

# NEW WAYS FOR WATER EFFICIENCY



## KEY CONCEPTS

- RESPONSIBILITY FOR WATER IS EVERYONE'S CONCERN.
- ACTIONS WE TAKE IN OUR EVERYDAY LIVES INFLUENCE THE SUSTAINABILITY OF THE GREATER VICTORIA WATER SUPPLY.
- A VARIETY OF FACTORS WILL INFLUENCE WATER QUALITY AND QUANTITY IN THE FUTURE.

## METHOD

Students will complete a water audit in their home and develop ideas for water efficient technologies and water conservation practices for the home.

### ACTIVITY INFORMATION BOX:

**TIME REQUIRED:** 120-150 minutes

**GRADE LEVEL:** Grades 8-10, 11

**KEY WORDS:** *water conservation, water efficiency, technology*

**MATERIALS:**

- Water Audit sheet
- PowerPoint (PDF) presentation (optional)  
*New Ways for Water Efficiency*
- House template (optional)

**SETTING:** indoors

**SKILLS:** Interpreting, problem solving, presenting

**SUBJECTS:** Science 8-10  
Science & Technology 11

### LEARNING OUTCOMES:

**IT IS EXPECTED THAT THE STUDENT WILL:**

- Identify a range of water efficient technologies and practices in the home;
- Design a model home that incorporates new water efficient technologies;
- Practice every day actions that incorporate their personal commitment to water conservation.



## BACKGROUND

How much water do we use? We can make use of water conservation and water efficient technologies to decrease overall water use. In Greater Victoria water efficiency practices have accommodated an eight percent increase in population between 1998-2007 with a reduction in per person water consumption by twelve percent. This decrease in per-person water use means that we are using water more efficiently; it also delays the need for expansion of the water supply system – a costly endeavour of approximately 100-150 million dollars!

Water conservation practices and water-efficient technologies are the backbone of preserving our precious water. Some of the benefits of water conservation include lower water and energy bills, enhanced drinking water quality by maintaining higher levels in Sooke Reservoir, and less need for costly water system infrastructure. Greater Victoria enjoys some of the best quality drinking water in the world – provided at a reasonable cost – however, maintaining this critical resource requires that we use water with care.

Water conservation can have different meanings for different people. Simply stated, water conservation can be defined as any beneficial reduction in water use, loss or waste. It can include use of water-efficient fixtures, fostering of water conservation practices and habits, and employing techniques for rainwater collection. At the resource management level, it can mean implementing measures to decrease peak consumption and charging for water at the appropriate rates. Water conservation can also foster new developments in water-efficient technologies and help lead to establishing new or updated standards and regulations.

Increasing the efficiency of water use can be seen as one type of method to conserve water. It means that we use the least amount of water feasible to accomplish a particular task. Efficiency focuses on reducing waste rather than restricting the use of water. There are numerous ways to help reduce water wastage. For example, changes can be made in the water fixtures we use in the home – a 5-minute shower under a lowflow shower head uses much less water than a 5-minute shower under a conventional shower head. Water can be wasted through leaking taps and use of other less efficient appliances such as clothes washers and toilets. Habits too, can waste water. Flushing tissues and other garbage down the toilet, brushing teeth while leaving the water running, or running a less than full load of laundry or dishes can all contribute to water wastage. By changing technologies and our habits, we can decrease water wastage on an everyday basis. For a more complete description of water saving tips go to <http://www.crd.bc.ca/water>.

How does water use in Greater Victoria compare to other countries around the world? Total world water use has increased dramatically over the last century due to population growth, industrial uses, and new technologies that enable us to take water from non-traditional sources. Water use per person varies greatly from country to country and depends on water availability, technologies, standard of living and water use habits. One of the challenges to understanding water availability and use is that some countries have a lot more water available than others. Some interesting facts include:

- Almost a quarter of the world's supply of fresh water lies in Lake Baikal located in sparsely populated Siberia, Russia.
- Latin America has 12 times more water available per person than South Asia.
- Sub-Saharan Africa has the largest number of water-stressed countries of any region in the world.
- Nature's needs for water are higher in areas that have more water available.
- In 2000, Canadians used an average of 326 litres of water per person (per capita) each day.
- A mere 12% of our home water usage is used in the kitchen and as drinking water.

### FOUR WAYS TO SAVE WATER AT HOME:

*Turn off the tap when brushing your teeth, shaving, or doing the dishes.*

*Take a short shower rather than a bath.*

*Let your lawn go golden in the summer.*

*Only run the dishwasher with a full load.*



- About 60% of indoor home water use occurs in our bathrooms. Toilets are the single greatest water user.
- Indoor water use peaks twice a day year-round, in the mornings and evenings.
- The biggest peaks during the year occur in the summer, when about half to three quarters of all municipally treated water is sprinkled onto lawns and gardens.
- The average daily domestic (residential) water use per capita is:
  - 425 litres in the United States
  - 326 litres in Canada
  - 250 litres in Italy
  - 200 litres in Sweden
  - 150 litres in France
  - 135 litres in Israel.

### HOW MUCH WATER DO WE USE?

*Flushing Toilet*

*Brushing Teeth*

*Showering/Bathing*

*Shaving*

*Cooking*

*Dishwashing by hand*

*Dishwashers*

*Washing Machine*

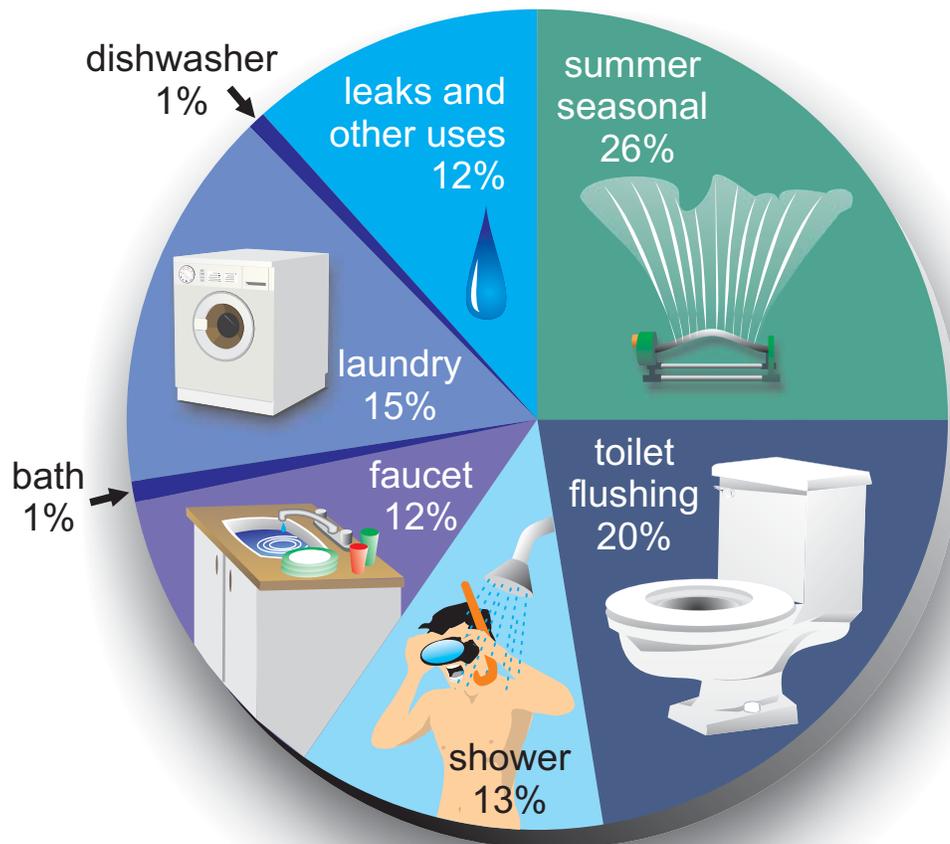
*Car Washing*

*Garden Watering*



## RESIDENTIAL WATER USE IN GREATER VICTORIA

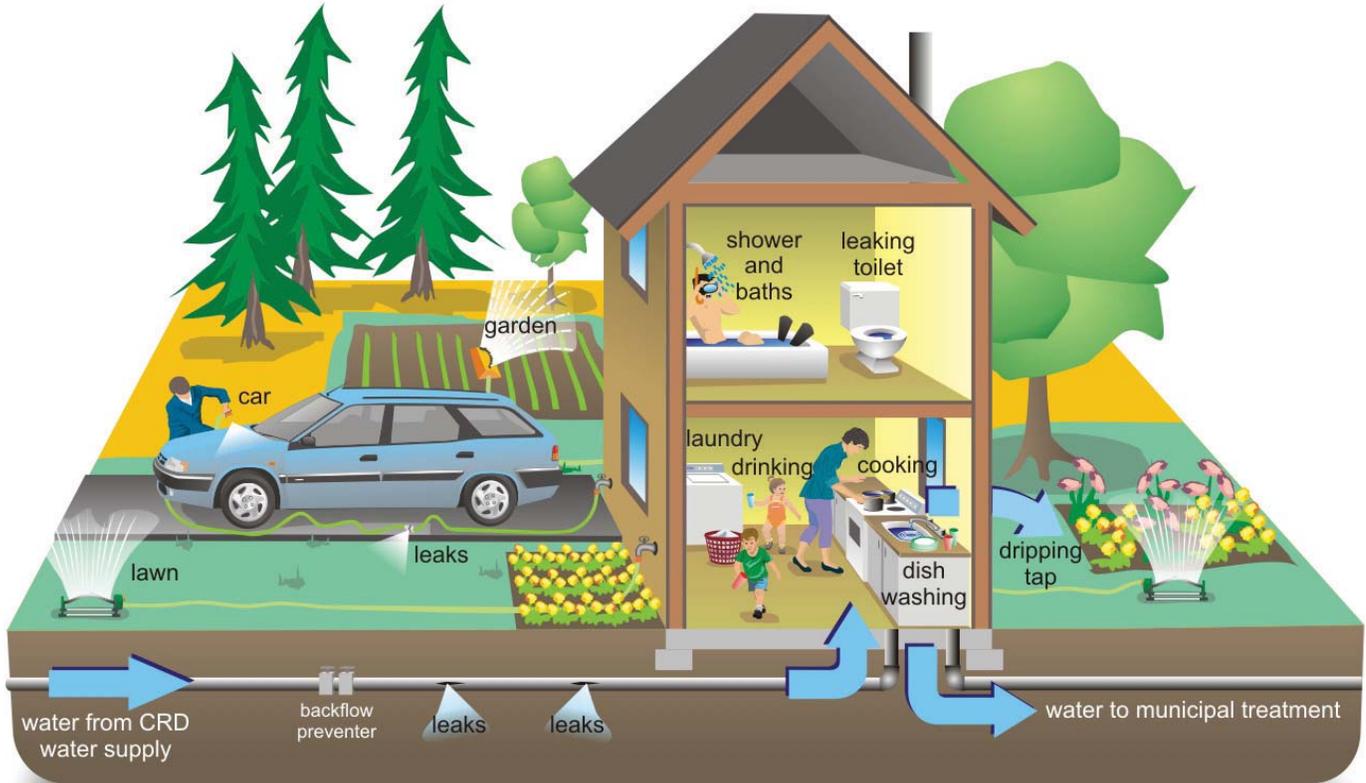
We flush almost a quarter of the water we use down the toilet. In the summer, watering our gardens can cause household use to jump by double!



(Source: CRD Water Services Dept. & CMHC – Household Guide to Water Efficiency)

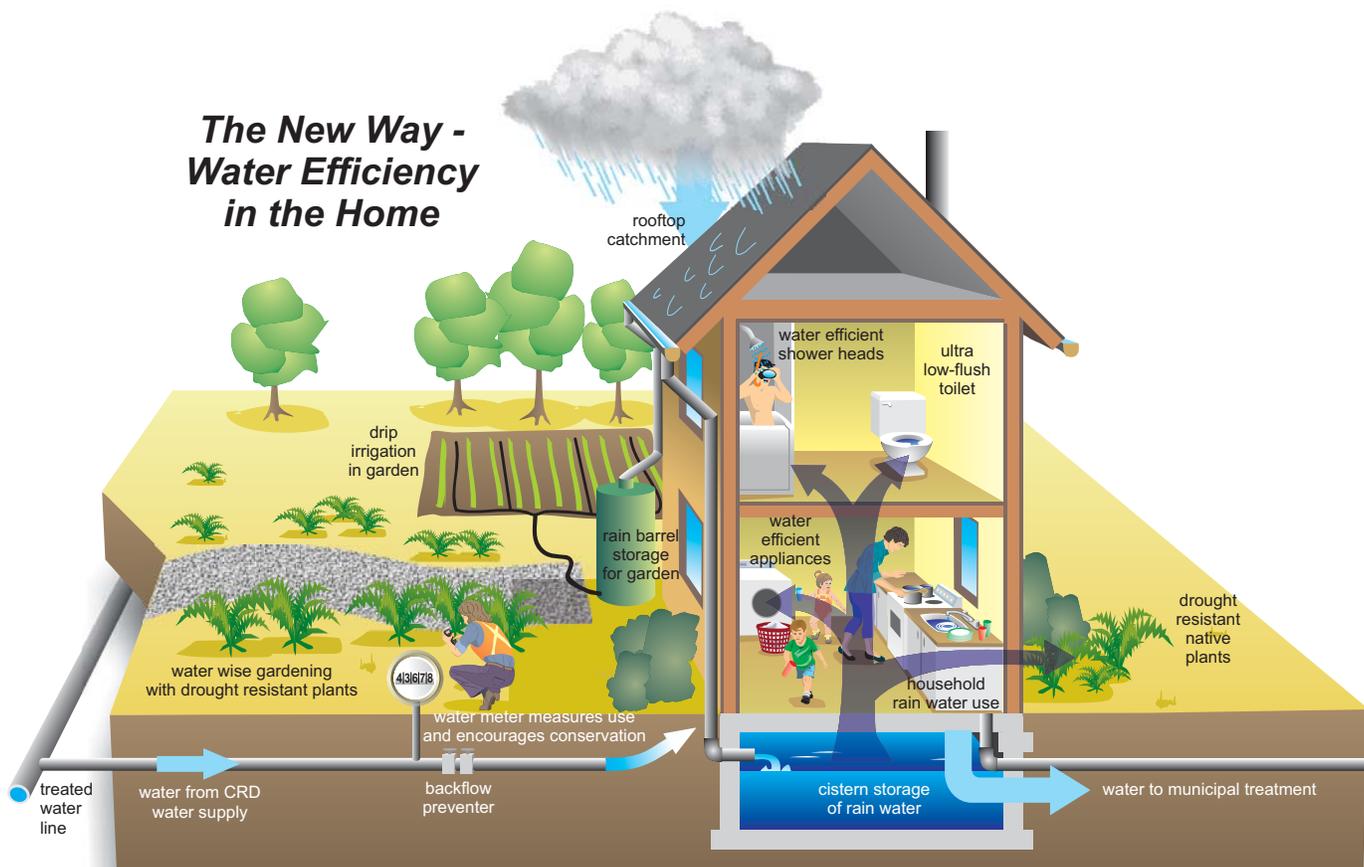


## The Old Way - Wasteful Homes





## The New Way - Water Efficiency in the Home





## PROCEDURE

1. Tell students that they are going to assess their water use at home and then come up with ideas to use water more efficiently. Use the PowerPoint® (PDF) presentation or view the video *Water Today and Tomorrow* to provide an overview of water use in the home and around the world (optional).
2. Give students the Student Water Audit checklist to complete for three days.
3. Back in the classroom, discuss and compare the findings from student water audits. Where was the most water used? The least? Brainstorm ways that water use could be reduced at home – How can students practice water conservation?
4. Ask students to generate new ideas about how water could be used more efficiently. For example, students could think of ways to save water that we are now sending down the drain. Areas of the home that should be considered include:
  - In the bathroom
  - In the kitchen
  - In the laundry room
  - Outside the home.
5. Divide students into design teams. Tell them their job is to design a model home that incorporates new water conservation practices and water-efficient technologies. On each team, new options for reducing water waste from the above areas should be devised.
6. Students should create a house design that demonstrates their ideas and provides an explanation of how their model works. They can use the House Template as a starting point or use a design of their own. Or alternatively, ask students to produce a poster of a water-conserving/water-efficient home.

## EVALUATION

Have students:

1. Complete a three day water audit and write a paragraph on how to conserve water;
2. Make a pledge sheet and have students adopt (at least one) new water-efficient or water-conservation action for one week and describe how their personal lifestyle has changed (or will change) in relation to the need for water conservation;
3. Design new water-efficient technologies for the home.

## EXTENSIONS

1. Give students water dye tablets to check their toilets for leaks and showerhead bags to test their showers for water use.
2. Ask students to research more information on water efficiency or water conservation.
3. Have students explain how their new water technology or practice works in a mini “Science Fair.”

## COMMUNITY CONNECTIONS

1. Ask students to read their home water meter – for an overview of how to do this, go to <http://www.h2ouse.net/resources/meter/index.cfm>
2. Find out more about new “green” building initiatives such as the LEED program and projects such as Dockside Green in Victoria.



## ADDITIONAL RESOURCES

1. <http://www.getwatersmart.com>
2. <http://www.ec.gc.ca/water>
3. <http://www.waterforpeople.org>
4. <http://www.docksidegreen.com/sustainability>
5. <http://greenlivingideas.com>

## REFERENCES

1. Canada Mortgage and Housing Corp. *"Household Guide to Water Efficiency."* Available from CRD Water Services Dept., Victoria, BC
2. UNESCO . *"Human development report, 2006: beyond scarcity; power, poverty and global water Crisis"* from <http://hdr.undp.org/hdr2006/>
3. Environment Canada – 2001 figures from [http://www.ec.gc.ca/water/en/manage/use/e\\_facts.htm](http://www.ec.gc.ca/water/en/manage/use/e_facts.htm)
4. CRD. *"Water Facts 6 – Straight Talk about Water Saving Actions for the Home."* Available from CRD Water Services Dept., Victoria, BC



NAME:

BLOCK:

# HOME WATER AUDIT

	LITRES USED PER ACTIVITY			QUANTITY USED PER WATER USAGE	
	A	B	C	D	E
ACTIVITY	TIMES PER DAY	AVERAGE (LITRES)	EFFICIENT (LITRES)	ACTUAL	TOTAL (A x D = E)
<b>IN THE BATHROOM</b>					
Toilet flushes		13.5 to 20	3 to 6		
Showers		100	7 per minute		
Bath		150	20 minimum		
Brushing Teeth		10	8		
Shaving		20	10		
<b>IN THE KITCHEN</b>					
Cooking		20	20		
Dishes by Hand		35	35		
Dishwasher		40	11 to 26		
<b>IN THE LAUNDRY</b>					
Washing Machine		225	113		
<b>OUTDOORS</b>					
Car Washing		400 estimate	200 estimate		
Garden Watering		27 per minute	15 per minute		
<b>TOTAL</b>					

**NOTE: WHEN DOING YOUR WATER AUDIT, YOU MUST ABIDE BY THE WATER CONSERVATION BYLAW!**

NAME:

BLOCK:



## NEW WAYS FOR WATER EFFICIENCY

### ASSIGNMENT INSTRUCTIONS:

Add your own water efficient technologies using the house template or make up your own house design.

