Be a Superhero:
Save Water with Water Woman

Day 4: **Water Woman Episode 4: The Invisible Leaker**

Developed by: Nathalie Boulanger & Amanda Reimer
for the Cowichan Watershed Board

Suggested Date: Drinking Water Week (May 1-7, 2016)

Overview & Purpose

Increases in our population, the growth of industry and agriculture, and the effects of climate change all put pressure on our water supply. Learning to conserve water is essential to the health of our local ecosystems.

A leaking toilet can waste 150 000 litres to 300 000 litres of water per year. In this lesson, students will learn an easy way to test their home toilets in order to check for leaks. We suggest that all students pledge to look for “leaky loos” (with their parents) as a way to save water, or to make another relevant personal pledge.

Toilet flushing is the single highest use of water in the average home, so it also presents a prime opportunity for water conservation. With the average person flushing five or six

times a day, toilets make up about 31% of overall household water consumption. We have included some relevant data on how much water different models of toilets use for flushing. If your students are studying graphs, we have provided a graph reading activity that you can use to practice your maths skills while discussing water conservation. We have also provided you with graphs using data from Home Water Works. You can use the sample questions provided or create your own questions.

Objectives

1. Students will learn that toilet leaks are an important but invisible source of water waste.
2. Students will learn a simple way to test their toilets at home.
3. Students will learn more about toilet water usage and practice math skills through graph reading (optional)

Suggested Activities

Hook: Watch Water Woman Episode 4: The Invisible Leaker

1. Make a personal pledge to test your toilets.

If you have chosen to create a visual banner to show your classroom's commitment to water conservation, follow the fourth episode of Water Woman by prompting your students to commit to test their toilets annually at home. Please see detailed instructions next page (parental guidance advised!).

If your school has the kind of toilets with removable tank lids in at least some of the bathrooms, your class could also test the school toilets for leaks. Some schools have institutional/commercial toilets in place, where access to the reservoir is not possible to conduct the test described below. However, because leak detection is a great way to save a lot of water (a leaking toilet can waste 150 000 litres to 300 000 litres per year), students can save a lot water by committing to testing their toilets at home annually and helping their parents replace old flappers when a leak is detected! You can print off or copy the following instructions for each of your students to bring home...

Test your toilet

Its free, takes under 15 minutes, and you don't even have to touch the "icky" part of the toilet! Leaking "flappers" at the bottom of toilet tanks are very common, even in new toilets, and they waste water 24/7. If we all checked our flappers and fixed the leaks, we would save a LOT of water! The great news is that most leaks can be fixed for under $20.00

How to Test for a Leaky Toilet

1) Drop a food dye tablet in the top TANK of your toilet (or 3 drops any food dye).

2) Wait for 15 minutes – don't flush.

3) Check your BOWL for colour. Colour in the water bowl means that you have a leaky toilet and your flapper needs a fix!

4) Color in the Bowl? Fix your Flapper!

If you found a leak, the flapper might just need a cleaning, or you might need to buy a replacement flapper from a plumbing supply or hardware store (<$20). Full instructions, and a short DIY video are available at http://thisbluedot.ca/

If your leak is more complicated, or if the DIY seems daunting, hire a plumber and get saving!

Ask students if they have other ideas of how they can save water from toilets and brainstorm other ideas for the pledge. Students write down their commitment and glue their pledge on the banner to inspire other students to do the same.

Relevant data for toilet water usage to inform your discussion

(Source: Home Water Works , adapted from gallons to litres)

- Toilet flushing is the single highest use of water in the average Canadian home, so it also presents a prime opportunity for water conservation. With the average person flushing 5.7 times a day, toilets make up about 31% of overall household water consumption.
- A leaking toilet can waste 150 000 litres to 300 000 litres per year. An ill-fitting or worn out flapper is one of main causes of toilet leaks.
- The oldest toilets can use more than 30 litres per flush while new High Efficiency Toilets (HETs) can flush effectively using less than 5 liters. Quite an improvement!
- In a home with old toilets (1980-1992), an average flush uses up to 14 litres, and the daily use is around 77 litres per person per day. In a home with modern toilets with an average flush volume of 5-6 litres, the daily use is about 31-34 liters per person per day.

2. Math (graph reading) activity on toilet water usage

Learning about water conservation involves numbers: it is a good opportunity to work on math skills! We created these graphs using data provided by Home Water Works. You can use them in the classroom to practice finding information recorded in a bar graph.

The four graphs all compare the amount of water used to flush 4 different types of toilets: pre-1980 toilets, 1980-1992 models, Ultra Low Flush toilets and High Efficiency toilets. Note that toilet efficiency varies between models so these are sample numbers for the sake of comparison.

Use the graphs to make up your own questions, or use the questions provided below (answers provided at end).

The **first graph** shows how many litres of water per flush are used on average for each model.

The **second graph** shows how many litres of water a day on average a person would use on each model (estimates show that people flush approximately 5,7 times/day).

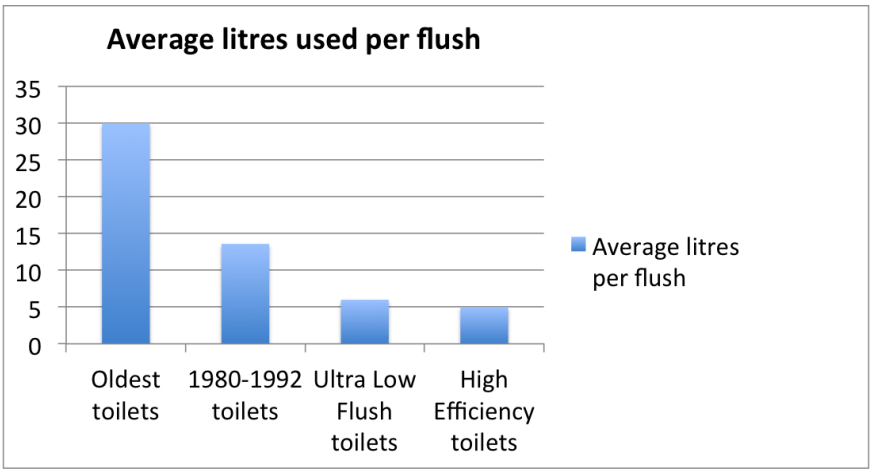
The **third graph** shows how many litres of water per year a person would use on each model (on average).

The **fourth graph** shows how many litres of water per year a family of four would use on each model (on average).

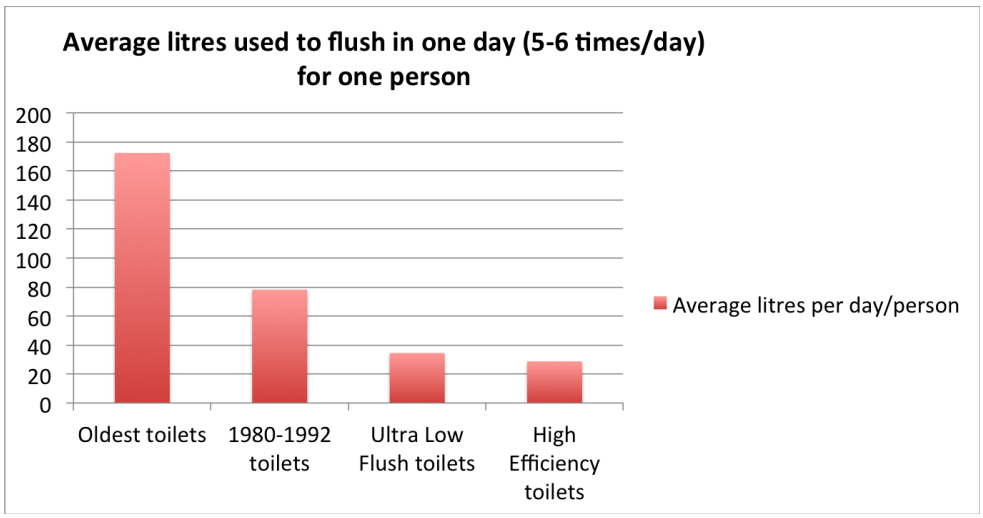
Graphs only : Make your own questions

These graphs show how many litres of water are used each time you flush 4 different types of toilets:

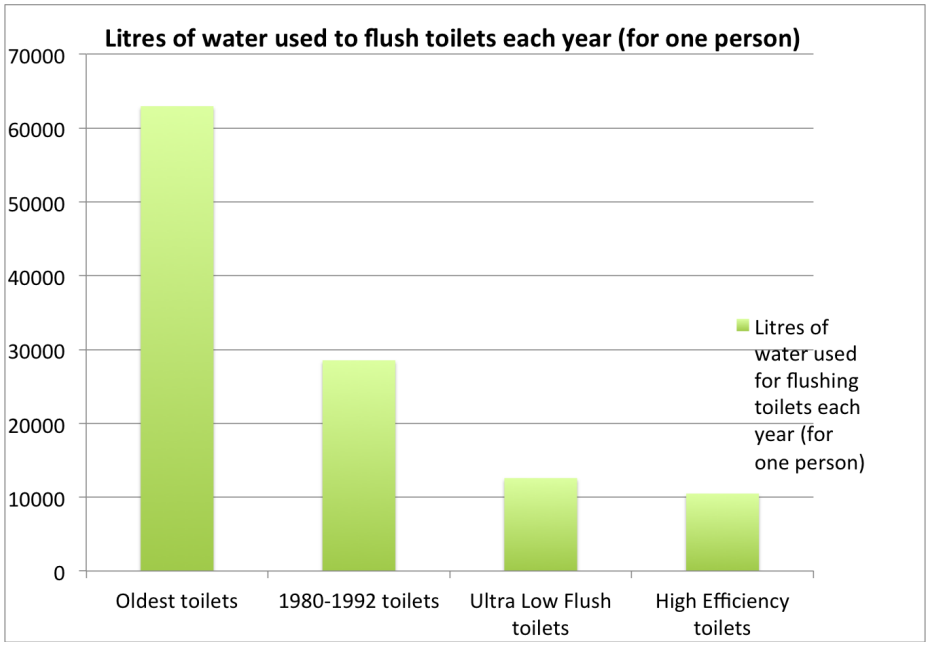
The first graph shows the average amount of litres per flush.



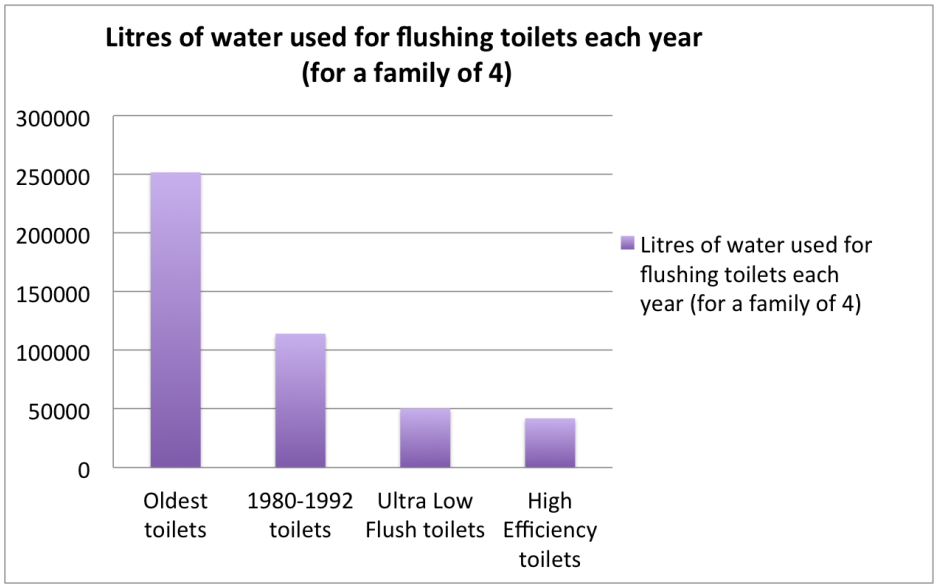
The second graph below shows the average amount of litres per day for one person (5 or 6 flushes/day.



The third graph below shows how many litres of water are used to flush 4 models of toilets each year by a person who flushes 5-6 times/day:

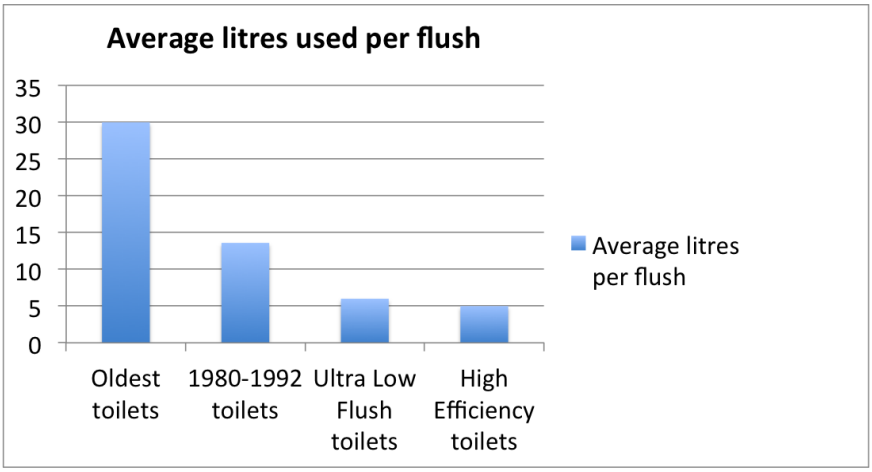


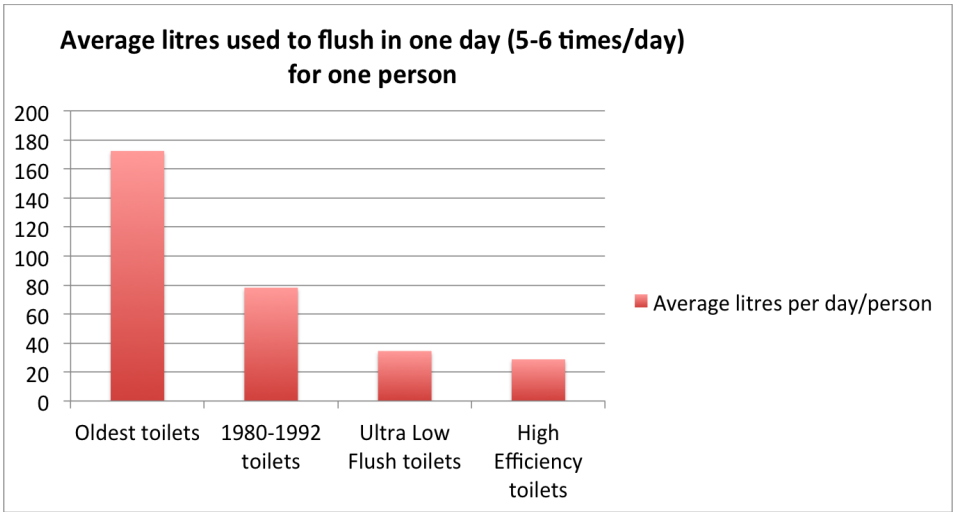
The fourth graph below shows how many litres of water are used to flush 4 models of toilets each year by a family of 4 (5-6 flushes a day person):



Data Source: [Home Water Works]

Graph reading activity with questions





1. A.How many litres of water are used on average to flush a toilet made in 1988? _____ litres

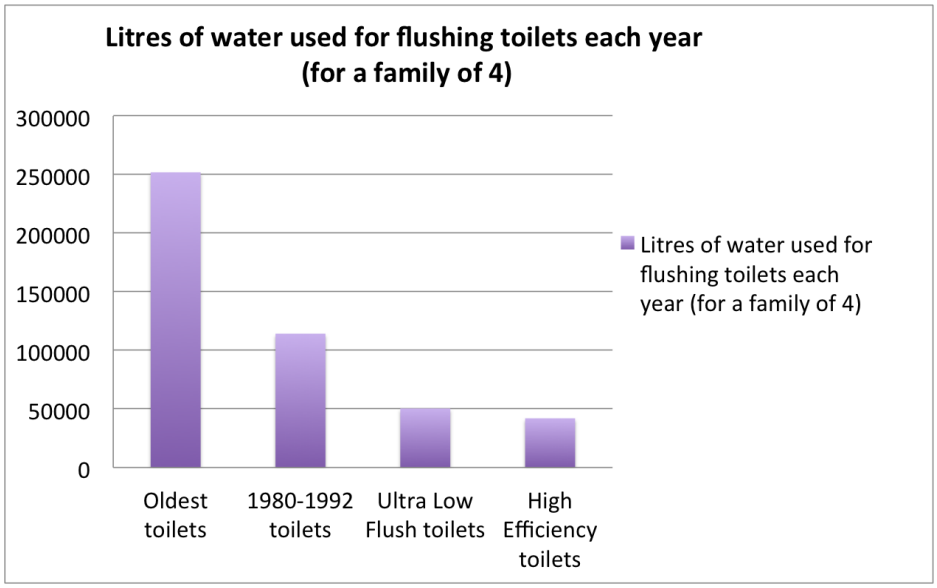
B. Mr. B. built his house in 1975 and has never changed the toilet. He is renovating his bathroom and he is at the hardware store trying to find a new toilet. He thinks he is going to get an Ultra Low Flush (ULF) toilet or a High Efficiency (HE) toilet but he is not sure which one uses the least water. Help him figure this out:

ULF toilet: _____ litres/flush HE *Toilet*: _____ litres/flush

Which one uses the least water? _____ What is the difference? _____ litres/flush

C. If Mr. B replaces his old toilet by a High Efficiency Toilet, how many litres of water is he going to save **every day**? Show your thinking.

2. This graph shows how many litres of water are used to flush 4 models of toilets each year by a family of 4 (5-6 flushes a day person):



The Wilson family has 2 adults and 2 children. They live in a house built in 1990 that has one bathroom. They have never changed their toilet.

A. Approximately how many litres of water do they use each year to flush the toilet?
_____litres

B. How much water could the Wilson family save each year if they replaced their 1990 toilet by a new High Efficiency toilet? Show all your steps.

3. Their neighbours, the Smith family, is another family of 4. Ten(10) years ago, they heard that they could save a lot of water by replacing their 1990 toilet. They bought an Ultra Low Flush toilet. Approximately how much water have they saved in 10 years with this new toilet? Show your thinking.

Answers:

1. A. How many litres of water are used on average to flush a toilet made in 1988? ***Approx. 14*** litres

B. Mr. B. built his house in 1975 and has never changed the toilet. He is renovating his bathroom and he is at the hardware store trying to find a new toilet. He thinks he is going to get an Ultra Low Flush (ULF) toilet or a High Efficiency (HE) toilet but he is not sure which one uses the least water. Help him figure this out:

ULF toilet: ***6*** litres/flush HE *Toilet*: ***5*** litres/flush

Which one uses the least water? _____***HE Toilet***__ What is the difference? ***1*** litre/flush **or approximately 5 litres per day (35 litres/day - 30 litres/day)**

C. If Mr. B replaces his old toilet by a High Efficiency Toilet, how many litres of water is he going to save **every day**? Show your thinking.

His old toilet used approximately 80 litres of water/day. The new HE toilet will use approximately 30 litres a day. 80 - 30 = 50. He will save 50 litres/day.

2. The Wilson family has 2 adults and 2 children. They live in a house built in 1990 that has one bathroom. They have never changed their toilet.

A. Approximately how many litres of water do they use each year to flush the toilet? **110 000** litres

B. How much water could the Wilson family save each year if they replaced their 1990 toilet by a new High Efficiency toilet? Show all your steps.

They are now using approximately 110 000 litres of water/year. The new HE toilet would use approximately 40 000 litres of water/year. 110 000 - 40 000 = 70 000.

They would save approximately 70 000 litres of water each year.

3. Their neighbours, the Smith family, is another family of 4. Ten(10) years ago, they heard that they could save a lot of water by replacing their 1990 toilet. They bought a Ultra Low Flush toilet. Approximately how much water have they saved in 10 years with this new toilet? Show your thinking.

Their old toilet used approx. 110 000 litres/year. If they had not changed the toilets, they would have used 10 X 110 000 litres = 1 100 000 litres of water in 10 years.

The Ultra Low flush toilet uses approx. 50 000 litres of water per year. In 10 years, they have used approx. 10 X 50 000 litres = 500 000 litres of water.

The difference is 1 100 000 litres - 500 000 litres = 600 000 litres. They have saved 600 000 litres in the last 10 years by replacing their old toilet with a Ultra Low Flush toilet.