

A Water Conservation Resource Kit for Teachers Grades 6–8



our
water
matters

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**PLEASE NOTE: Website addresses (URLs) are provided
throughout this learning kit for reference and additional research.
Every effort has been made to ensure these sites are
up-to-date at the time of publication.**

December 2013 Edition 2

Our Water Matters

Learn – Inspire - Act

Grades 6–8

 For the Teacher


Abbotsford
Mission
Water & Sewer Services



Thank you for your interest in water and for inspiring your students to use it wisely.

Our Water Matters!

Be sure to tap into www.ourwatermatters.ca for community water initiatives, updates, and more educational materials.

Welcome to Our Water Matters!

The aim of these action-oriented learning resources is to provide students with an introduction to water and promote a culture of water stewardship in the local communities of Abbotsford and Mission.

These B.C. curriculum aligned resources give students the opportunity to:

- Develop an awareness for water as Earth's most precious resource.
- Gain an understanding of water as a vital community resource.
- Explore ways of incorporating water-smart actions in everyday life.
- Inspire others to value, protect, and conserve water.

Organization

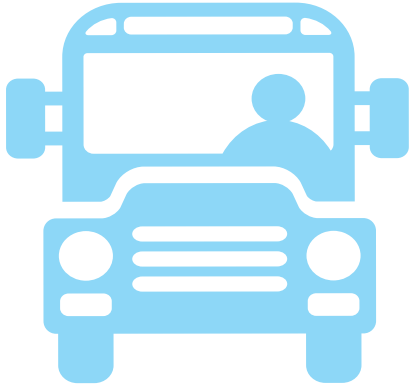
Resources are aligned to B.C.'s Prescribed Learning Outcomes (PLOs) and the Performance Standards for Social Responsibility. They are organized as follows:

- At a Glance – An overview of activities, learning and action outcomes.
- Tap Into Water Facts – Key facts & background information.
- Ready-to-use worksheets and activities.
- Field trip ideas and supporting materials promoting real water connections in the community.
- A Waterfall of Ideas & Resources – Links to more water education resources and initiatives.

Why Teach about Water?

Water is a precious and finite resource which we often take for granted. Educating children and youth about their water supply, water quality, and the importance of responsible water conservation practices is an important investment in the future.





Step Outside the Classroom & Discover Water in Your Community!

Field Trip Ideas!

- **Visit the Norrish Creek Water Treatment Plant** where students can learn about their water from source to tap. Meet with the experts who will provide a guided tour. We'll come to pick you up! The bus and driver are part of our program. See supporting classroom materials.
- **Visit the Abbotsford Entertainment & Sports Centre (AESC)** where students can learn about the benefits of rainwater harvesting. Yes, the Abbotsford Heat hockey team is playing on rainwater ice! See supporting classroom materials.
- **Coming soon! Visit the Water-Wise Demonstration Garden at Mill Lake** in Abbotsford and **The Rain Garden** in Mission (7th & Grand St) where students can learn about water-wise garden designs and water conservation strategies.

To book a tour, please contact:
City of Abbotsford Engineering
604-864-5514



Tap into www.ourwatermatters.ca
for updates, community water events,
and additional educational initiatives

Grades 6–8: At A Glance

A Summary of Activities, Objectives,
Curriculum Links and Action Outcomes



For the Teacher



Overall Objectives:

1

Develop an awareness for water as Earth's most precious resource

2

Gain an understanding of water as a vital community resource

3

Explore ways of incorporating water-smart actions in everyday life at home, at school, and in the community

4

Inspire others to value, protect, and conserve water

Activity # & Title	Learning Objectives
1. Our Water Matters!	• Gain an understanding that water is precious & essential to life. • Develop an understanding that water is a limited resource. • Develop positive attitudes and actions in conserving water in the community.
2. Where does my Water come from?	• Develop an understanding of where water in Abbotsford and Mission comes from. • Introduce the term <i>watershed</i>. • Identify your local watershed on a map.
3. Reducing Our Water Footprint	• Develop an awareness for water as a precious and limited community resource. • Develop an understanding of why water conservation is important in Abbotsford & Mission. • Explore ways in which water can be conserved at home and in the garden. • Develop an initial understanding of rain water as a renewable natural resource.
4. Our Watershed Matters	• Gain an understanding of watersheds and the importance of protecting them. • Make connections between watershed protection and the provision of clean and safe drinking water.
5. Be a Water Ambassador	• Identify qualities, skills, and abilities required for water related careers. • Develop an action-oriented final project using the qualities displayed by the Water Ambassadors in your Community, as an inspiration.

Desired Action Outcomes:

At Home

- Implement your Water Conservation Action Plan.

Worksheets, Teaching Aids, Classroom Consumables from the Abbotsford Mission Water & Sewer Commission

Teaching Aids:

Mind Map Information-
<http://www.ndstudies.org/images/mind-map.gif>.
Video Suggestion: Introduction to Water
<http://www.youtube.com/watch?v=nSENoIWbyYQ&feature=related>

Student Worksheets:

1. My Water is Our Water – Page 10
2. Testing the Waters - Quiz & Answers – Pages 11 & 12
3. Our Water Matters worksheet – Page 13

Classroom Consumables:

Refer to the list at the end of the kit

Teaching Aids:

Our Water System poster
Access to Google Maps and/or Canadian Geographic
<http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/>
Satellite image of the Norrish Creek & Cannell Lake Watersheds

AMWSC Water Supply Diagram

Student Worksheets:

1. My Water System Map Criteria for Assignment – Page 15

Classroom Consumables:

Refer to the list at the end of the kit

Teaching Aids:

Video Suggestions:
Water Crisis: <http://www.youtube.com/watch?v=BkNY78B2Jio&feature=related>
Water Conservation Tips - How to conserve water at home: <http://www.youtube.com/watch?v=4MDLpVHY8LE>
Zero Footprint: <http://goblue.zerofootprint.net/>
Suggestion: Abbotsford Entertainment and Sports Centre fieldtrip

Student Worksheets:

1. Water: A Precious Community Resource – Page 21
 2. Water at Home – Pages 22 & 23
 3. A Water-Smart Action Plan – Page 24
 4. Welcoming Rain in Our World – Pages 25 & 26
- Field Trip info: Turning Rain Drops into Pucks Drops

Classroom Consumables:

Refer to the list at the end of the kit

Teaching Aids:

Canadian Geographic- Pacific Ocean Watershed
<http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/watersheds/pacific-ocean>
Canadian Geographic- Watersheds 101
<http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/watershed101>
Canadian Geographic- Take Action
<http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/take-action>
Prepare erosion demonstration (See lesson notes), teacher will need: 2 plastic cups, a pan of water, ½ cup of soil, some grass clippings, a spoon for preparing

soil, some water in a container and a utensil for pouring water (activity adapted from Environmental Detectives)
Picture Gallery (Norrish Creek, Cannell Lake, Groundwater well head)

Field Trip Suggestion:
Norrish Creek Water Treatment Plant

Student Worksheets:

1. Our Watershed Matters – Page 32
2. Water Quality in the Watershed – Page 36
3. The Great Debate – Page 37

Classroom Consumables:

Refer to the list at the end of the kit

Teaching Aids:

Video Suggestions:
People Behind the Water
<https://www.bcwva.org/bcwva-news/269-people-behind-the-water-video.html>
Why Care About Water?
<http://video.nationalgeographic.com/video/environment/freshwater/env-freshwater-why-care>

Student Worksheets:

1. The Water Ambassadors in Our Community (profile cards)
2. The Water Ambassadors In Our Community worksheet – Pages 44 & 45
3. Let's Fill the Bucket-Taking Action! – Pages 46 & 47

Classroom Consumables:

Refer to the list at the end of the kit

Objectives, Curriculum Links & Ministry Documents

Science:

- Evaluate human impacts on local ecosystems
- Assess the requirements for sustaining healthy local ecosystems
- Describe how water and ice shape the landscape (erosion)
- Demonstrate ethical, responsible, cooperative behavior

Social Studies:

- Implement a plan of action to address a selected local or global problem or issue
- Assess the relationship between cultures and their environments
- Interpret graphs, tables, aerial photos, and various types of maps
- Use various types of graphs, tables, timelines, and maps to obtain or communicate information
- Compile a body of information from a range of sources

Health & Career Education:

- Describe how personal attributes can be related to career options
- Identify skills that are transferable to new tasks and situations within and outside the school

Social Responsibility:

- Exercising Democratic Rights and Responsibilities.
- Show a sense of community and an interest in making the world a better place; try to follow through on planned activities

Additional Documents:

- <http://www.bced.gov.bc.ca/greenschools/>
- Environmental Learning and Experience- An Interdisciplinary Guide for Teachers http://www.bced.gov.bc.ca/environment_ed/
 - Environmental Learning and Experience- Curriculum Maps http://www.bced.gov.bc.ca/environment_ed/ele_curricmaps.htm
 - Sustainable Schools- Best Practice Guide <http://www.bced.gov.bc.ca/greenschools/sustbestpractice.htm>

At School

- Present and display **Let's Fill the Bucket**

In the Community

- Present, display and/or implement **Let's Fill the Bucket** project
- Participate in **Drinking Water Week**

Grades 6–8: Tap Into Water Facts

 For the Teacher



Water on Earth

- About 70% of the Earth's surface is covered in water. However, 97% of the planet's water is too salty for humans, 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 available for human use!
- There is no new water. The water that is on the Earth now is the same water that dinosaurs drank!

Water Supply in Abbotsford and Mission

- The Abbotsford Mission Water & Sewer Commission (AMWSC) supplies bulk water to the City of Abbotsford and the District of Mission who then distribute water to residents and businesses
- The water supply systems consists of two surface water sources: Norrish Creek and Cannell Lake, 19 groundwater wells, two water storage reservoirs and 86 km of high pressure, steel water transmission mains
- This system can supply and deliver approximately 150 million litres per day (150 MLD).

Water Use in Abbotsford and Mission

- There are approximately 170,000 residents in Abbotsford and the District of Mission
- The average person in Abbotsford consumes approximately 200 to 300 litres of water per day, and in Mission, the average person consumes about 400 to 450 litres of water per day.
- On an average day, Abbotsford and Mission use approximately 60 to 80 million litres per day (MLD) (based on 2007 to 2011 data). That's enough to fill an Olympic sized swimming pool approximately 25 times!
- Summer consumption can almost double!
- Outdoor water use accounts for about 23% of total annual average daily use.

Water Use at Home and in the Garden

- Dripping taps are the biggest water wasters. Fixing a dripping tap can save up to 300 litres (L) drinking water per week.
- A running tap pours out seven to twelve litres a minute!
- A leaking toilet can waste up to 2500 litres per day (L/d)
- Less than 3% of municipal water is used for drinking and the rest goes down the drain, down the toilet and onto our gardens.
- An average garden hose pours out 38 litres of water per minute! A lot of water can be wasted when gardening or washing the car if you don't turn the hose off

Fun Water Facts!

- All living things need water to survive.
- You can live without food for a month, but you can live only a few days without water
- Your brain is 70% water
- A chicken is about 90% water
- A tomato is about 95% water
- A tree is 70% water
- In the summer, one mature pine tree needs about 20-40 litres of water per day!
- More than half of the world's animal and plant species live in water



Want to know more about water
in Abbotsford and Mission?
Visit www.ourwatermatters.ca

Sources: Environment Canada, Living Water Smart BC and Abbotsford Mission Water & Sewer Commission

Activity 1: Our Water Matters!

(suggested time: 4x40 minutes each)

Grades 6–8
For the Teacher



Materials:

Teaching Aids	Student Worksheets	Classroom Consumables
For the Teacher • Mind Map Information- • Video Suggestion: Introduction to Water http://www.youtube.com/watch?v=nSENoIWbyYQ&feature=related	1. My Water is Our Water 2. Testing the Waters- Quiz & Answers 3. Our Water Matters worksheet	Refer to the list at the end of the kit.

Video Suggestion:

Introduction to Water

<http://www.youtube.com/watch?v=nSENoIWbyYQ&feature=related>

Water Talk:

- Create groups of 3-4 students. Hand out **My Water is Our Water**. The objective of the activity is to help students develop values, attitudes, and positive actions towards conserving water in the community. Students cut the sentence strips and organize them in order of importance. Students need to work cooperatively to prioritize the list, discuss their choices, and provide a rationale. Each group reports back to the whole class with their choices and rationale.
- Encourage students to explain how they can make a difference in their communities. On a separate piece of paper, students write a response to share observations, ideas and thoughts about local citizenship, water conservation, and their ability to make positive changes in their community.

Water Talk:

In groups students create a mind map on chart paper to introduce the theme of water.

- **Ask** students to draw a water drop in the middle of the chart paper. Write WATER inside the water drop and ask students to write down all their ideas related to water.
- Use the mind map to help students recognize:
 - a) **Water is fun!**
What do we do with water? We can play in it, swim in it, skate on frozen water, etc...
 - b) **All Living Things Need Water to Survive!**
What do all living things need to survive?
(**water**, food, health, shelter, safety, family, etc...)

Learning Objectives:

1

Gain an understanding that water is precious & essential to life

2

Develop an understanding that water is a limited resource

3

Develop positive attitudes and actions in conserving water in the community

Grades 6–8: Activity 1 – Our Water Matters!

 For the Teacher



- c) **How Water is used at Home, at School and in the Community.**
How do you use water at home, at school and in the community?
- d) **Water is a limited and precious resource therefore we need to care for it and protect it.**
Do you think we have lots water on Earth? Do you think we have enough water to last us forever?
- Assist the students in understanding the value of water for themselves, their families, their school and the greater community.

Ask: *What would happen if you turned on the tap and water didn't come out?!*

Use the following demonstration to show the students that water is a limited resource. About 70% of the Earth's surface is covered in water. However, 97% of the planet's water is too salty for humans, 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 available for human use!**

Let's pretend we can put all the Earth's water in this 4L bucket. But most of this is ocean water and is too salty.



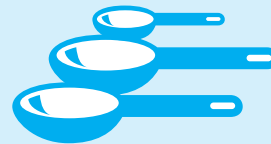
Why can't we use all of this water?

Take out 125 mL (1/2 cup) of water from the bucket. This represents all of the fresh water on Earth. But most of this water is found in glaciers and frozen lakes.



Why can't we use all of this water?

Now take out 30 mL (2½ tbsp.) of water from the fresh water. This represents the water that is available for human use for the WHOLE Earth.



How do we share and care for this water?

Testing the Waters - A Quiz:

- Students complete the quiz.
- In small groups students discuss the quiz answers. Encourage students to discuss the answers using the key questions on the answer sheet.

Water Talk:

- Have students add any new knowledge to their mind maps.
- Re-assemble groups and give one follow up discussion question to each group.
Suggestion - Use student generated questions resulting from insight gained during the quiz discussions.
- Provide chart paper to illustrate answers with notes, charts or diagrams.
- Students share responses with the class.

Grades 6–8: Activity 1 – Our Water Matters!

For the Teacher

Questions:

1. What are the implications of knowing we have only 1% fresh water available to the entire Earth? (limited resource, 1% needs to be shared, our actions can affect the limited supply).
2. The next time you turn on your tap, what will you consider? (We need to be careful how much water we use every day, water is overused and wasted).
3. What was the main idea presented in the quiz? (water is precious, water is a shared community resource, we use a lot of water, water is overused).
4. How might your individual water use affect your community water resources? (we may be using more than we need, may harm our water supply).
5. How can you change your attitudes and behaviours to protect water resources? (conservation strategies, consider sustainability).
6. What are the implications if most of the fresh water on Earth is found in the north of the Canada when most of the population lives in the south? (it can cost a lot of money and use a lot of energy to distribute water, these processes can also harm local ecosystems).
7. What are some strategies you can adopt to change the amount of water you use? (see Activity #3 for strategy suggestions)
8. Why should you care about water as a resource? (water connects all of us, water is essential and precious, it is limited and we have to be careful how much water we use, we need to re-think water and learn to conserve it, what happens now affects our future).

- Complete the worksheet called **Our Water Matters!**



Cut out the sentence strips.

Work in groups to organize each statement in order of importance. Provide reasons for your choices. Be prepared to share your ideas with the whole class.

I know where my water comes from.



Water is very important to everyday living.



How much water I use affects others.



I can show and inspire others how to conserve water.



I can make a difference in conserving water in my community.



My community water needs to be taken care of.



Water is a precious and limited resource on Earth.



I should be careful how much water I use.



Grades 6–8:

Activity 1 – Our Water Matters!

Testing the Waters - A Quiz

True or False?

Beside each statement, circle **T** (true) or **F** (false).

- | | | |
|---|----------|----------|
| 1. Approximately 3% of the water on Earth is fresh water. | T | F |
| 2. Rain, hail and snow provide Earth with new sources of water. | T | F |
| 3. Most of our fresh water is found on the surface in lakes, rivers and streams. | T | F |
| 4. An average person in Abbotsford and Mission uses 50 litres of water per day. | T | F |
| 5. Most of the water used at home is used in the kitchen. | T | F |
| 6. Most of our fresh water resources are located close to where we live. | T | F |
| 7. The Abbotsford Mission Water & Sewer Commission (AMWSC) supplies 10 million litres of water per day to the city of Abbotsford and District of Mission. | T | F |
| 8. On average, Abbotsford and Mission use about 25 litres of water a day. | T | F |
| 9. During the summer months water consumption can double in Abbotsford & Mission. | T | F |
| 10. It takes 125 litres of water to produce one apple (150g). | T | F |



Grades 6–8:

Activity 1 – Our Water Matters!

Testing the Waters - Answers

As you discuss the answers in your group, consider the following questions: What did you already know and understand about water? What surprised you? What conclusions can you make based on your new water knowledge?

1. **True**
About 75% of the Earth's surface is covered in water. However 97% of the planet's water is too salty for humans, animals and plants so only about 3% is fresh water. But keep in mind that 2% of the water is held as glacial ice at the north and south poles so **only 1% of the Earth's water is available for human consumption!**
2. **False**
The amount of water on Earth has been the same for billions of years. Rain, snow & hail are part of the hydrological cycle: evaporation, condensation, and precipitation. There is no new water so the water we have on Earth is all that we'll ever have now and in the future.
3. **False**
Most fresh water on Earth is not found on the surface. It is found underground as groundwater. Approximately one in four Canadians (eight million people) rely only on groundwater for their water needs rather than water from river and lakes.
4. **False**
The average person in Abbotsford consumes approximately 200-300 litres of water per day, and in Mission, the average person consumes about 400 to 450 litres of water per day.
5. **False**
Most water used at home is used in the bathroom for flushing the toilet, washing and showering (65%). The rest of our water use habits breakdown like this: laundry room (20%), kitchen and drinking (10%) and cleaning (10%).
6. **False**
Most of our fresh water resources are not located where we live. About 65% of Canada's water is in the north of the country and most of us (90%) live within 300 km of the US border in the southern part of the country.
7. **False**
The AMWSC system can supply approximately 150 million litres per day (MLD).
8. **False**
We use a lot more than 25 million litres. On an average day, Abbotsford and Mission use approximately 60 to 80 million litres per day (MLD) (based on 2007 to 2011 data). That's enough to fill an Olympic sized swimming pool approximately 25 times!
9. **True**
During the summer months water consumption often doubles due to increased use for gardens and lawn irrigation.
10. **True**
Water is used in the production of many items including meat, produce and clothing. For example:
An apple (150 g) = 125 litres of water per apple
Beef (1 kg) = 15,400 litres of water
Potato Chips (1 kg) = 1,040 litres of water per kilogram
A cotton t-shirt (250g) = 2,500 litres of water
A pair of jeans (800g) = 8,000 litres of water

Sources: Abbotsford Mission Water & Sewer Services, Environment Canada, Water Footprint and Canadian Geographic.

Grades 6–8: Activity 1 – Our Water Matters!

Complete the following to demonstrate your understanding of water as a precious and limited resource.

Before I thought: <i>e.g. Canada's water resources are limitless!</i>	Now I know: <i>e.g. We have to share 1% of the earth's water, it is mostly in the ground and it's in the north while I live in the south!</i>	This is important because: <i>e.g. Water is limited so I need to remember that saving and sharing water is important!</i>

Activity 2: Where Does Our Water Come From?

(suggested times will vary depending on preparation and creation of maps)



Learning Objectives:

1

Develop an understanding of where water in Abbotsford and Mission comes from

2

Introduce the term *watershed*

3

Identify your local watershed on a map

Materials:

Teaching Aids	Student Worksheets	Classroom Consumables
For the Teacher • Our Water System poster • Access to Google Maps and/or Canadian Geographic http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/ • Satellite image of the Norrish Creek & Cannell Lake Watersheds AMWSC Water Supply diagram	1. My Water System Map: Criteria for Assignment	Refer to the list at the end of the kit.

Water Talk:

The teacher has a glass of water on the desk.

- **Ask:** *Who can tell me where our water comes from?*
- Use the poster Our Water System to show students how water travels from Cannell Lake and Dickson Lake to their homes in Abbotsford & Mission.
- **Ask:** *What is a watershed?*
- Provide students with a basic definition as defined by Canadian Geographic www.canadiangeographic.ca/watersheds

A **watershed** is defined as an area of land where all the surface water drains into the same place, whether it's a creek, a stream, a river or an ocean. All precipitation that falls on a watershed ends up flowing downhill to the same place. It is a landscape feature also referred to as a catchment or drainage basin.

Activity:

Students draw a detailed map of the water systems of Abbotsford & Mission.

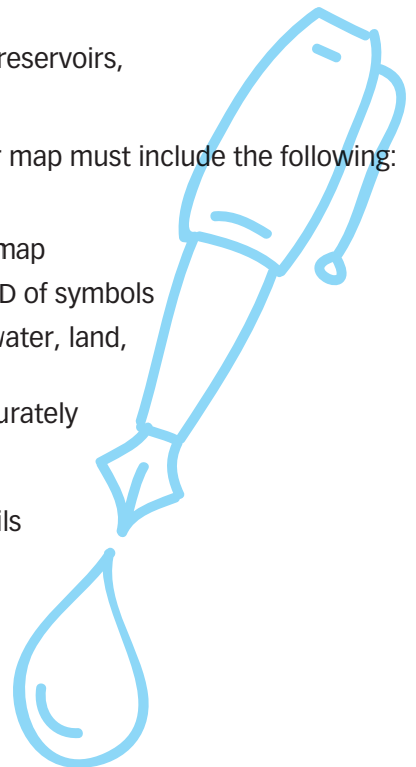
- Students work in pairs to research a more detailed understanding of the water system. Provide copies of satellite images of the Norrish Creek & Cannell Lake Watersheds, AMWSC Water Supply diagram and provide links to Google maps and/or Canadian Geographic: <http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/>
- Hand out **My Water System Map: Criteria for Assignment**

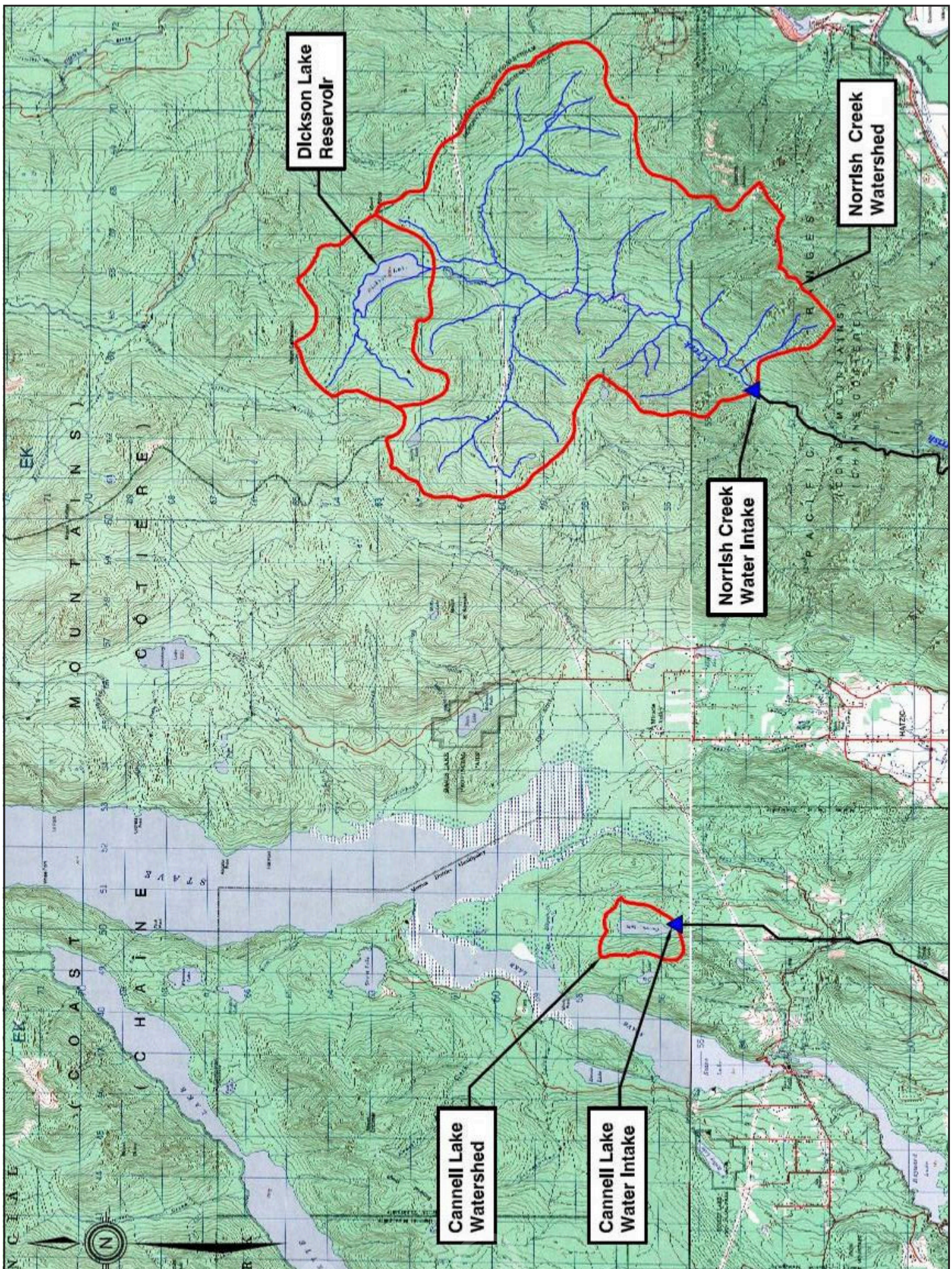
Objective: to draw a detailed map demonstrating the Abbotsford and Mission water system.

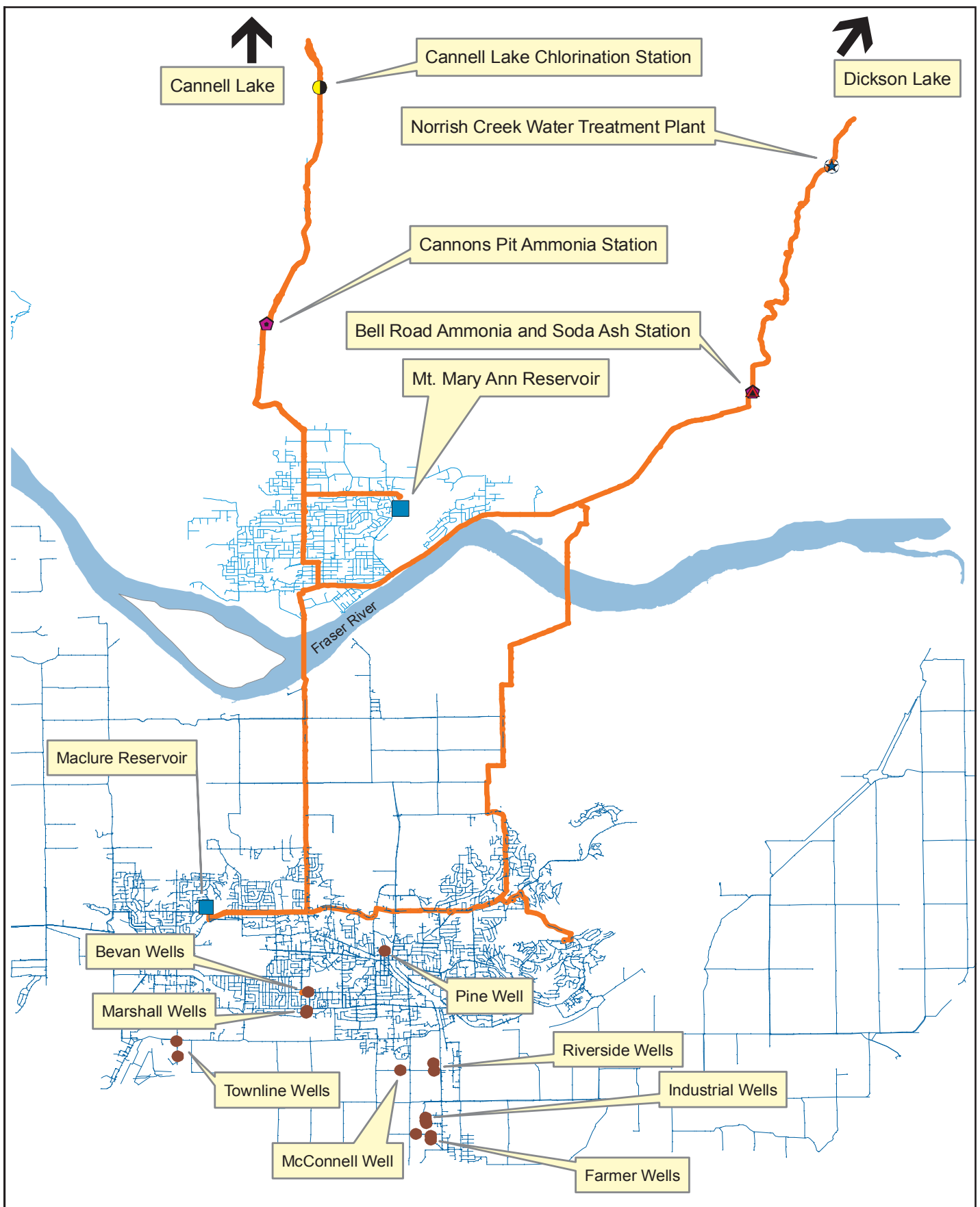
The Abbotsford Mission Water & Sewer Commission (AMWSC) supplies bulk water to the city of Abbotsford and the District of Mission who then distribute the water to residents and businesses. The water supply system includes two surface water sources (Norrish Creek and Cannell Lake), 19 groundwater wells, two water storage reservoirs (Maclure Reservoir and Mt. Mary Ann Reservoir) and 86 km of high pressure, steel water transmission mains.

1. Work in pairs to research your local water system.
2. Use the following sources:
 - a) Our Water System poster
 - b) Google Maps and/or Canadian Geographic
<http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/>
 - c) Norrish Creek & Cannell Lake Watersheds satellite image
 - d) AMWSC Water Supply diagram
3. Using the above sources, carefully locate the following:
 - a) Waterways - Fraser River, Cannell Lake, Dickson Lake, Norrish Creek
 - b) Landforms - Mountainous areas, residential areas, and the city of Abbotsford & the District of Mission
 - c) Locate the Norrish Creek Water Treatment Plant, the two water reservoirs, and at least 4 groundwater wells.
4. Design a detailed map of the water systems in your community. Your map must include the following:

Map Elements: • Fraser River • Cannell Lake • Dickson Lake • Norrish Creek • Norrish Creek Water Treatment Plant • City of Abbotsford • District of Mission • 2 Water Reservoirs – Maclure Reservoir & Mt. Mary Ann Reservoir • At least 4 groundwater wells • Water paths - one from Cannell Lake to Mission and one from Dickson Lake to Abbotsford	Design Elements: • Write a title for your map • Provide a KEY/LEGEND of symbols • Use colour to show water, land, mountains, etc... • Label clearly and accurately all details • Be accurate with all information and details
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5. Your evaluation will be based upon the complete and accurate completion of all criteria.







Legend

- AMWSC Transmission Mains
- City of Abbotsford Distribution Mains
- City of Mission Distribution Mains



Prepared by:	S.M.
Scale	Plot Date
1:125,000	(mm/dd/yyyy) 5/31/2011

Activity 3: Reducing Our Water Footprint

(suggested time: 3x40 minutes each plus time to complete audit at home)

Learning Objectives:

1

Develop an awareness for water as a precious and limited community resource

2

Develop an understanding of why water conservation is important in Abbotsford & Mission

3

Explore ways in which water can be conserved at home and in the garden

4

Develop an initial understanding of rain water as a renewable natural resource

Materials:

Teaching Aids	Worksheets		Classroom Consumables
	Student Worksheets	Take It Home	
For the Teacher Video Suggestions- - Water Crisis http://www.youtube.com/watch?v=BkNY78B2Jio&feature=related - Water Conservation Tips - How to conserve water at home http://www.youtube.com/watch?v=4MDLpVHY8LE Zero Footprint http://goblue.org Suggestion: Abbotsford Entertainment and Sports Centre fieldtrip	1. Water: A Precious Community Resource 2. A Water Smart Action Plan. 3. Welcoming Rain in Our World! Field Trip: Turning Rain Drops into Puck Drops	Water At Home (2 pages)	Refer to the list at the end of the kit.

Video Suggestion:

Water Crisis - a short clip of children talking about the need to conserve water and recycle it.

<http://www.youtube.com/watch?v=BkNY78B2Jio&feature=related>

Ask: *Why do you think we need to conserve water in Abbotsford & Mission?*

Hand out **Water: A Precious Community Resource**. Students read and discuss the information provided. Write a response to the question on a separate piece of paper.

Water Talk:

- Ask:** *How much water do you use at home?*
Take a guess! Think of how often you use water during a day to brush your teeth, shower, wash dishes, wash clothes, etc...
Student Response: I think I use _____ litres a day.
- Reduce Your Water Footprint.**
Introduce the term **water footprint**. Students use the website Zero Footprint <http://goblue.org> to understand how much water they are using and to discover ways to reduce their water footprint.
- Ask:** *How did you do?*
Overall how much water does your family use in one day? _____
- Ask:** *Have you ever seen water over-used, misused or wasted?*
- Introduce the words **Conservation** and **Sustainability**
Conservation: Doing the same with less, by using water more efficiently or reducing where appropriate, and being careful not to waste water.
Sustainability: the ability to support and preserve water for today and tomorrow.

Grades 6–8:

Activity 3 – Reducing Our Water Footprint

 For the Teacher

- **Video Suggestion:**

Water Conservation Tips - How to conserve water at home

<http://www.youtube.com/watch?v=4MDLpVHY8LE>

- Review and discuss conservation strategies:

1. Run the water only when you're ready to rinse
2. Use only a small amount of water in a tub or take a shower instead
3. Fix the leaks in the kitchen
4. Fix the leaks on the hose
5. Use a dish squeegee* to scrape dishes rather than rinsing
6. Only use a full washing machine when doing laundry
7. Water the garden in the cool temperature of the morning
8. Use a rain barrel to collect rain water
9. Irrigate lawn with only 1 inch of water a week*
10. Use a bucket and sponge to wash your car
11. Wait until the dishwasher is full and then start it
12. Use a bowl or put a plug in a sink to wash vegetables
13. Follow water restrictions
14. Use a timer attachment* on your hose for garden irrigation
15. Use a spring loaded water hose sprayer* (attached to your hose)
16. Use a broom to clean the driveway instead of a hose.
17. Use a moisture meter* for the garden

*Note: Several water saving devices are available from the AMWSC for use in this kit. They are helpful in showing students how to improve their water conservation practices. Refer to the list at the end of the kit for suggestions and ordering information.

Ask:

- *What conservation strategies do you already use at home?*
- *Which practices are new to you?*
- *Which conservation strategies would you like to try at home?*

Students take home the worksheet **Water At Home** and complete it with their family.

Water Talk:

Once completed, students discuss the results of their worksheet **Water at Home**.

- **Ask** students:

How water-smart are you at home?

What areas are you doing well with and what areas need improvement?

How can you help others understand the importance of water conservation?



Grades 6–8:

Activity 3 – Reducing Our Water Footprint

 For the Teacher



Activity:

- Create an action plan to help improve and practice water conservation strategies at home. Hand out the **Water Smart Action Plan** Note: Several water saving devices are available from the AMWSC for use in this kit. They are helpful in showing students how to improve their water conservation practices. Refer to the list at the end of the kit for suggestions and ordering information.

Water Talk: Rain as a Renewable Natural Resources

- Review uses of water, water sources and conservation practices, and remind students of their Water Conservation Action Plan.
- Hand out the **Welcoming Rain in Our World!**
- Students answer questions on the worksheet:

Answer key

1. Abbotsford 2. Halifax 3. St. John's
 2. Abbotsford gets about 1,575 mm (62 inches) of water a year
 3. On average Abbotsford has 171 days of rain a year
- Introduce the term **renewable resource**. Explain that some resources are able to replace themselves (renewable), while others can only be used once (non-renewable).
 - Hold up a 1L container of "rainwater" and tell students it was collected during the last rainfall. Introduce the term **rainwater harvesting**. Elicit different ways rainwater can be used. In times of low water availability, water held in rain barrels and cisterns may be used for gardening or other **non-potable needs**. Highlight that rainwater harvesting can serve as a supplement to municipal water.

Suggestions: watering gardens, washing the driveway, flushing toilets, washing cars, household cleaning, and laundry.



Extension activity for students at or above grade level:

Students design a poster explaining Rainwater Harvesting and its benefits.



Field trip idea!

Take your class to the Abbotsford Entertainment and Sports Centre (AESC)!

What do rainwater and hockey have in common?

The ice rink at AESC is made of rainwater! Yes, the Abbotsford Heat hockey team plays on rainwater ice. See notes **Turning Rain Drops into Puck Drops!**

To learn more about this community Rainwater Harvesting project go to:
<http://www.abbynews.com/news/128332033.html>

To book a field trip please contact:
City of Abbotsford Engineering, 604-864-5514

Analyse the following graphs and charts to interpret the data.

On a separate piece of paper use the data to respond to the question:

Why do you think we need to conserve water resources in Abbotsford & Mission?

Water Supply vs. Water Demand

2011 Population in Abbotsford & Mission: 170,000

2031 Estimated population of Abbotsford & Mission: 250,000

An increase in population will create a deficit in the amount of water that is supplied versus the water demand.

Water Demand Scenario	Water Supply (MLD)	Existing Water (2007 - 2011)		Future Water (2031)*	
		Demand (MLD)	Surplus/(deficit) (MLD)	Demand (MLD)	Surplus/(deficit) (MLD)
Average Day	150	60-80	70-90	150	0
Peak Day	150	90-140	10-60	220	(70)

*MLD=Million Litres per Day

*Future water demand numbers are hypothetical. Please contact Abbotsford Water and Sewer Commission for up-to-date numbers.

THINK ABOUT IT! Why do we use more water in the summer?

Peak Day Demand

Peak day demand (PDD) is the day of the year on which the greatest volume of water is consumed. In Abbotsford & Mission, PDD usually occurs each July or August and is generally more than 1.5 times greater than the average day demand.

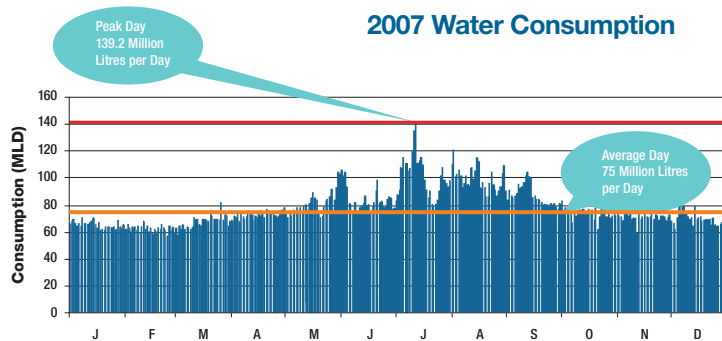
Average Day Demand

Average day demand (ADD) is the average amount of water consumed over the year. On an average day, Abbotsford & Mission use 60-80 million litres of water a day. That's enough to fill an Olympic sized pool 25 times!

Did **YOU** know?

In 2010 our peak day demand dropped to 106.8 MLD saving over 32 MLD from 2007?

How much water do we use?

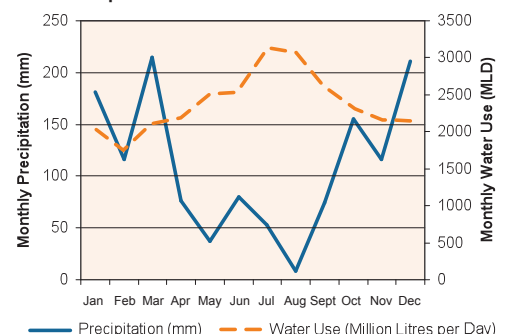


In 2007, water demand on the peak day consumed over 97% of the available capacity. At the expected growth rates in Abbotsford and Mission, it is difficult to meet these high peak day water demands with the existing system.

Why is water conservation important?

Abbotsford and Mission receive an abundant amount of precipitation (rain or snow) from October to May and many residents wonder why we need to conserve water with the amount of precipitation we receive.

2007 Precipitation vs. Water Use for Abbotsford & Mission



Grades 6–8:

Activity 3 – Reducing Our Water Footprint

Water At Home: Part 1

Tell your family that you have been learning about water conservation in class. Share with them some of your new water knowledge and then work with your family to complete this worksheet. Find out how Water Smart you are!

In All Areas of the Home

We fix leaks on taps, toilets and shower heads.

YES or NO

Tip: Dripping taps are the biggest water wasters. Fixing a dripping tap can save up to 300 litres drinking water per week.

Place a few drops of food coloring in the toilet tank. If the food coloring is seen in the bowl without flushing, there is a leak.

We use aerators on all of our taps.

YES or NO

Tip: Aerators can save up to 7.5 litres of water per minute.

In the Kitchen & Laundry Room

We use our dishwasher only when it's full.

YES or NO

Tip: Wait until you have full loads. Use water and energy-saving cycles.

We use a bowl of water or a plugged sink to rinse vegetables.

YES or NO

Tip: Fill the kitchen sink with water to wash and rinse dishes & food instead of letting the water continually run.

We use our washing machine only when it's full.

YES or NO

Tip: Wait until you have full loads. Use water and energy-saving cycles.

In the Bathroom

We turn off the tap when brushing our teeth.

YES or NO

Tip: Turn off the tap to brush teeth and wash. A running tap pours out seven to twelve litres a minute!

We take showers that are less than 5 minutes

YES or NO

Tip: Taking shorter showers can save approximately 19 litres of water per minute depending on the type of showerhead.

We use a low flow toilet.

YES or NO

Tip: A low-flow toilet uses less than 6 litres of water per flush instead of an older toilet that uses 13 or more litres of water per flush.

Outside

We follow the water restrictions.

YES or NO

Tip: Water restrictions are important. They are designed to optimize water use and protect our water availability.

We use a bucket and sponge to wash our car instead of running the hose continuously.

YES or NO

Tip: Use a bucket of water to wash your car instead of letting the garden hose continually run. If you use a garden hose to rinse your car, turn the water on and off as needed.

We use a Rain Barrel to collect rain water.

YES or NO

Tip: Collected water can be used for non-potable water uses: garden/lawn irrigation, laundry, flushing toilets. Harvested water contributes to water conservation and reduces water demands in urban area.

We water our garden during the early morning hours.

YES or NO

Tip: Watering in the morning reduces the amount of water that is lost through evaporation.

How many times did you circle yes?

12 Excellent! You are possibly saving hundreds of litres of water each month. Share your Water Smart Tips with family, friends, and neighbours.

7-10 You're starting to tap into water conservation.

0-6 Are you a water waster?

Grades 6–8:

Activity 3 – Reducing Our Water Footprint

Water At Home: Part 2

Now with your family decide how you can become even more water smart!

Read these additional suggestions or think of some of your own.

1. Run the water only when you're ready to rinse
2. Use only a small amount of water in a tub or take a shower instead
3. Fix the leaks in the kitchen
4. Fix the leaks on the hose
5. Use a dish squeegee to scrape dishes rather than rinsing
6. Only use a full washing machine when doing laundry
7. Water the garden in the cool temperature of the morning
8. Use a rain barrel to collect rain water
9. Irrigate the lawn with only 1 inch of water a week
10. Use a bucket and sponge to wash your car
11. Wait until the dishwasher is full and then start it
12. Use a bowl or put a plug in a sink to wash vegetables
13. Follow water restrictions
14. Use a timer attachment on your hose for garden irrigation
15. Use a spring loaded water hose sprayer (attached to your hose)
16. Use a broom to clean the driveway instead of a hose
17. Use a moisture meter for the garden



Write a paragraph to share & explain what you learned after completing **Water at Home**.

Grades 6–8:

Activity 3 – Reducing Our Water Footprint A Water Smart Action Plan

 For the Student

 Abbotsford
Mission
Water & Sewer Services

Fill in the action plan by choosing at least three areas where you can be even more water smart at home! Decide where you might wish to improve your water conservation strategies. Share your plan with your family to **MAKE IT HAPPEN!**

Areas Where We Can Be Even More Water Smart! <i>e.g. sometimes we water our garden during the day.</i>	Water Smart Solutions <i>e.g. we will water our garden only in the morning or evening.</i>	Water Smart Plan <i>e.g. we will buy a timer for our hose so it will only water at a certain time and for only the correct amount of time.</i>
In the Kitchen & Laundry Room		
In the Bathroom		
Outside		
Additional Ideas		

Rain for thought...

- *What are the three wettest cities Canada?*
- *How much rain does Abbotsford get annually?*
- *On average, how many days a year does it rain in Abbotsford?*



Rain: a gift from the sky!

Have you ever noticed how much it rains in Abbotsford and Mission? We receive a great deal of rain each year making it a readily available resource for our community.

With the average person in Abbotsford consuming approximately 200-300 litres of water per day, and in Mission about 400 to 450 litres of water per day, collecting and using your rainwater can contribute significantly to saving water!

Do you know ...

How many litres of water can be collected when 1mm of rain falls on 1 acre of land?

1 mm of rain falling on 1 acre = about 4047 litres of water!



Grades 6–8:

Activity 3 – Reducing Our Water Footprint
Welcoming Rain in Our World!

 **For the Student**

 **Abbotsford
Mission**
Water & Sewer Services

Reusing your rain!

Can you think of ways in which collected rainwater can be recycled?

Write 5 ways in which you could use rainwater in your home and in your garden.

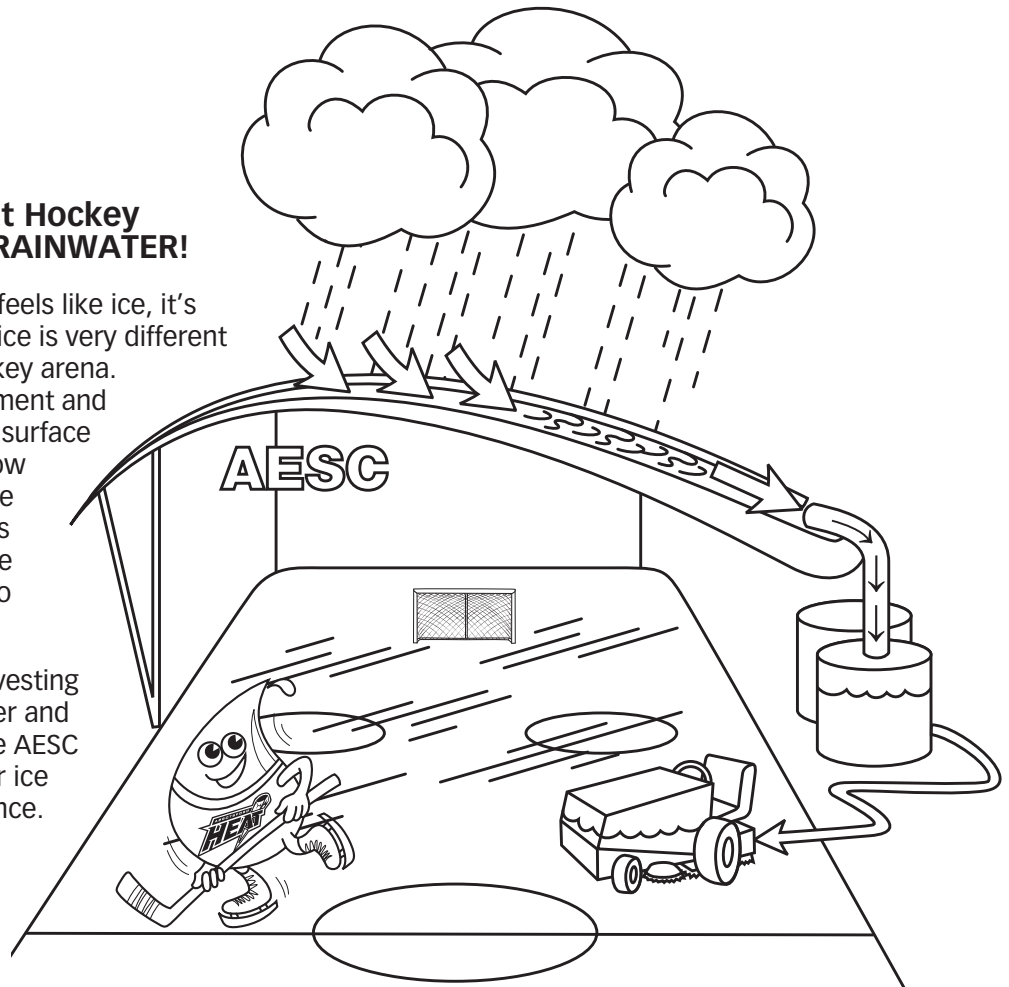


We recycle newspapers, pop cans, plastic ...why not **RAIN?!**
Don't just go **green. Go **blue** too!**

The Abbotsford Heat Hockey Team is playing on RAINWATER!

It looks like regular ice, it feels like ice, it's slippery like ice - but this ice is very different from ice in any other hockey arena. The Abbotsford Entertainment and Sports Centre (AESC) rink surface is made from rain and snow run off from the roof of the building. What's more, it's the first professional grade indoor ice-hockey arena to use rainwater!

The AESC Rain Water Harvesting project captures rain water and snow melt runoff from the AESC roof, reusing the water for ice production and maintenance.



Tap into these AESC facts...

- One million litres of water is required each hockey season to make and maintain the ice
- Creating the initial playing surface requires 38,160 litres
- 370,000 litres (10,000 litres per game, 37 home games a season) is needed to maintain the ice during play
- An additional 420,000 litres is used for practices and community rentals

Now tap into these water saving facts!

Do you know...?

- *How big is the AESC roof?*
The roof is 1333 m². (12,000 sq. ft) and is capable of collecting up to 1,736,000 litres (448,560 US Gals) per year!
- *How much rain is the AESC rainwater system capable of harvesting?*
The AESC rainwater harvesting system is capable of generating 30,000 litres of water for every 25mm (one inch) of rain!

This rainwater harvesting project saves approximately 830,000 litres of water each hockey season saving up to 1 million litres per year of water!

To learn more about this community Rainwater Harvesting project go to
<http://www.abbynews.com/news/128332033.html>

Activity 4: Our Watershed Matters

(suggested time: 3x40 minutes each plus time to prepare and present projects)

 For the Teacher



Learning Objectives:

1

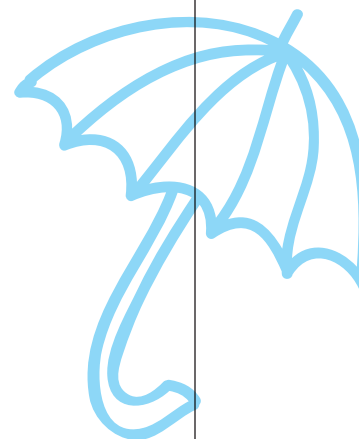
Gain an understanding of watersheds and the importance of protecting them

2

Make connections between watershed protection and the provision of clean and safe drinking water

Materials:

Teaching Aids	Student Worksheets	Classroom Consumables
For the Teacher - Canadian Geographic Pacific Ocean Watershed http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/watersheds/pacific-ocean - Canadian Geographic- Watersheds 101 http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/watershed101 - Canadian Geographic- Take Action http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/take-action - Prepare erosion demonstration before lesson (see notes below), 2 plastic cups, a pan of water, ½ cup of soil, some grass clippings, a spoon for preparing soil, some water in a container and a utensil for pouring water (activity adapted from Environmental Detectives) - Picture Gallery (Norris Creek, Cannell Lake, Groundwater well head)	1. Our Watershed Matters 2. Water Quality in the Watershed 3. The Great Debate	Refer to the list at the end of the kit.



Water Talk:

- **Ask** - *What is a watershed?*
- Review definition from the last activity

A **watershed** is defined as an area of land where all the surface water drains into the same place, whether it's a creek, a stream, a river or an ocean. All precipitation that falls on a watershed ends up flowing downhill to the same place. It is a landscape feature also referred to as a catchment or drainage basin.

Research & Write

- Students read, research, and take notes from the websites below to further explore the term **watershed**:

Canadian Geographic- Pacific Ocean Watershed
<http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/watersheds/pacific-ocean>

Canadian Geographic- Watersheds 101
<http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/watershed101>

Grades 6–8:

Activity 4 – Our Watershed Matters

 For the Teacher

- Students can use a variety of ways to demonstrate an understanding of the term watershed.

Suggestions:

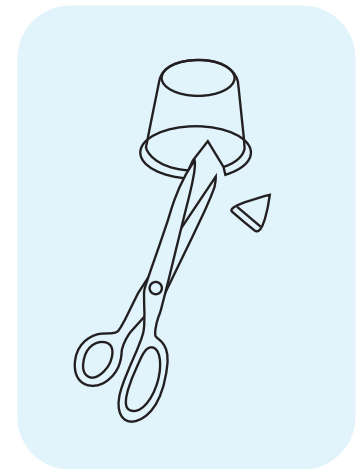
- Draw a picture or diagram
- Take a photo
- Create a model
- Make a map
- Create an animation

Demonstration

Preparation – Erosion Demonstration:

Prepare the demonstration before the lesson:

- Fill the pan with 1" of water, and set it on a table where the students can observe.
- Cut a small triangle in the rim of each cup. Turn the cups upside down and place a mound of soil onto one of the cups, label it A. Take another scoop of soil and mix it with the grass clippings, place this scoop of soil onto the other cup, and label it B. Sample A represents a hillside where major logging has taken place; lack of vegetation can cause erosion when it rains. Sample B represents a hillside where less erosion will occur because of the vegetation.
- Have a container of water ready to use in the demo.



Water Talk:

Ask:

- *Do you know what happens to your water before it gets to your tap?*
- *How is water turned into safe drinking water?*
- *What are some environmental factors that might harm the quality of the water in your watershed?*

Give students **Our Watershed Matters**

Read and discuss the facts and information provided. Share the images in the **Picture Gallery**.

Suggestion: Access watershed information and maps on the Canadian Geographic Website;
<http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/>



Grades 6–8: Activity 4 – Our Watershed Matters

 For the Teacher



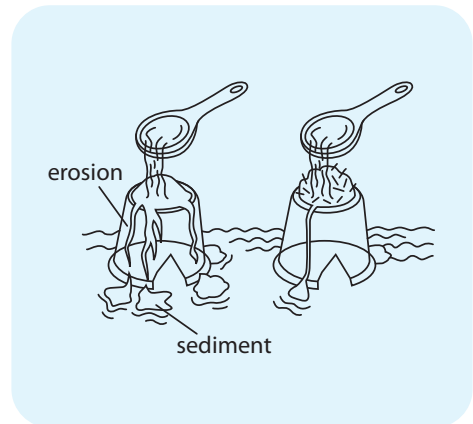
Demonstration:

Since erosion and the resulting sediment in water is an issue for water supply and treatment, use the demonstration of erosion to help explain the process. Use the demonstration to introduce the terms: Watershed, Groundwater, Erosion, Turbidity and Sediment.

Display the prepared demonstration. Tell the students that the cups represent two sections of land that are part of a watershed. A **watershed** is an area of land where all the surface water drains into the same place, whether it's a creek, a stream, a river or an ocean. All precipitation that falls on a watershed ends up flowing downhill to the same place. The 2 sections of land are slightly different as one is mostly soil and the other contains vegetation that could be trees, plants and grasses.

- Scoop 1 tablespoon of water from the container and tell the students this represents rain.
- **Ask:** *What will happen if this much rain falls on the hillside?* Note student predictions.
- Pour the tablespoon of water on one hill and repeat with the other hill.
- **Ask:** *What did you observe?* (maybe little or nothing, or the dirt soaked up the water, or the soil is falling into the water). Let the students know that the water travelling through the soil is called **groundwater**.
- **Ask:** *What will happen if this much water (rain) falls on the hillside again?* Note student predictions (continue to repeat this process until the soil from sample A begins to noticeably fall into the water more than sample B)

Tell students that as soil gets saturated with water it is unable to hold the water so the water will flow into lakes and rivers and it will take the soil with it - **erosion**. The soil that falls into the water is called **sediment**. The sediment builds up to make the water cloudy and this is called **turbidity**.



Students complete **Water Quality in the Watershed**.

Students answer the question: **How does human activity in the watershed affect water quality?**

Students should recognize that logging and recreational activity can be a factor in causing erosion, which affects water treatment for the community.

Water Talk

Ask: *How do recreational activities like motorized on and off road driving, hiking, camping, horseback riding, swimming, fishing and/or boating affect our water supply?*

Suggestions:

- Development of roads can impact watersheds.
- Contaminants from gasoline and oil seep into water supplies.
- Human waste and garbage can pollute water supplies.
- Traffic and travelling throughout the area can degrade land and soil.
- Animal waste (dogs) can pollute water supplies.



Grades 6–8:

Activity 4 – Our Watershed Matters

 For the Teacher

The type and amount of watershed activity varies in BC since guidelines and practices differ within each municipality. As students develop debate arguments, the following can be considered:

- Recreation activities that are **not regulated** puts water supplies at risk since it's hard to pinpoint specific problems.
- Recreation access should be **discouraged** within one kilometer of community water supply intake.
- Recreation access should be **managed** or limited beyond one kilometer of the community water supply intake.
- **Outline appropriate types and levels of activities** that will not create ongoing impact to the watershed.
(Community Watershed Guidebook, Recreation Access & Activities (section 14);
Ministry of Environment-Forest Practices Code of BC).

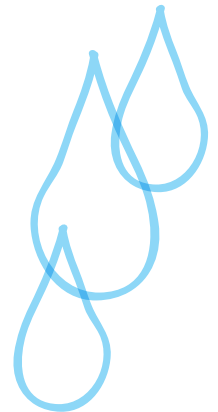
Debate!

Following the discussion, plan a debate: ***Should all recreation be banned from our watershed?***

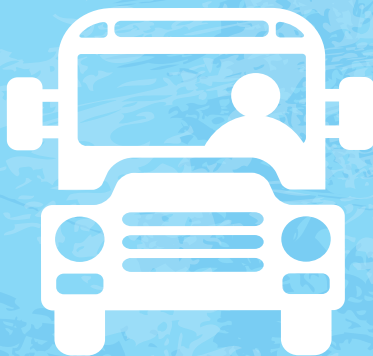
- Hand out planning sheet **The Great Debate**.
- Divide the class into appropriate groupings. Assign each group the task of arguing for or against the question.
- Provide ample time for students to brainstorm and develop well-thought out answers.
- Provide time to present arguments.

Helpful Information:

- Canadian Geographic-Take Action
<http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/take-action>
- Community Watershed Guidebook
<http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/watrshed/water9.htm#part14>
- Capital Regional District- How do human activities contribute to erosion?
<http://www.crd.bc.ca/watersheds/protection/concerns/Erosion.htm>
- Watersheds- Human Impacts on Watersheds
<http://geography.about.com/od/physicalgeography/a/watersheds.htm>



As an alternative or follow up: Students write an opinion paper *Should all recreation be banned from our watershed?* Encourage students to support their claims with well-researched reasons and examples.



Field trip idea!

Take your class to the Norrish Creek Water Treatment Plant!

What happens to your water before it gets to your tap?

Find out by booking a trip to the Norrish Creek Water Treatment Plant where students learn about their water source and the treatment of water. Meet with the experts who will provide a guided tour.

To book a field trip please contact:
City of Abbotsford Engineering, 604-864-5514

Grades 6–8:

Activity 4 – Our Watershed Matters

Did You Know?

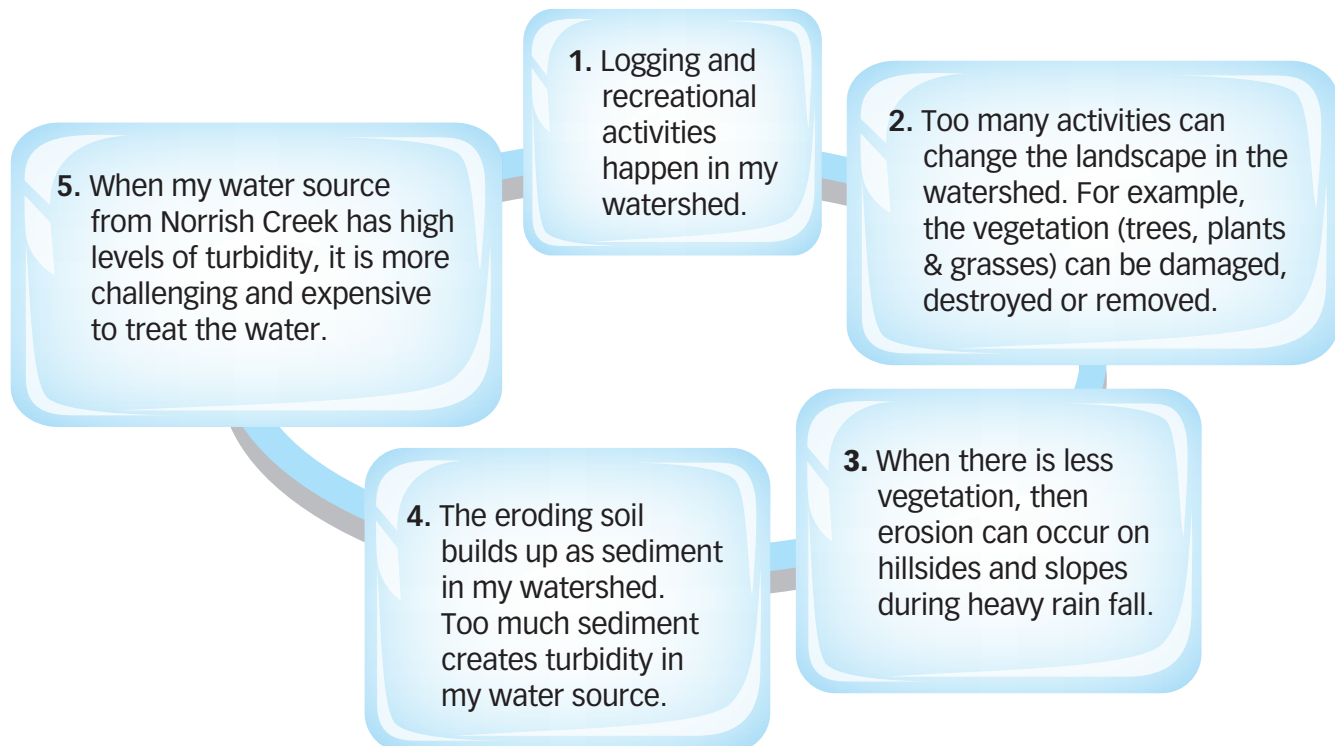
- Water is supplied from Norrish Creek (85%), Cannell Lake (10%) and 19 Ground water wells (5%)
- More than 10,000 water tests are done annually to make sure your water is safe to drink
- Drinking water in Abbotsford and Mission continually exceeds the standards set out by the Canadian Drinking Water Standards Guidelines
- Water from Norrish Creek is filtered by slow sand or ultrafiltration membranes at the Norrish Creek Water Treatment Plant

What are some Environmental Challenges that affect my water source?

- A long history of logging in the Norrish Creek Watershed has been linked to landslides and turbidity
- The recreational use of the Norrish Creek watershed for camping and water sports is a problem since these activities can harm watersheds

(AMWSC- Water Master Plan 2010)

What Happens in the Watershed:





Norrish Creek Water Treatment Plant



Cannell Lake

Groundwater Well Head



Grades 6–8:

Activity 4 – Our Watershed Matters
Water Quality in the Watershed

Draw a diagram to show the process and effects of erosion.

Label the following terms in your picture: **groundwater**, **turbidity**, **erosion** and **sediment**.

How does human activity in our watershed affect water quality?

Grades 6–8:

Activity 4 – Our Watershed Matters

The Great Debate

Read carefully.

The amount and type of recreation allowed in BC's community watersheds is a point for significant discussion, and the AMWSC Norrish Creek and Cannell Lake Watersheds are no exception.

Provincial policy has generally allowed **unrestricted public recreation** in the Crown forest. However, some districts and areas have a different policy. The Greater Victoria Water Supply Area (land that is owned and protected by the Capital Regional District) has a **total ban** on recreation within its boundaries. Metro Vancouver has a similar **closed watershed approach** whereby all recreation in its watershed is **banned**. Prince Rupert **restricts recreation** in its watershed because it owns the land controlling access to it, and Nanaimo's watershed is on private land.

(Source: AMWSC- Water Master Plan 2010)

- **Research and read.**
- **Critically think about the facts and ask questions.**
- **Write down your thoughts and ideas in the chart below and then answer this question:**

Should all recreation be banned from our watershed?

Check out these websites for background knowledge!

- Canadian Geographic-Take Action
<http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/take-action>
- Community Watershed Guidebook
<http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/watrshed/water9.htm#part14>
- Capital Regional District- How do human activities contribute to erosion?
<http://www.crd.bc.ca/watersheds/protection/concerns/Erosion.htm>
- Watersheds- Human Impacts on Watersheds
<http://geography.about.com/od/physicalgeography/a/watersheds.htm>

Keep track of your ideas here!

Fact	Question	Answer

Activity 5:

Be a Water Ambassador!

(suggested time: 3x40 minutes each plus time to prepare and present projects)



Learning Objectives:

1

Identify qualities, skills, and abilities required for water related careers

2

Develop an **action-oriented final project** using as an inspiration the qualities displayed by the Water Ambassadors in your community

Materials:

Teaching Aids	Student Worksheets	Classroom Consumables
For the Teacher People Behind the Water https://www.bcwwa.org/bcwwa-news/269-people-behind-the-water-video.html Why Care about Water? http://video.nationalgeographic.com/video/environment/freshwater/env-freshwater-why-care The Water Ambassador in Our Community (profile cards)	1. The Water Ambassadors In Our Community worksheet (2 pages) 2. Let's Fill the Bucket!- Taking Action	Refer to the list at the end of the kit.

The purpose of this activity is for students to identify the qualities of a Water Ambassador and to use these as an inspiration to develop an action-oriented water conservation project.

Water Talk

Video Suggestion: The video is BC Water & Waste Association's (BCWWA) story of the journey of water, the people who work to provide safe, clean drinking water and protect the environment.

People Behind the Water

<https://www.bcwwa.org/bcwwa-news/269-people-behind-the-water-video.html>

Ask:

Who in your community ensures you receive clean and safe water every day?

Introduce the term **Ambassador** as a representative or someone who encourages a specific activity.

Hand out the profile cards **The Water Ambassadors In Our Community**. Students work in small groups to read and discuss the profiles of each Water Ambassador. Students share their comments and feedback with the whole class.

Hand out the worksheet **The Water Ambassadors In Our Community** (part 1). Students re-read profiles to fill in details about each Water Ambassador. Using the details from the chart students synthesize information to identify what skills and qualities make a Water Ambassador.

Grades 6–8:

Activity 5 – Be a Water Ambassador!

For the Teacher

Suggestions:

Water Ambassadors are people who...

- Have a deep interest in protecting the environment
- Have a great passion for water
- Have studied to become water professionals
- Are knowledgeable and continue to do research
- Are highly committed to their community and are making a positive difference in their community
- Share information and ideas with community members
- Believe that water knowledge and education can inform water-smart practices
- Enjoy their work and take pride in what they do



Suggestion: Invite or have students invite one of the Water Ambassadors to your class. Contact the City of Abbotsford Engineering at 604-864-5514.

A Final Activity:

Let's Fill the Bucket

Students work in pairs or as a group on a project of their choice aimed at demonstrating their water knowledge and inspiring others to conserve water.



A video suggestion:

The teacher may consider showing the video clip **"Why Care about Water?"** The clip reviews all major concepts taught in this kit and invites viewers to act to protect and care for water. The video is narrated by Sandra Postel, the first National Geographic Freshwater Fellow and Alexander Cousteau, explorer for National Geographic.

Hand out **Let's Fill the Bucket**. Final Projects can be displayed in the school or the community.

Contact the City of Abbotsford Engineering at 604-864-5514

Grades 6–8: Activity 5 – Be a Water Ambassador!



 For the Student

The Water Ambassadors in Our Community

Clean and safe drinking water is provided to us every day. We turn on our faucets and there it is! However, few of us give little thought to the people behind the scenes that supply our water, protect public health, and the environment.

An entire team of dedicated professionals in every community is required to protect water resources. This group of professionals treat the water to the highest standards, design state-of-the-art treatment and distribution systems, lay the pipes and distribute the water to each home and business and promote water conservation strategies through public awareness and education.

When the water is used, another group of committed professionals create the system for collecting wastewater for treatment, design and build innovative treatment facilities to meet growing environmental standards, and return the treated water back to the environment.

Every level of these professions is essential, demanding, and a rewarding career choice.

Meet the Water Ambassadors in our Community!



Profile 1

Water Planning & Processing Engineer



Education:

Environmental-
Chemical Engineering
B.ASc in Environmental-
Chemical Engineering,
University of Waterloo

This is what I do in our community:

- Work with a team to ensure that the community receives safe potable water.
- Monitor water quality data and use my water knowledge to ensure our community continues to have the necessary treatment processes to convert raw water into safe drinking water.
- Plan new infrastructure and upgrades required to ensure a continued supply of safe drinking water.
- Analyze and report water quality results to the public and Health Authorities.
- Write reports to City Council and the Water Commission, recommending actions to improve the supply of safe drinking water.
- Work with consultants to explore solutions to the various challenges of supplying safe drinking water such as watershed management, infrastructure design, regulations, etc.

Why Water?

- I love working with water! Water is the basis of life.
- I enjoy working in the area of water quality and turning contaminated water into drinking water.
- I feel that working in the water industry is more likely to have a net benefit on the planet, as opposed to many other industrial sectors.
- I also enjoy working in a team and feel that working to ensure safe potable water to the community is a very rewarding profession.



Profile 2

Water Project Engineer



Education:

Civil Engineering -
University of Alberta

This is what I do in our community:

- Ensure an adequate supply of safe drinking water to the community.
- Work with consultants to develop designs for new infrastructure such as pipelines and water treatment equipment.
- Work to improve current operations, provide a more reliable system, and improve capacity of the system.
- Review studies and reports to determine future options for the water system, such as investigating new sources of water supply and improving the system's capacity and constraints.
- Liaise with other users of our watershed to ensure that activities do not have a detrimental impact to the water quality.
- Manage construction projects, working with consultants and contractors.
- Write and present reports to City Council and the Abbotsford Mission Water & Sewer Commission (AMWSC) regarding issues related to the water supply system.
- Work with operations staff to ensure that new projects address operational issues that they encounter.

Why Water?

- I am passionate about water, public health and about protecting our environment!
- Every project I work on has an impact on the community, although often hidden in the background.
- Many people take for granted the ease of access to high quality drinking water and how relatively inexpensive it is. I think of people around the globe who don't have access to clean water or have to walk great distances for water, and am reminded how fortunate we are in Canada.
- I am equally passionate about water-related public education. There are many misconceptions about water. Understanding and valuing water as one of Earth's most precious resources is vital to the sustainable future in our community and beyond.
- By working with others to provide safe, clean water to residents, I feel I am contributing in a very meaningful way to my community. A community's well-being and future is tightly bound to water.

Profile 3

Water Planning Engineer



Education:

Civil Engineering
South Bank University,
London, U.K.

Masters degree at
Imperial College,
London U.K.

This is what I do in our community:

- Plan new infrastructure and upgrades required to ensure a continued supply of safe drinking water.
- Write reports to City Council and the Water Commission, recommending new projects to improved our water system.
- Work with consultants to explore opportunities and solutions to the various challenges of supplying safe drinking water.
- Work within a team to ensure that the community has enough water. I specifically contribute to this goal by being part of water structure upgrades and future planning.

Why Water?

- I have always loved fluid mechanics at university and knew that was the area I wanted to work in!
- Planning future water supply infrastructure is one of the most rewarding jobs I have ever had.
- I look forward to going to work every day!



Profile 4

Director of Water & Solid Waste



Education:

Bachelors of
Applied Science-UBC

This is what I do in our community:

- Oversee the water supply and solid waste planning for the City of Abbotsford.
- Lead, guide, and work with my team to ensure we have an adequate supply of good quality water and that the solid waste generated by the homes and businesses in the community is disposed of in a sustainable manner.

Why Water?

- I have always had a longstanding passion for the environment; both water and solid waste are closely connected to the environment.
- When I was going to university I had a summer job working for the City of Vancouver in the waterworks department. It was at this time that I realized that I wanted to be an engineer in a municipality, particularly in the area of water and solid waste.
- Water supply and solid waste (garbage, recycling, composting) play a crucial role in shaping our communities. It is very important to each home and business in our community.
- All of our projects have an impact on the environment; it is a challenge to ensure that we minimize the impact that our community is making.
- I enjoy working in a profession that contributes so significantly to the well-being of my community.

Profile 5

Director of Utility Operations



Education:

Earned an apprenticeship in plumbing
Built infrastructure so I knew how to build
BCIT - garnered a diploma in Civil and Structural Technology

This is what I do in our community:

I monitor the operations and maintenance of:

- The water supply system which included 2 surface sources and 19 wells
- The water distribution system for Abbotsford, including all pipes, valves, hydrants, etc.
- The waste water collection for Abbotsford, including pipes, manholes, pump stations etc.
- The waste water treatment
- The storm water collection, including, pipes manholes, detention tanks, etc.

I also serve as President of the BC Water & Waste Association

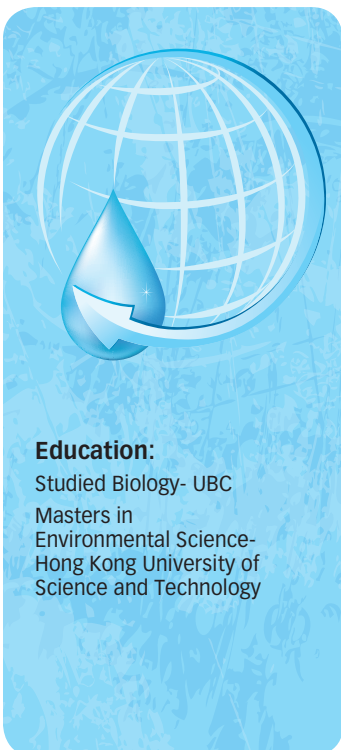
Why Water?

- I have always had a passion for water and for the *how* and *why* of the mechanics of the operations
- I enjoy working in a team to provide clean drinking water to residents



Profile 6

Water Conservation Program Coordinator



Education:

Studied Biology- UBC
Masters in Environmental Science-
Hong Kong University of Science and Technology

This is what I do in our community:

- Develop, manage, and deliver water efficiency programs for the Abbotsford Mission Water & Sewer Commission (AMWSC).
- Help residents and businesses in Abbotsford and Mission save water and money.
- Participate in awareness and educational programs and represent the AMWSC at public events
- Undertake scientific research and write technical reports
- Prepare cost estimates, reports, studies, and recommendations.
- Prepare educational and awareness brochures & materials for the community.
- Develop and implement water conservation education programs in Abbotsford and Mission schools.
- Manage water conservation summer staff.
- Prepare applications for grants and other funding sources as well as coordinate with other levels of government, environmental non-governmental organizations and private companies on various conservation initiatives.

Why Water?

- I've always been passionate about safeguarding the environment!
- My first degree was in conservation biology and geography. My specific interest in water and waste started in graduate studies.
- I completed my Masters in Hong Kong focusing mainly on environmental impact assessments, which look at the impacts of projects and infrastructure on the environment.
- I also worked as an educator and learned that education is one of the most effective vehicles in promoting water-wise practices in the community and beyond.
- Education is one of the most effective vehicles for supporting and promoting water conservation activities and water efficient practices in the community.

Grades 6–8:

Activity 5 – Be a Water Ambassador!

The Water Ambassadors in Our Community: Part 1

 For the Student

 Abbotsford
Mission
Water & Sewer Services

An **ambassador** is a representative or someone who encourages a specific activity.

Can you identify the qualities and skills that make a **Water Ambassador**?

Name	Job Title	Qualities, Interests, Passions, Skills, Responsibilities

Grades 6–8:

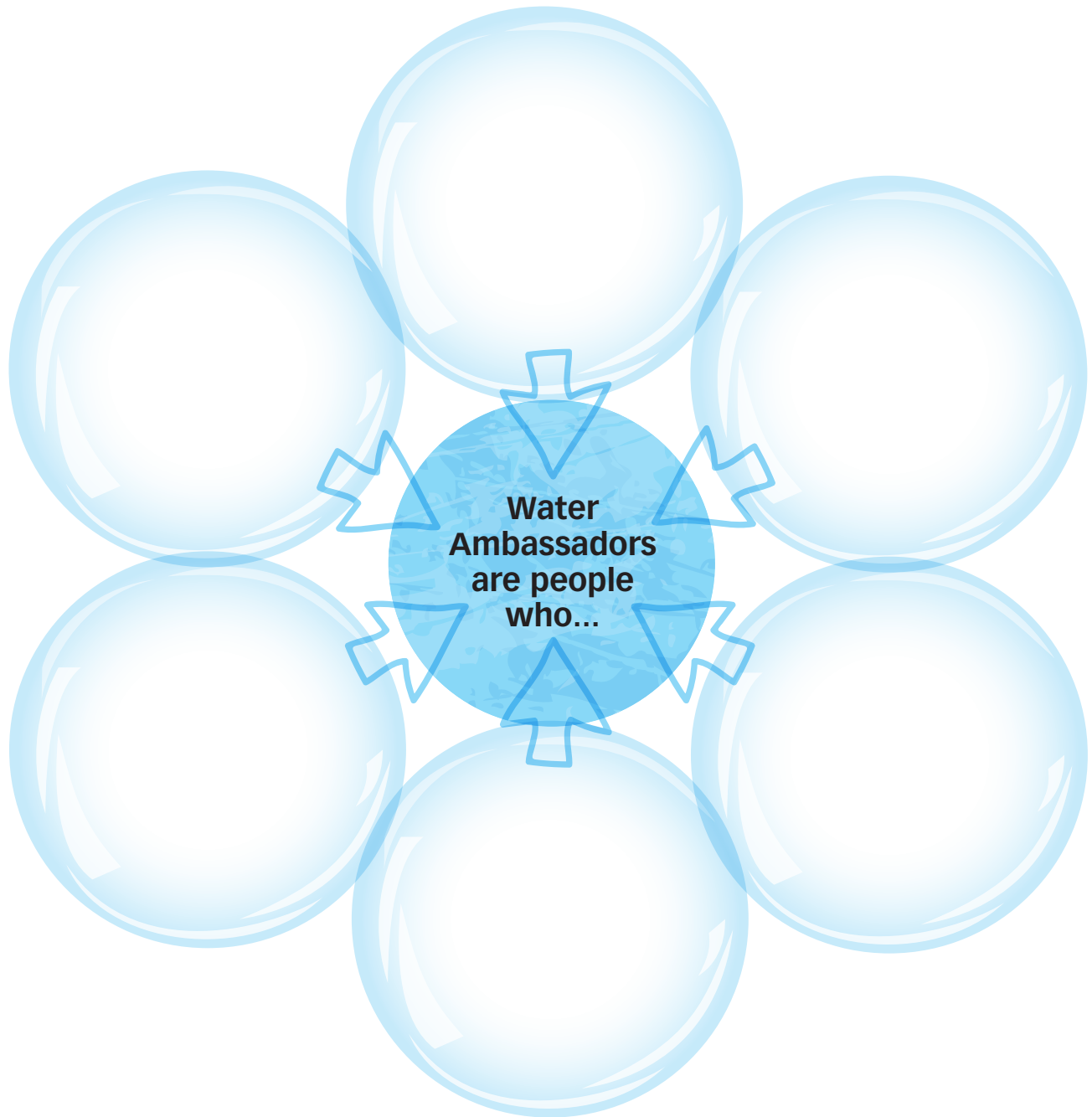
Activity 5 – Be a Water Ambassador!

The Water Ambassadors in Our Community: Part 2

 **For the Student**

 **Abbotsford
Mission**
Water & Sewer Services

What are some of the qualities shared by ALL the Water Ambassadors?
Fill in the bubbles with your suggestions based upon the profiles you read.



Invite one of the Water Ambassadors in your community to visit your class!

Write to City of Abbotsford Engineering
32315 South Fraser Way, Abbotsford BC V2T 1W7
eng-info@abbotsford.ca

Activity 5 – Be a Water Ambassador!

Let's Fill the Bucket!: Part 1

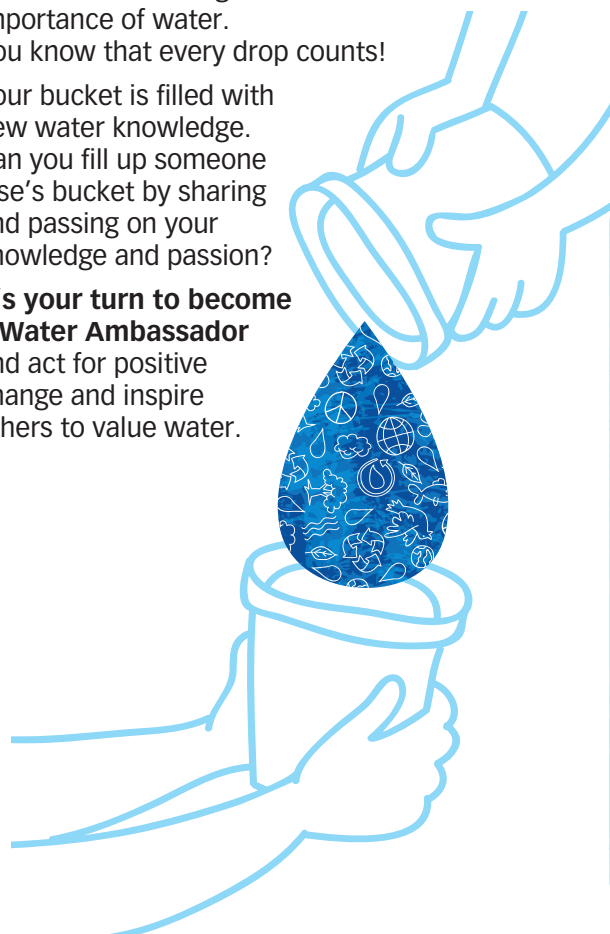
Let's Fill the Bucket! Take Action!

You have learned a great deal about the importance of water.

You know that every drop counts!

Your bucket is filled with new water knowledge. Can you fill up someone else's bucket by sharing and passing on your knowledge and passion?

It's your turn to become a Water Ambassador and act for positive change and inspire others to value water.



"People can only protect what they love, but they love only what they know."

Quote from Philippe Jacques Cousteau Sr (1910-1997), explorer, ecologist, innovator, scientist, photographer, author and researcher who studied life in water.

WANTED

Your Talents and Skills!

Before embarking on your water project, investigate the resources **YOU** bring to your community!

Do you enjoy writing, photography, art, research, math, science, or technology? Are you a behind-the-scenes organizer or do you enjoy being on stage?

Just like the Water Ambassadors you learned about, **YOU** too have unique qualities and skills that can contribute to protecting and caring for **YOUR** water.

Skills	Talents

Grades 6–8:

Activity 5 – Be a Water Ambassador!

Let's Fill the Bucket!: Part 2

Final Project - Let's Fill the Bucket!

Choose a project to demonstrate your knowledge and inspire others to conserve water. Work with a partner or partners.

Consider some of these water topics:

- Water in Abbotsford and Mission
- Water Conservation at Home
- Water Conservation in the Community
- Watershed Protection
- Water Quality
- Re-using Rain (Rainwater Harvesting)

Share your knowledge by:

- Designing a poster
- Organizing a water-themed assembly
- Designing and implementing a water conservation action plan for your school
- Writing a newspaper article
- Writing and performing a play or skit
- Using social media to design a website or create a Facebook page
- Creating a water-smart game
- Creating an advertisement
- Drawing or painting
- Photography
- Geocaching
<http://www.pc.gc.ca/docs/pc/guide/geocache/geocache1.aspx>



Let your water knowledge, your creativity, and your talents inspire others to protect and conserve water!

Brainstorm, Research, and Exchange Ideas

Review the video clips and websites you used in this kit. Remember these?

Websites:

Our Water Matters
www.ourwatermatters.ca
Environment Canada
<http://www.ec.gc.ca>
British Columbia Water and Waste Association
<https://bcwwa.org/>
Canadian Geographic
<http://canadiangeographic.ca/>
Zero Footprint
<http://goblue.org>

Videos:

Water Crisis: <http://www.youtube.com/watch?v=BkNY78B2Jio&feature=related>
Water Conservation Tips - How to conserve water at home: <http://www.youtube.com/watch?v=4MDLpVHY8LE>
Why Care About Water?: <http://video.nationalgeographic.com/video/environment/freshwater/env-freshwater-whycare>
People Behind the Water: <https://www.bcwwa.org/bcwwa-news/269-people-behind-the-water-video.html>

Here are other helpful resources:

Living Water Smart
www.livingwatersmart.ca
Earthcare Canada
<http://www.earthcarecanada.com>
EcoKids!
http://www.ecokids.ca/pub/games_activities/index.cfm

Grades 6–8: A Waterfall of Resources and Ideas



Classroom Consumables

The following are available to you to display and use in your classroom:

- Our Water System poster
- Tattoos & Buttons
- Aerators
- Bookmarks
- 10 tips for water wise gardening - seed paper
- Flow bags
- Moisture Meter
- It Just Takes One Measurement tool
- Dish Squeegee
- Hose/Faucet Timer
- Leak Detector Tablets for your toilet

For more information contact:

Amy Wakeford, City of Abbotsford Engineering
604-864-5514 www.ourwatermatters.ca

Beyond the Classroom – Water in Canada and in the World!

- Canada Water Week: <http://canadawaterweek.com/>
- World Water Day: <http://www.unwater.org/worldwaterday/>
- World Environment Day: <http://www.unep.org/wed>
- Earth Day Canada: www.earthday.ca
- Earth Day in the World: www.earthday.org

More Water Cool Ideas to Inspire your Students to Conserve Water!

At School

- Have students share their water conservation knowledge through assemblies, daily announcements, art projects, poetry and posters
- Global Water! Tap into the **Run for Water** curriculum at www.runforwater.ca (under schools)
- Invite a **Water Ambassador in your Community** to come into your class
- Have your students attend a DreamRider Theatre performance on water conservation. During Drinking Water Week in May.

In Your Community & B.C.

- Celebrate your H₂O during **B.C. Drinking Water Week!** It happens in May every year! For more details visit www.drinkingwaterweek.org and www.ourwatermatters.ca
- Take your students on a field trip: **The Abbotsford Entertainment & Sport Centre (AESC).** www.abbotsfordcentre.ca
The Norrish Creek Water Treatment Plant
- **Run for clean water in Ethiopia!** An event in Abbotsford, visit www.runforwater.ca

For more information contact:

City of Abbotsford Engineering
604-864-5514
www.ourwatermatters.ca

Splash Out with Water Conservation Games

- Canada National Geographic Games and Quizzes: <http://kids.nationalgeographic.com/kids/games/puzzlesquizzes/water-wiz/>
- Water Footprint Calculator: <http://environment.nationalgeographic.com/environment/freshwater/water-footprint-calculator/>
- The Water Wise Family: http://www.thewaterfamily.co.uk/index2_content.html
- Water Use it Wisely: <http://wateruseitwisely.com/kids/index.php>
- Water Detectives: <http://www.waterdetectives.com.au/en-au/games.aspx>

Teacher's Resources

The following resources provide additional support for teaching about water and water conservation:

- Canadian Geographic – <http://canadiangeographic.ca/>
- Earthcare Canada – <http://www.earthcarecanada.com>
- EcoKids! – http://www.ecokids.ca/pub/games_activities/index.cfm
- Environment Canada – Water <http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=65EAA3F5-1>
- Go Blue – <http://goblue.org>
- Living Water Smart – www.livingwatersmart.ca
- Project Wet: Worldwide Water Education – <http://projectwet.org/>
- Our Water Matters – www.ourwatermatters.ca
- Waterbucket – <http://www.waterbucket.ca>



www.ourwatermatters.ca