

Teacher's Notes

Waste Water Watcher

- A tree is 75% water.
- More than half the world's animal and plant species live in water.
- 30% of the earth's fresh water exists as ice in the form of glaciers and ice caps.
- 3/4 of the earth's surface is covered with water.
- 2/3 of the world's fresh water is groundwater
- Rain drops are not tear shaped. High speed cameras have revealed that they resemble a small hamburger bun.
- The Great Lakes are one of the largest systems of fresh water on earth. They represent 18% of the earth's fresh surface water!
- About 70% of the human body is water.
- 83% of human blood is water, helping our body to digest food, take in oxygen, transport body waste and control body temperature!
- A person can live without food for more than a month, but can live only a few days without water!
- Humans need a minimum of 30 litres of water a day. 5 litres for drinking and cooking, 25 litres or more to keep clean.
- All living things, from the tiniest insect to the tallest tree, need water to survive.

Average Water Consumption for Typical Daily Functions per person

Bathroom:	Flushing Toilet	24 litres (avg. 4.8 litres per flush, x 5 flushes)
	Showering	66 litres (avg. 6.6 litres per minute x 10 minutes)
	Bath	150 litres
	Brushing Teeth	3 litres (taps running while you brush @ 1 litre per minute x 3 brushes per day) 0.5 litres (taps only used to wet and rinse brush)
Kitchen:	Shaving	10 litres
	Cooking	20 litres
	Hand Washing Dishes	35 litres
	Operating Dish Washer	15 litres for efficient, 25 – 40 for older
	Using Garbage Disposal	20 litres (now illegal in Ontario)
Laundry:	1 Load of Laundry	75 litres for efficient machine, 150 litres for older machines
Outdoor Chores:	Washing Car	400 litres without bucket, less than 100 with
	Watering Lawn	25 litres per square foot (average lawn 750 litres)

Waste Water Watcher

Overview of Activity:

This activity introduces water issues that deal with natural and human uses. Students list and describe living things that depend on water for survival. They discover that all living things on earth, including humans need water to live and grow.

Students also learn about water conservation in the home. They are asked to identify water-wasting habits in their home and discover alternative water saving tips to reduce water wastage in their home.

Outcomes:

- Recognize that all living things need water to live.
- Analyze ways in water connects humans to other living creatures.
- To recognize the wasteful uses of water in the home.

To develop conservation practices that apply to personal water uses.

Activity 1

Purpose:

In small groups students identify ways in which humans and other living creatures use water. Groups communicate their findings through pictures, models, and graphs. They discover that all living things use water for drinking, food, hygiene and shelter.

<p><u>Materials Needed:</u></p> <ul style="list-style-type: none"> • art supplies (paper, pencil, crayons, Bristol board, etc.) • Diagram 1 • Activity Chart 1,2 & 3: How Do We all Use Water? <p><u>Procedure:</u></p> <ul style="list-style-type: none"> • Examine a globe. Stress that humans and all other creatures need water to live. <p>Part 1</p> <p>Form small groups. Each group will be assigned one of the following topics:</p> <ol style="list-style-type: none"> 1. How do animals in a forest use water? 2. How do my family members use water? 3. How do fish use water? 4. Why do trees and plants need water? 5. How does a farmer use water? 6. How does a cat or dog use water? 	<ul style="list-style-type: none"> • Ask groups to make a list of water uses according to their question (Using We Use That Much Chart 1) and then use pictures, figurines, or toys to communicate each water use on their list. <p>Examples: How do animals in a forest use water:</p> <ul style="list-style-type: none"> • For drinking (a deer drinks from a river) • For shelter (a beaver lives in a beaver lodge) • For food (a bear catches fish from the river) • To keep clean • To cool of from the heat • To swim (ducks)
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Groups can build models, draw or assemble picture collages to communicate their water uses to others in the class

Part 2

- Use We Use That Much: Chart 2 and Chart 3 to help the class tally their findings. Students can then create bar graphs, circle graphs, etc. to illustrate their findings

Observations:

In Part 1 students use their imagination, creativity and teamwork skills to discover water uses of an assigned living thing. In Part 2 they compare their class findings and see that all living things use water similarly.

Conclusion:

Students conclude that all living things (animals, plants, humans) use water in similar ways. They all need water to live and grow.

Teacher Notes

How Do We All Use Water?: Chart 1

Animals in a Field & Forest	My family	Fish in Seas, Lakes, Rivers & Oceans	A Farmer	Trees and Plants
drinking shelter finding food keeping clean fun	drinking use in food keeping clean (self & home) fun sports relax	home & shelter finding food drinking breathing	to grow his crops drinking for animals use in food keeping clean	drinking homes/shelter (plants that live under water)

Common Water Uses: Chart 2

Animals in a Field & Forest	My family	Fish in Seas, Lakes, Rivers & Oceans	A Farmer	Trees and Plants
drinking food keeping clean fun/relaxation	drinking food keeping clean energy fun/relaxation	drinking food shelter	drinking food keeping clean energy fun/relaxation	drinking shelter

Water Use Tally: Chart 3

Drinking Water	Shelter	Keeping Clean	Source of Food	Relaxation	Energy
	III	III	IIII	III	II

How Do We all Use Water?: Chart 1

Animals in a Field & Forest	My Family	Fish in Seas, Lakes, Rivers and Ocean	A Farmer	Trees and Plants

Common Water Uses: Chart 2

Animals in a Field & Forest	My Family	Fish in Seas, Lakes, Rivers and Ocean	A Farmer	Trees and Plants

Water Use Tally: Chart 3

Drinking Water	Shelter	Keeping Clean	Source of Food	Relaxation and Fun	Energy

Activity 2

Purpose:

Students are placed into two groups and given a set of Water Use Cards to read. Each card indicates how much water is consumed with each action. Group 1: "Clever Conservers" keep water conservation in mind. Group 2: "Water Wasters" do not keep water conservation in mind.

Materials Needed:

- 4 large buckets (8 litres each)
- 3 litres of water
- Water Use Cards
- 2 measuring cups
- 2 large rulers (1m)

Preparation:

1. Label 2 buckets "Water Supply"
Label the other 2 "Used Water"
2. Duplicate and use the "Water Use Cards."

Procedure:

1. Place students into 2 large groups.
2. Give groups their Water Use Cards.
Everyone should have 1 card
(At least)
3. Each group has 2 students who will be called "Water Control Officers".
One will measure the amount of water needed. The other will record amounts.
4. Begin by asking the Water Control Officer to measure water amounts in the Water Supply bucket (using a measuring stick)
5. Have students in Group 1 with Water Use Card A read the demand aloud. The Water Control Officer should remove that amount of water from the Water Supply bucket and pour it into the Used Water bucket
6. Ask the student in Group 2 with Water Use Card A to read the demand on the card. The Water Control Officer should remove and record the amounts. Repeat the process until both groups have read all their cards.
7. When complete, ask Water Control Officer to measure water amounts left in buckets.
8. Record starting and finishing water amounts on the board. Subtract to see how much water each group used, then compare the difference in water use.
9. Discuss the noticeable difference between groups. Make a list of water uses that occurred in both groups. Then compare the differences.

Observations:

Have students fill out the Water Use, Water Reduce chart. This will prepare them for Activity 3.

Conclusions:

Upon completing the activity, students should realize that by keeping small conservation measures in mind, they can make a big difference in water conservation.

Water Use Cards

Group 1: Clever Conservers		Group 2: Water Wasters	
1 - A We flush the toilet only when we need to. We never flush disposable wipes, kleenex or clean toilet paper down the toilet bowl. We have a low flush toilet. 125 ml or ½ cup	1 - B We take short showers and use a water saving shower head. 125 ml or ½ cup	2 - A We flush the toilet almost every time we enter the bathroom. We often flush flushable wipes, kleenex or clean toilet paper down the toilet. 250 ml or 1 cup	2 - B We often take long Hot showers and baths. Before showering, I let the water run. 500 ml or 2 Cups
1 - C When I brush my teeth I use a glass of water to rinse. I turn off the water while brushing. 125 ml or ½ cup	1 - D In the summer our grass needs to be watered, but not every day. We use a sprinkler and garden hose/ water from the rain barrel 125 ml or ½ cup	2 - C When I brush my teeth I let the water run. 250 ml or 1 Cup	2 - D In the summer our grass needs to be watered every day. 250 ml or 1 Cup
1 - E I am very thirsty and want a cold glass of water. We always have a pitcher of cold water in the fridge. 125 ml or ½ Cup	1 - F I have been playing outside. I need to take a short shower. 250 ml or 1 Cup	2 - E I am very thirsty. I would like a glass of cold water. I will run the tap. 250 ml or 1 Cup	2 - F I have been playing outside. I need to take a bath. 250 ml or 1 Cup
1 - G We wash the clothes only when there is a full load for the washing machine. 250 ml or 1 Cup	1 - H I heard the faucet dripping so I went to turn it off, but it kept dripping. I told my parents and they fixed it. 0 ml or 0 Cups	2 - G We wash the clothes in the washing machine every time we dirty our clothes. 500 ml or 2 Cups	2 - H I heard the faucet dripping but I ignored it because it was nothing more than a drip. 250 ml or 2 Cups
1 - I I must wash my hands before coming to eat. I fill the sink half way and don not let the faucet run. 125 ml or ½ Cup	1 - J I had to wash the dishes. I waited for the dishwasher to be full of dirty dishes before turning it on. 125 ml or ½ Cup	2 - I Before eating I wash my hands with the faucet running. 250 ml or 1 Cup	2 - J I had to wash the dishes. I placed the dishes into the empty dishwasher and turn it on. 250 ml or 1 Cup
1 - K Our car needs to be washed. I reused the water from the laundry sink and washing machine instead of letting water run down the drain. 0 ml or 0 Cup	1 - L When my dad shaves he fills the sink half way with water and then rinses the razor in the sink. He does not leave water running. 125 ml or ½ Cup	2 - K Our car needs to be washed. We use a hose and dishwashing detergent. 500 ml or 2 Cups	2 - L When my dad shaves he lets the water run. 250 ml or 1 Cup
1 - M Last week we installed water saving shower heads in our house. They save water when we shower. 125 ml or ½ Cup	1 - N We fill the sink with water before washing the dishes. 250 ml or 1 Cup	2 - M Our showerhead leaks. When we turn it on, water flows from the bathtub faucet too. 500 ml or 2Cups	2 - N We let the faucet run as we wash dishes in the sink. 375 ml or 1 ½ Cup

Water Use: Water Reduce Chart

<u>Water Conservation</u>	
New Word and Definitions	
Conservation:	To continually protect and manage natural resources so that there will be enough for future economic and social benefits.
Domestic Use:	The amount of water that 1 house uses for the purpose of washing, bathing, and Food preparation.
Litre:	The basic unit of measurement for measuring volume in the metric system.
Recycle:	Refers to products or natural resources that can be reprocessed and then reused again.
Resource:	A thing, person or an action that is needed to live or to improve the quality of life.
Water Conservation: The care, preservation, protection and wise use of water.	

<i>Room</i>		<i>Clever Conserver</i>	<i>Water Waster</i>
Bathroom	flushing the toilet		
	showering		
	bath		
	brushing teeth		
	shaving		
Kitchen	hand washing dishes		
	operating dishwasher		
	food / drink		
	washing machine		
Out Doors	watering the lawn		
	washing the car		
Around the House	washing hands		
	watering plants		

Activity 3: Wise Use Water Patrol

Purpose:

Students discover how much water they use each day. By tracking personal and family water uses in the home and outside. They compare their estimated water use with the average Canadian who uses 250 litres of water daily.

Observations:

Upon completing this activity student will discover how much water they and their families use each day. They will have explored alternatives to wasting water as well as taught their family members about water conservation in the home.

<u>Bathroom</u>	<u>Kitchen</u>	<u>Laundry</u>	<u>Outside</u>
toilet flushing	washing dishes	washing clothes	watering lawn
showers	cooking		washing car
baths	drinking		
	water for flowers		

Materials Needed:

- List of Daily Water Use Activities
- Activities to Look Our For sheet
- Graph paper & construction paper
- Plain white paper
- Pencil crayon, markers

Extensions:

1. Discuss the bar graph and identify areas in the home where most water is wasted. Develop Water Conservation Rules for these areas. (See Home Water Conservation Tips)
2. The Water Conservation Rules should be made into a diploma style document, with borders, pictures, etc. Send a letter to the parents telling them that these are water conservation rules that their child has personally developed for their household.

Procedures

1. Photocopy the two lists for students to review and keep in mind
2. In a class discussion, review daily water uses on the board
3. Tell students that they have 2 days to make a list of Wasteful Water Uses that they see at home. Give students "List of Water Wasting Activities" to Look Out For and "Your Total Daily Water" sheet
4. When students return to class with their lists, tally up the daily water uses.
5. Then have students calculate how much water they and their family used in one day.
6. Using the tallied information, have students draw a bar graph showing average class Water Uses in the Home (from most used to least used)

Your Total Daily Water

Activity	Water Used (each time)	Time Done	Water Used x Times Done	Total Water Used
flushing toilet	4.8L (average) Check your toilet			
5 minute shower	6.6L / minute = 33 L			
10 minute shower	6.6 L / minute = 66 L			
Brushing Teeth - tap on for 1 minute - tap off for Brushing	3 L/ minute 0.5L/ brush			
Hand / Face Washing - tap running	10 L			
Glass of Water - run tap until water is cold - from jug in fridge	5.5 L 0.5 L			

Your Total Personal Water Use= _____ L (litres)

Your Family Water Use

Activity	Water Used	Times Done	Water Used X Time Done	Total Water Used
Cooking 1 Meal	20 L			
Doing Dishes - tap on 10 mins - tap off while washing - by dishwasher	110 L 22 L 15 L (older models 25-40L)			
Laundry	75 L / load (150L for older models)			
Car Washing Watering Lawn	400 litres 35 litres/ sq.ft Average lawn 750 sq.ft.			