare you can use the guidelines recommended by relevant authorities. For example, the CDC recommends washing your hands for 20 seconds and Health Canada recommends brushing your teeth for at least two minutes, twice a day.

Sample calculations:

Toilet — Monday

Low-flow (4.8 LPF):
=4.8 L x 7 flushes
= 33.6 L

Average (6 LPF):
=6 L x 7 flushes
= 42 L

Actual (12 LPF):
=12 L x 7 flushes
= 84 L

Fixture: Toilet				
	Uses	Low-flow (4.8 LPF)	Average (6 LPF)	Actual (12 LPF)
Monday	7	33.6	42	84
Tuesday	7	33.6	42	84
Wednesday	5	24	30	60
Thursday	6	28.8	36	72
Friday	6	28.8	36	72
Total	31	148.8	186	372

Discussion Questions

1. What was your average daily washroom water use for the week? How does your washroom water use compare to the average capital region resident?
2. Calculate your percentage of water use per fixture. Which fixture uses the most? The least?
3. If you were to switch all your fixtures to a low-flow option how much water would you save?
4. Use visual representations (tables, charts, graphs, etc.) to show the difference in water use of low-flow, average and actual for the different fixtures.
5. Use visual representations (tables, charts, graphs, etc.) to show the difference in water use for each fixture based on behavioural changes. For example, compare various showers times, turning the tap off when brushing teeth or shaving vs. leaving the tap on, "if its yellow, let it mellow," etc.
6. What are some actions you could take right now to reduce your washroom water consumption?

Expand and Connect

Compare your daily water use to that of an average British Columbian and/or average Canadian.

Create a new chart and include all the ways you use water at home (washing dishes, laundry, cooking, etc.) or use the Alliance For Water Efficiency's online [water calculator](#) to estimate your total at home water use.

Research and/or design a fixture or system that would reduce the amount of water used in the bathroom. For example, are there ways we could avoid using treated drinking water to flush toilets? Could we collect and reuse water running down the shower drain?

Check your house for leaks. An estimated 12% of all indoor water use is actually due to leaks.

- Check your toilet — add a few drops of dye or food colouring to the tank. Wait 20-30 minutes. Check the toilet bowl. If there is dye in the toilet bowl, your toilet has been leaking. To fix the leak first try tightening the rubber flapper in the tank. If that does not fix the problem you may have to replace the flapper or eventually look for professional help.
- Check all your faucets and showers. Are any of them dripping? If so, is there a simple fix you can do to stop the leak? See BC Hydro's [Fix a water leak](#) for tips.

What other environmental factors are impacted by water use? For example, if we take longer showers, use the dishwasher for small loads, and wash clothes with hot water we are using energy to heat our water. Depending on your home energy hook-ups this you could be creating GHG emissions without realizing.

How might a changing climate impact our drinking water supply?

- Consider the capacity of the water supply area and reservoirs.
- Consider seasonal changes in precipitation and water use. For example, our water supply relies mainly on rain collected in the winter but our highest water use is in the summer.

Still Curious?

CRD resources:

[Water conservation at home](#)

[High Efficiency Showerheads](#) and [Shower Smart Brochure](#) (PDF)

[High Efficiency Toilets](#) and [High-Efficiency Toilet Brochure](#) (PDF)

[Sooke Water Supply Area](#) and [Weekly Water Watch](#)

Greater Victoria Water Supply Area [Facts and Figures](#)

Other resources:

Province of BC - [Water Conservation](#) and [Living Water Smart](#) (PDF)


[BC Building Code](#)

The [Partnership for Water Sustainability BC](#)

If you have any questions about drinking water and water use in the region, or are looking for ideas on how to connect this topic with other learning opportunities, contact us at education@crd.bc.ca.

Weekly Water Use

Record how much water you use in the washroom during the week by adding a tally mark or amount of time to the corresponding category.

	Monday	Tuesday	Wednesday	Thursday	Friday		Weekly Totals
Flush Toilet  ___ litres per flush							How many times did you flush the toilet this week? _____ How many litres of water did your toilet use in total? $\frac{\text{number of flushes} \times \text{LPF}}{\text{LPF}}$ = _____ litres
Wash Hands  ___ litres per min.							How many times did you wash your hands this week? _____ How much water did you use washing your hands? $\frac{\text{number of washing} \times \text{L/min}}{\text{L/min}}$ = _____ litres
Brush Teeth  ___ litres per min.							How many times did you brush your teeth this week? _____ How much water did you use brushing your teeth? $\frac{\text{number of brushes} \times \text{L/min}}{\text{L/min}}$ = _____ litres
Shower or Bath  ___ litres per min. ___ litres per bath							How many times did you shower this week? _____ How much water did you use having a shower? $\frac{\text{number of showers} \times \text{L/min}}{\text{L/min}}$ = _____ litres
Other: (laundry, dishes, water lawn etc.)							
Daily Totals							<div style="border: 1px solid black; width: 100px; height: 20px; display: inline-block; margin-left: auto;"></div> litres