A Water Conservation Resource Kit for Teachers Grades 4–5

our water matters

Learn. Inspire. Act.

www.ourwatermatters.ca

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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

Welcome to Our Water Matters!

The aim of these action-oriented resources is to provide children with an introduction to water in Abbotsford and Mission and to inspire water-smart practices in the community and beyond.

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

- Develop an awareness for water as one of Earth's most precious resources
- Gain an understanding for water as a precious and vital community resource
- Explore ways of incorporating water-smart actions in everyday life at home, at school and in the community

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
- Tapped Into Water Facts – Key facts & information to deliver the lesson
- Ready-to-use classroom worksheets and activities
- Field Trip Ideas - promoting real water connections outside the classroom
- A Waterfall of Ideas & Resources – Links to more water education resources to include online conservation games, videos, and songs

Meet Mr. BLADE!

Who is he? Mr. Blade is the **Our Water Matters** mascot! He will be helping kids learn about water. He makes a splash on fact sheets, worksheets and coloring sheets.

Mr. BLADE can also make a splash into your class!
Please see how to book Mr. Blade in the following pages.

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

Thank you for your interest in water and for inspiring your students to use it wisely. **Our Water Matters!**

Grades 4–5: At A Glance

Overall Objectives:

1. To gain an understanding of the importance of water for all living things
2. To develop an awareness for the importance of water in our daily life
3. To think of ways in which water can be saved at home and at school

Activity # & Title	Key Inquiry Questions	Activity Learning Objectives
1. Our Water Matters!	• What do all living things need to survive? • How can I make a difference in my community by conserving water?	• Understand that all humans, plants, and animals need water to survive • Develop an understanding of how water is used for everyday living • Develop an awareness that water is a precious and limited resource on Earth • Develop values, attitudes, and positive actions in conserving water in the community
2. Where Does My Water Come From?	• Where does my tap water come from? • How does water get to my tap?!	• Develop an awareness of where water in Abbotsford and Mission comes from • Recognize and locate landmarks such as Dickson Lake, Cannell Lake, and Norrish Creek on a poster
3. Be Water Smart – Don't Waste Water!	• How is water used at home in our everyday lives? • How is water a limited resource? • How can I conserve water at school, at home and in the garden?	• Develop an awareness that water is a precious and limited community resource • Develop an understanding of how water is used at home and in the garden • Develop an understanding of why water conservation is important in Abbotsford & Mission • Explore ways in which water can be saved and not over-used
4. Be a Water Quality Detective	• What is a watershed? • Do changes in my watershed affect my water supply? • What happens to my water before it gets to my home? • What affects the quality of my water?	• Explore issues of water quality in our watershed and how personal actions can help protect water resources • Demonstrate a desire to make a difference at home, at school and in the community
5. Using Water at Home	• Am I water-smart at home and in the garden? • How can I conserve water at home and in the garden?	• Develop an understanding of how water is used at home • Explore ways in which water can be saved and not over-used • Demonstrate an awareness and interest in conserving water at home
6. Welcoming Rain in My World	• How is rain useful to conserving water? • How is rainwater used as a water conservation strategy? • How can rainwater harvesting benefit our community?	• Develop an appreciation for rain • Develop an initial understanding of water as a renewable resource • Gain an understanding of how rainwater was used to create the ice-hockey rink at the Abbotsford Entertainment & Sports Centre (AESC)

Do something about it! Desired Action Outcomes:

At Home
• Implement & use your Water Conservation Action Plan

B.C. Curriculum Links	Worksheets, Teaching Aids, Classroom Consumables from the AMWSC
Science: • Analyse how BC's living and non-living resources are used	**Teaching Aids:** Information re: Mind Mapping Suggestion: Invite Mr. Blade mascot into the classroom Water Video: *http://www.youtube.com/watch?v=m54SmVsQqgc&feature=related* **Student Worksheets:** • Water on the Brain – Page 7 • My Water is OUR Water (Values and Attitudes about Water) – Page 8 • Our Water Matters! – Page 9 **Classroom Consumables:** Refer to list at the end of the kit.
Science: • Describe the location of natural resources within BC and Canada	**Teaching Aids:** Our Water System poster **Student Worksheets:** Where Does My Water Come From?– Page 11 **Classroom Consumables:** Refer to list at the end of the kit.
Science: • Determine how personal choices and actions have environmental consequences • Describe potential environmental impacts of using BC's living and non-living resources **Social Studies:** • Explain why sustainability is important	**Teaching Aids:** Copies of the Water Smart game, player pieces (e.g. bingo chips or pennies), one die per game. The game is located at the end of the kit. Video- Energy Conservation for Kids- Water Usage Tips *http://www.youtube.com/watch?v=Xz8sVG6GVWw&feature=related* **Student Worksheets:** • Protect the Future of Your H_2O! – Page 15 • Be Water Smart – Don't Waste Water! – Pages 16 & 17 • Water Smart Cards – Page 18 **Classroom Consumables:** Suggestions: Moisture Meter, It Just Takes One measurement tool, Dish Squeegee, Hose/Faucet Timer. Refer to list at the end of the kit.
Science: • Describe potential environmental impacts of using BC's living and non-living resources • Determine how personal choices and actions have environmental consequences **Social Responsibility**-Exercising Democratic Rights and Responsibilities: • The student shows a growing sense of responsibility toward the classroom, school, community, and world; wants to make a difference but needs help identifying opportunities for action	**Teaching Aids:** 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. Watershed Information & Map *http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/* Picture Gallery (Norrish Creek, Cannell Lake, groundwater well head) **Student Worksheets & Activity:** • Be a Water Quality Detective! – Pages 21 & 22 • Debate: Should all recreation be banned from our watershed? **Classroom Consumables:** Refer to list at the end of the kit.
Science: • Determine how personal choices and actions have environmental consequences **Social Responsibility**-Exercising Democratic Rights and Responsibilities: • The student shows a growing sense of responsibility toward the classroom, school, community, and world; wants to make a difference but needs help identifying opportunities for action	**Teaching Aids:** Heroes of Water Saving: Water Project H2Ooooh! *http://www.youtube.com/watch?v=kp_nyVPK4XQ&feature=related* **Student Worksheets:** • Water at Home – Pages 27 & 28 • Water Conservation Action Plan – Page 29 **Classroom Consumables:** Refer to list at the end of the kit.
Science: • Analyse how BC's living and non-living resources are used • Describe the location of natural resources within BC and Canada • Determine how personal choices and actions have environmental consequences	**Teaching Aids:** 1L container **Student Worksheets:** • Students design a poster • Turning Raindrops into Puck Drops – Page 32 **Classroom Consumables:** Refer to the list of materials at the end of the kit.

At School	Community
• Put up signs at water fountains and in washrooms reminding classmates to not waste water. • Share your new water knowledge with your school through assemblies, posters, and newsletters.	• Participate in Drinking Water Week. • Display your poster during Drinking Water Week.

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

- The population in Abbotsford and Mission is approximately 170,000 (2011).
- The average person in Abbotsford consumes approximately 250-300 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!
- The 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 of drinking water per week.
- A running tap pours out seven to twelve litres a minute!
- A leaky toilet can waste up to 2,500 litres of water per day.
- Less than 3% of municipal water is used for drinking. 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.

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

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
- All insects need water to survive; even a ladybug drinks water!
- Ducks drink plenty of water so they can swallow their food!

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

Activity 1:
Our Water Matters!
(suggested time- 3x40 minutes each)

Grades 4–5
For the Teacher

Learning Objectives:

1. Understand that all humans, plants, and animals need water to survive
2. Develop an understanding of how water is used for everyday living
3. Develop an awareness that water is a precious and limited resource on Earth
4. Develop values, attitudes, and positive actions in conserving water in the community

Materials:

Teaching Aids	Student Worksheets	Classroom Consumables
For the Teacher Background knowledge on creating mind maps; refer to the following links *http://www.ndstudies.org/images/mind-map.gif* **Suggestion:** Invite Mr. Blade mascot into the classroom **Video Suggestion:** *http://www.youtube.com/watch?v=m54SmVsQqgc&feature=related*	• Water on the Brain • Our Water Matters! • My Water is Our Water- (Values and Attitudes about Water)	Refer to the list of materials at the end of the kit.

Vocabulary: surplus, deficit

Video Suggestion:

This video is a slideshow of water photos set to the music of Loreena McKennitt La Serenissima
http://www.youtube.com/watch?v=m54SmVsQqgc&feature=related

Water Talk:

Use a mind mapping strategy to introduce the theme of water and start a discussion. Draw a large water drop on the board or chart paper.

- Write **WATER** inside the water drop
- Ask students to share everything they know about water. Begin to make a web of the ideas.
- Add additional branches and categories to enlarge the map.
- Assist students in understanding the value of water for themselves, their families, their school and the greater community.
- Hand out Water on the Brain. Students work on their own mind map.

Use the mind map to help students recognize:

- **Water is fun!**
  What do we do with water?
  We can play in it, swim in it, skate on frozen water, etc…
- **All living things need water to survive!**
  What do all living things need to survive?
  (water, food, health, shelter, safety, family, etc…)
- **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?
- **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?

Ask:

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

Use the following demonstration to show 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!

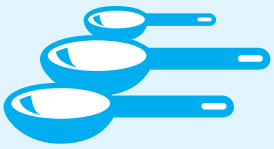
Let's pretend we can put all the Earth's water in this 4L bucket. But most of this is ocean water and is too salty.

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?

Water Talk:

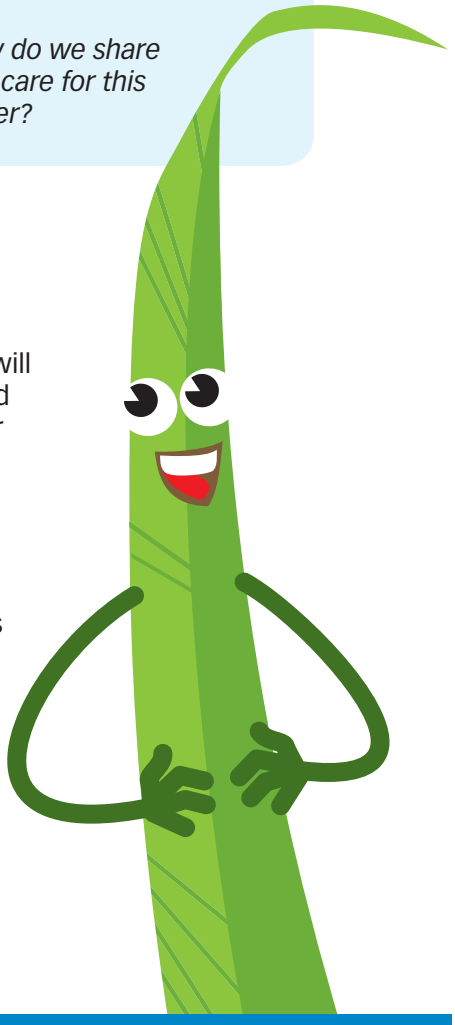
- Create groups of 3-4 students. Hand out My Water is OUR Water. The objective of the activity is to help students develop values, attitudes, and positive actions in conserving water in the community. Students cut the sentence strips and organize them in order of importance. Students will need to work 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.

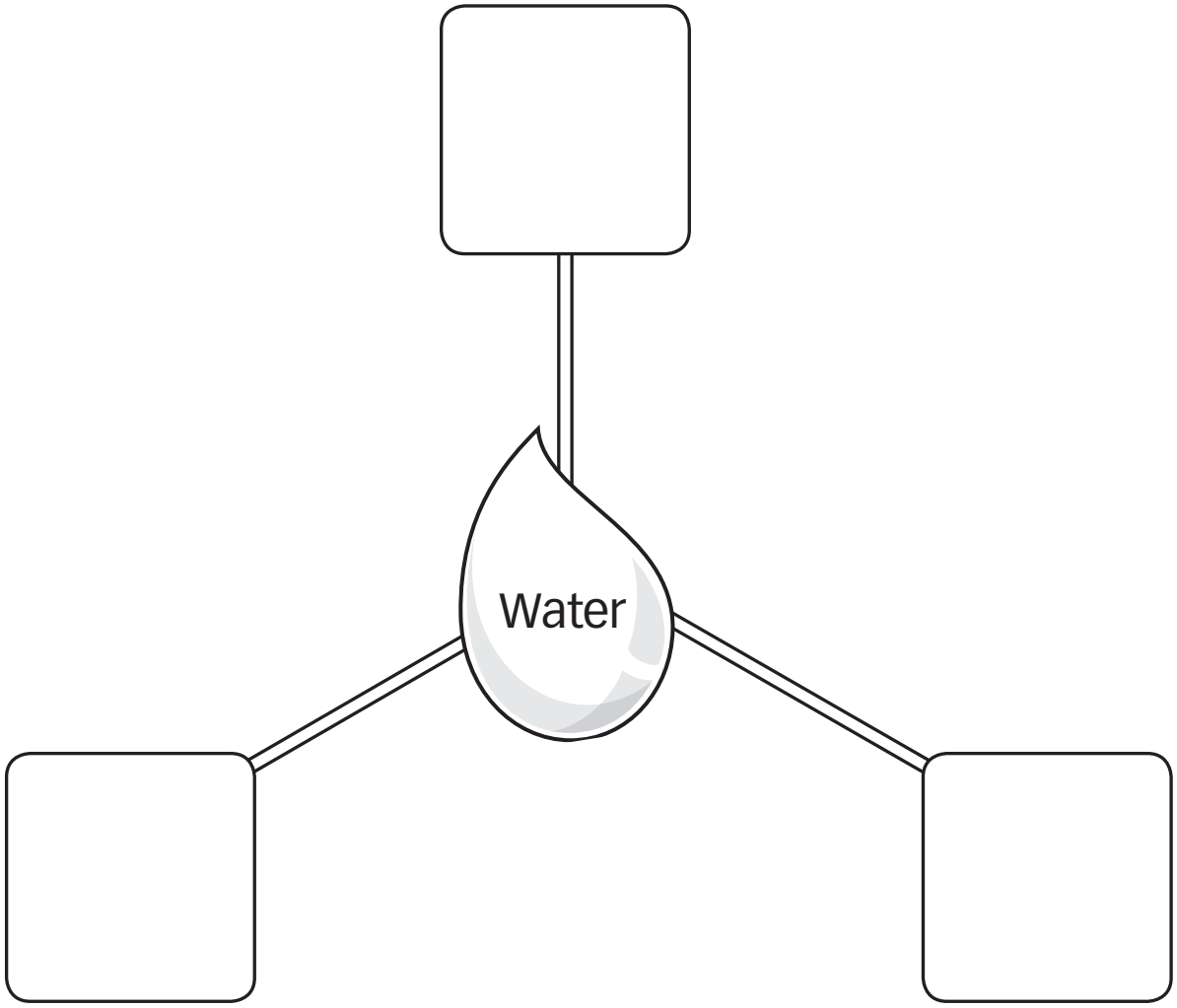
Water Talk:

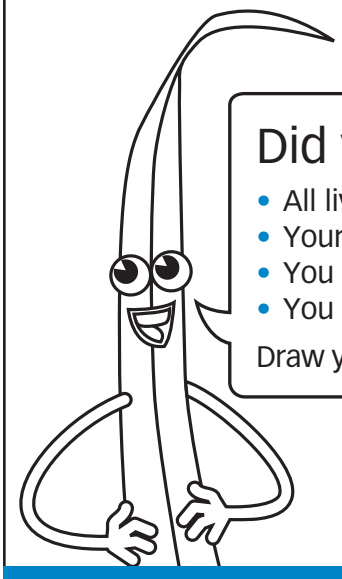
- Help students understand that we assume we have an infinite amount of water available for our community. However, due to many issues such as population growth, overuse and misuse at home and in the garden, industry demand, and climate change, our water supply is depleting (more information in activity #3).
- Assist students in developing an understanding that water is limited and therefore we should use only what we need and learn to share the rest.

Student Worksheet:

Students complete the sheet- Our Water Matters!







Did you know?

- All living things need water to survive
- Your brain is 70% water
- You can live without food for a month, but can live only a few days without water
- You need to drink plenty of water a day to keep healthy

Draw your own water mind map.

Name:_____

Values and Attitudes about Water

I know where my water comes from.

Water is very important to everyday living.

How much water I use affects others.

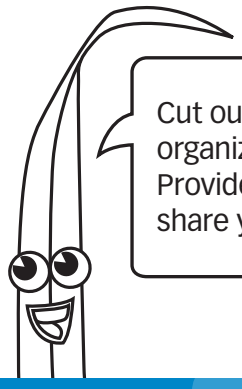
I can show and inspire others how to conserve water.

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.

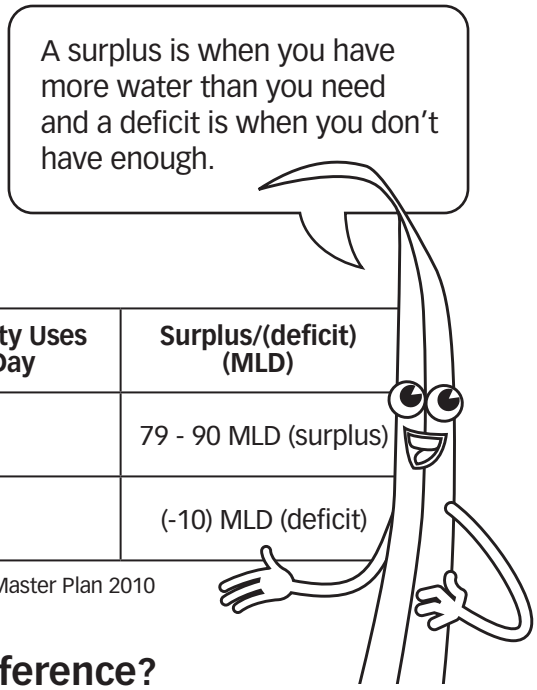
I should be careful how much water I use.



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

Name:_____

In Abbotsford and Mission water is precious. It is important to protect our water source, use it carefully and make sure there is enough for everyone.



Did You Know?

In the future our population will grow but what if the amount of available water doesn't increase?

Year and Population	Available Water	Water My Community Uses on an Average Day	Surplus/(deficit) (MLD)
2011 170,000	150 MLD	60 - 80 MLD	79 - 90 MLD (surplus)
2031 250,000 (Estimated)	150 MLD	160 MLD	(-10) MLD (deficit)

(MLD=Million Litres a Day) Source- AMWSC Water Master Plan 2010

How can YOU make a difference?

Explain what you can to do to help make sure our community has enough water now and in the future.

Name:_____

Activity 2:
Where Does My Water Come From?
(suggested time: 30-40 minutes)

Learning Objectives:

1. Develop an awareness of where water in Abbotsford and Mission comes from
2. Recognize and locate landmarks such as Dickson Lake, Cannell Lake, and Norrish Creek on a poster

Materials:

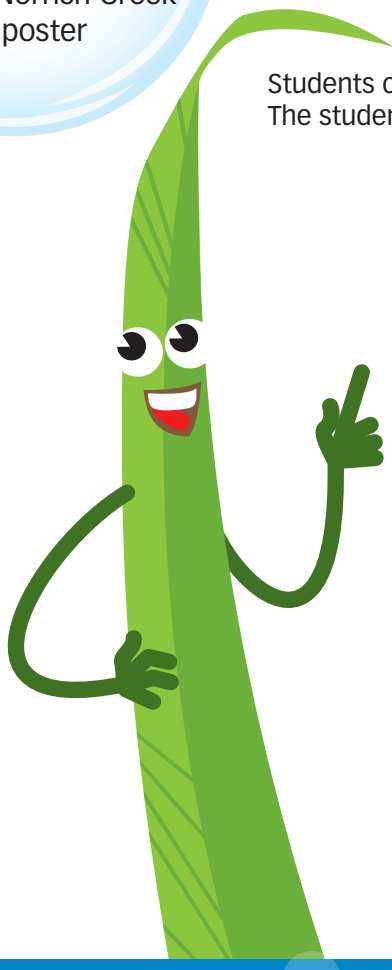
Teaching Aids	Student Worksheets	Classroom Consumables
For the Teacher • Our Water System poster	• Where does my water come from?	Refer to the list of materials at the end of the kit.

Vocabulary: system

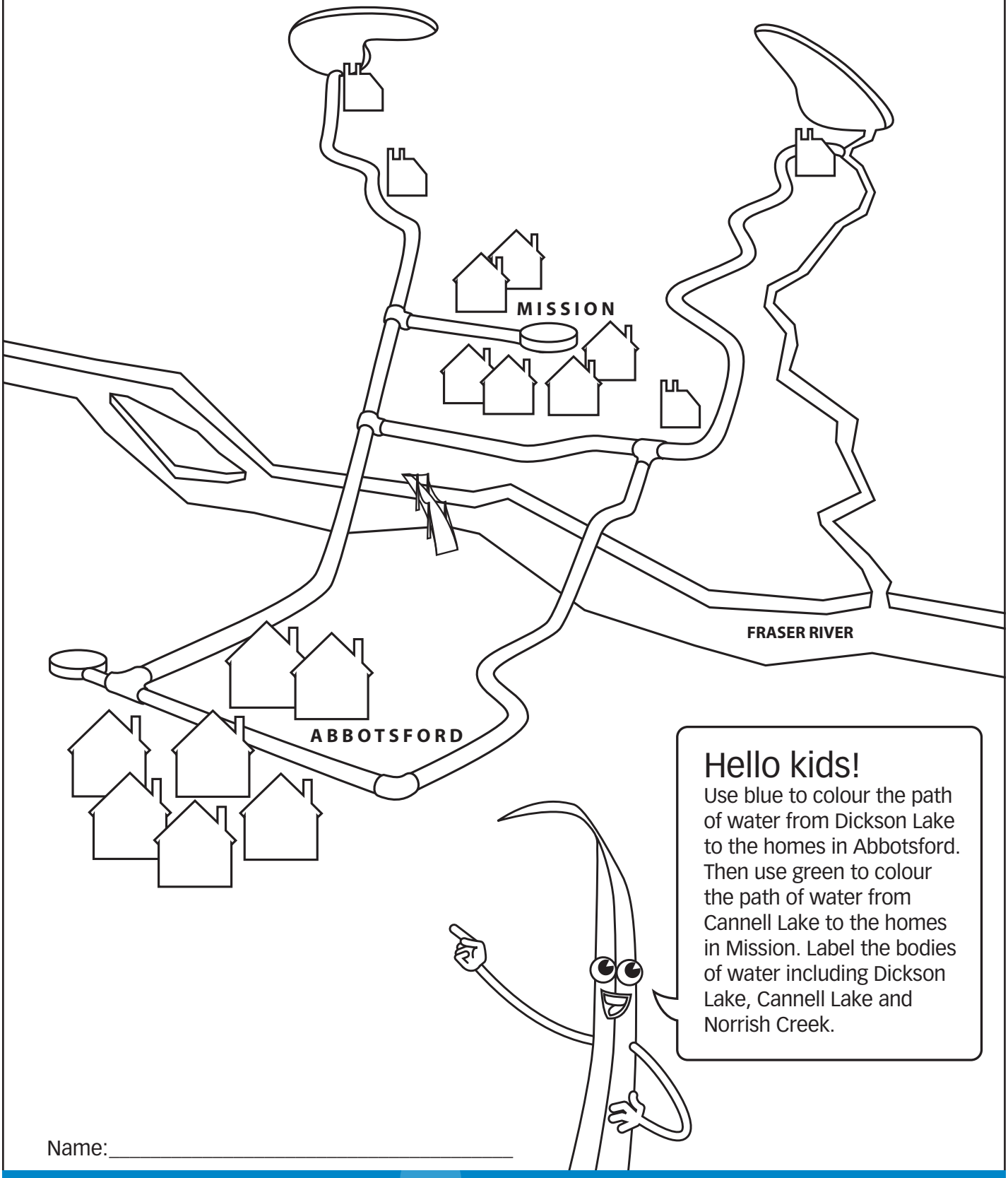
Water Talk:

Ask: *Who can tell me where our water in Abbotsford and Mission comes from?*

Use the poster Our Water System to show the students how water travels from Cannell Lake and Dickson Lake to their homes in Abbotsford & Mission.



Students complete the worksheet Where Does My Water Come From? The students can colour the path of water and label the bodies of water.



Hello kids!

Use blue to colour the path of water from Dickson Lake to the homes in Abbotsford. Then use green to colour the path of water from Cannell Lake to the homes in Mission. Label the bodies of water including Dickson Lake, Cannell Lake and Norrish Creek.

Name:_____

Activity 3:
Be Water-Smart – Don't Waste Water!
(suggested time: 2x60 minutes each)

Learning Objectives:

1. Develop an awareness that water is a precious and limited community resource
2. Develop an understanding of how water is used at home and in the garden
3. Develop an understanding of why water conservation is important in Abbotsford & Mission
4. Explore ways in which water can be saved and not over-used

Materials:

Teaching Aids	Student Worksheets	Classroom Consumables
For the Teacher Copies of the Water Smart game, player pieces (e.g. bingo chips or pennies), one dice per game. Located at the end of the kit. Video Suggestion- Energy Conservation for Kids-Water Usage Tips *http://www.youtube.com/watch?v=Xz8sVG6GVWw&feature=related*	• Be Water Smart-Don't Waste Water! • Protect the Future of Your H_2O! • Water Smart Card	Suggestions: Moisture Meter, It Just Takes One measurement tool, Dish Squeegee, Hose/Faucet Timer. Refer to the list of materials at the end of the kit.

Vocabulary: conservation, sustainability, deficit, surplus

Suggestion:

Share a video to help introduce the activity.

e.g. A video created by Horizon Utilities Corporation Ontario, Canada . Although the video discusses energy it features water conservation strategies as well. A sink and other appliances discuss specific examples of water conservation practices for the bathroom, kitchen and laundry room.

Energy Conservation for Kids - Water Usage Tips
http://www.youtube.com/watch?v=Xz8sVG6GVWw&feature=related

The Water Smart Game: (located at the end of the kit)

Play The Water Smart Game to introduce the concept of water conservation. It is designed for 2 or more players as a way to introduce the concept of water conservation. Students follow a path of water from its source to the home. As the players move back and forth through the game they learn about water waste and conservation strategies. After the students have played the game once or twice they may be able to share some knowledge on conservation practices.

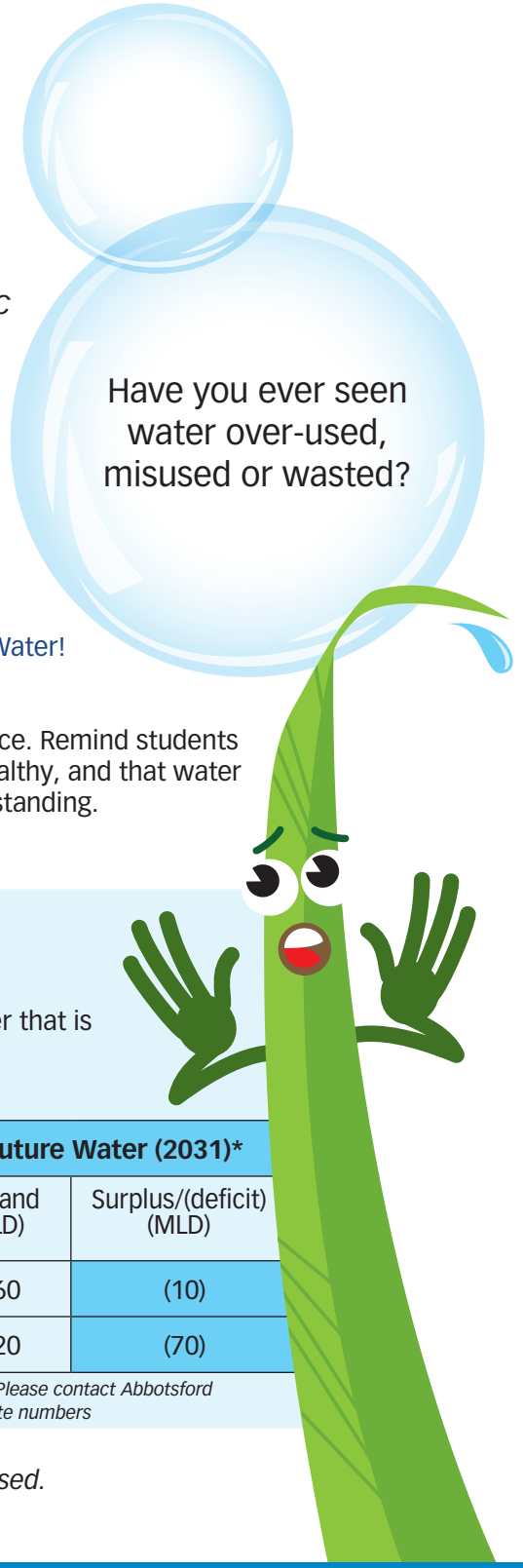
Water Talk:

- **Ask:** *Have you ever seen water over-used, misused or wasted?*
- Introduce the words **conservation** & **sustainability**.
- Conservation: preserving, protecting and restoring the natural environment
  Sustainability: the ability to support and preserve water resources for today and for tomorrow.

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 garden

Note: There are several water saving devices 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



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?*
- *Why is sustainability important?*

Students complete worksheet (2 pages) Be Water Smart- Don't Waste Water!

Water Talk:

Help students understand that water is an essential community resource. Remind students that we need water to survive, that we need to drink water to keep healthy, and that water is essential to everyday life. Review the mind map for ideas and understanding.

The chart below is for the teacher.

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 Supply vs. Water Demand

		Existing Water (2007 - 2011)		**Future Water (2031)***	
Water Demand Scenario	Water Supply (MLD)	Demand (MLD)	Surplus/(deficit) (MLD)	Demand (MLD)	Surplus/(deficit) (MLD)
Average Day	150	60-80	70-90	160	(10)
Peak Day	150	90-140	10-60	220	(70)

*MLD=Million Litres per Day

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

For the student worksheet the highest number in the range has been used.

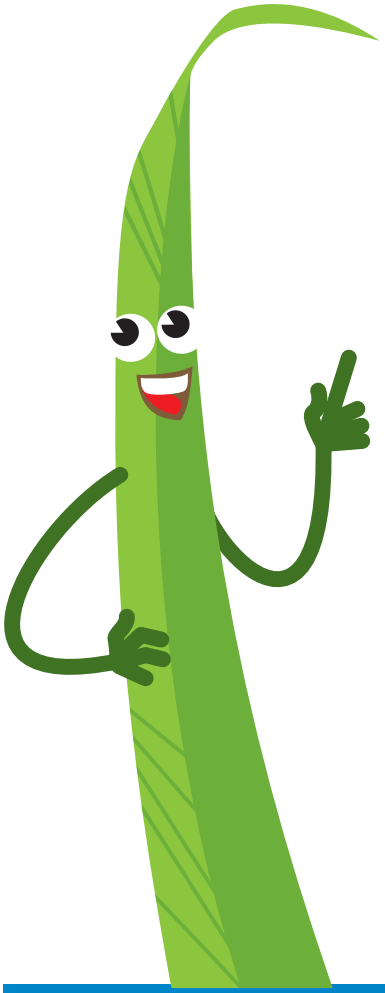
Protect the Future of your H_2O!

Hand out Protect the Future of your H_2O! Use the following exercise to reinforce the understanding that water is limited and that, sometimes, we use too much.

- Tell students there are about 170,000 people living in Abbotsford and Mission and we have about 150 Million Litres per Day (MLD) at our disposal.
- Tell students that on an average day we use 80 MLD. On the worksheet have them colour in 8 buckets. Have students write down how many buckets were not used (7).
  Ask: *If we have 7 buckets left over it means we have 70 million litres left — what does this mean for our community?*
  We have not used all of the water/we have a surplus.
- Do the same for a "peak day"— a day of the year in which the greatest volume of water is consumed. Tell the students we use 140 MLD. Have students colour in 14 buckets and then write how many buckets were left over (1).
  Ask: *What does this information tell us?*
  We used almost all of the available water/ summer days use a lot of water.
- Tell students that the population in Abbotsford and Mission is expected to grow from 170,000 to 250,000 by the year 2031 but we might still only have 150 MLD of water for our use.
- **Ask:**
  Who can predict what will happen to our water— will we have a deficit or surplus of water?
- Repeat the process. Provide an opportunity for reflection.
  2031 Predicted Average day- 160 MLD (colour 15 buckets and draw 1 more)
  2031 Predicted Peak Day- 220 MLD (colour 15 buckets and draw 7 more)
- **Ask:**
  What does the information tell us?
  We will be using more water than we have available

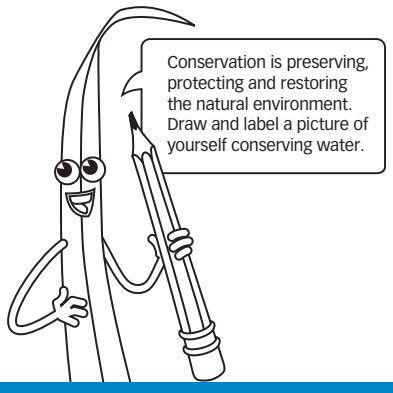
  How will water overuse affect us?
  We won't have enough water for everyone.

  What can we do to make sure we don't use more water than we need?
  We can conserve water to make sure there is enough for everyone.



Students complete the last question of the worksheet:
What can we do to make sure we don't use more water than we need?

Students create Water Smart Card (see worksheet)
Students write messages about water conservation on cards to be displayed around the school in areas where water is often wasted - bathrooms, sinks, fountains, outside faucets, changing room showers, etc…


Conservation is preserving, protecting and restoring the natural environment. Draw and label a picture of yourself conserving water.

Name:_____

Tap into these Facts!

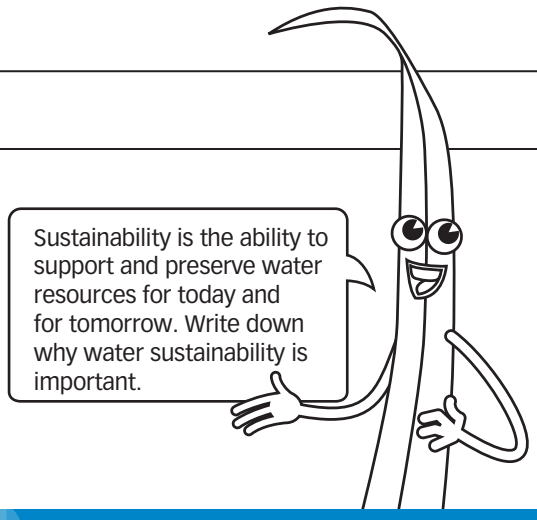
- The water on Earth is the same water that was here during the time of the dinosaurs.
- Wasting and over consuming water can limit our water resources.
- For every glass of water we save, we have to produce and treat one less glass of water from the environment.

Now let these facts soak in!

- An average garden hose pours out over 20 litres of water per minute!
- A running tap can pour out 7-12 litres a minute!
- Less than 3% of municipally-treated water is actually used for drinking. The rest goes down the drain, down the toilet, or on our gardens.

(Environment Canada & Living Water Smart BC)

Why is water sustainability important?



Name:_____

We have 150 Million Litres per Day (MLD) of water available for use in our community.
Each bucket is 10 MLD. Can you count by 10 and colour in the buckets to find out how much water we use every day?

1. Average Day

We use 80 MLD of water. Colour in the buckets of water to show 80 MLD. How many buckets were left over?
Write beside the buckets SURPLUS or DEFICIT.

2. Peak Day- usually July or August

We use 140 MLD. Colour in the buckets of water to show 140 MLD. How much was left over?
Write beside the buckets SURPLUS or DEFICIT.

3. What did you learn about water use in Abbotsford and Mission?

_____

_____

In the future we will have more people living in Abbotsford and Mission. But we might still have the same amount of water available — 150 MLD.

4. Future Average Day

We will use 160 MLD. Colour in the correct amount of buckets. Do you have enough?
Can you draw more buckets to show 160 MLD? How many more buckets did you need to add?

I drew _____ more buckets. This tells me _____

5. Future Peak Day

We will use 220 MLD. Colour in the correct amount of buckets. Do you have enough?
Can you draw more buckets to show 220 MLD? How many more buckets did you need to add?

I drew _____ more buckets. This tells me _____

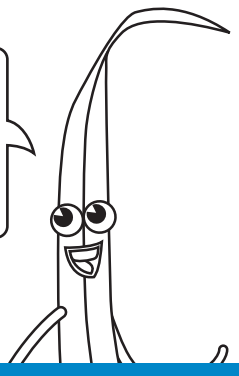
What can we do to make sure we don't use more water than we need?

_____

_____

Name:_____

Show your friends at school how to conserve water by writing a message to remind students & staff to be water smart. Write or draw your message on the card (or do both!). Make your card bright and easy to read. Laminate it and display it in your school around water fountains, sinks and other areas where water is often wasted.



Name:_____

Activity 4:
Be a Water Quality Detective
(suggested time: 2x40 minutes each)

Grades 4–5
For the Teacher

Learning Objectives:

1. Explore issues of water quality in our watershed and how personal actions can help protect water resources
2. Demonstrate a desire to make a difference at home, at school and in the community

Materials:

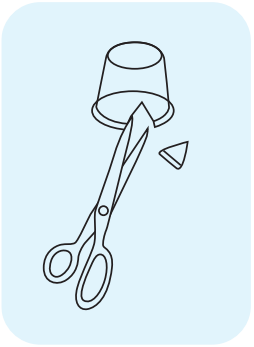
Teaching Aids	Student Worksheets	Classroom Consumables
For the Teacher Prepare erosion demonstration before lesson (see notes below), 2 plastic cups, a pan of water, ½ cup of soil, some grass clippings, a spoon for preparing soil, some water in a container and a utensil for pouring water (activity adapted from Environmental Detectives) Picture Gallery (Norrish Creek, Cannell Lake, groundwater well head) Watershed Information & Map *http://www.canadiangeographic.ca/watersheds/map/index.aspx?path=english/*	• Be a Water Quality Detective	Refer to the list of materials at the end of the kit.

Vocabulary: watershed, erosion, turbidity, sediment

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 home?
How do you know your water is safe to drink?
What are some environmental factors that might harm the quality of your water?

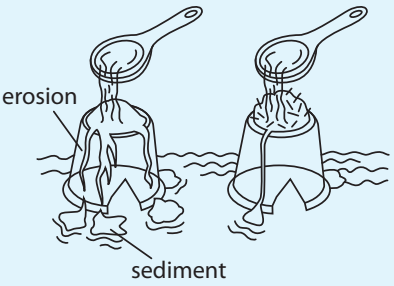
Give students Be a Water Quality Detective!
Read & discuss the facts and information provided & share the images in the Picture Gallery.

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

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 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 1L 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 then flows into lakes and rivers and takes the soil with it - this is called **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**.

Complete exercise on erosion on the worksheet.

Water Talk:

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

Suggestions:

- 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.
- Over activity that's not regulated puts water supplies at risk as it's hard to pinpoint specific problems.

Debate!:

Following discussions students could debate:
Should all recreation be banned from our watershed?

- Divide the class into appropriate groupings. Assign each group the task of arguing for or against the question.
- Provide ample time to brainstorm and formulate an answer.
- Provide time to present arguments

Alternative: Present the question to the students and have them write an opinion paper on the answer. Encourage them to support their reasons with examples and explanations.

Your city's goal is to provide a clean and safe source of drinking water for all to enjoy. Abbotsford and Mission`s water is one of the cleanest and safest.

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 meets the demands of the BC Drinking Water Protection Act
- 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?

- Cannell Lake supplements the Norrish Creek water source when it is offline due to high levels of sediment caused by erosion between Dickson Lake and the Norrish Creek inlet during periods of heavy rain
- 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 as these activities can harm watersheds

(AMWSC- Water Master Plan 2010)

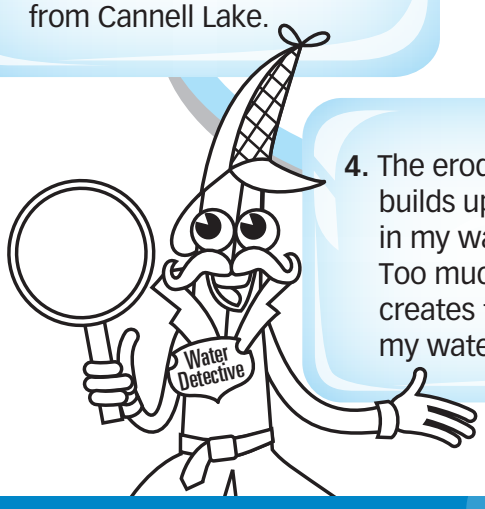
1. Logging and recreational activities happen in my watershed.

2. Too many activities can change the landscape in the watershed. For examples, the vegetation (trees, plants & grasses) can be damaged, destroyed or removed.

3. When there is less vegetation then erosion can occur on hillsides and slopes during heavy rain fall.

4. The eroding soil builds up as sediment in my watershed. Too much sediment creates turbidity in my water source.

5. When my water source from Norrish Creek has high levels of turbidity then my water can't be treated and we must access the water from Cannell Lake.



Name:_____

Draw a diagram to show the process and effects of erosion. Label the following terms in your picture: **watershed**, **groundwater**, **turbidity**, **erosion** and **sediment**.

What I Learned:
How can erosion affect my water supply?

Name:_____

Norrish Creek Water Treatment Plant


Cannell Lake

Groundwater Well Head

Activity 5:
Using Water at Home
(suggested time 45 minutes in class and 30 minutes at home)

Learning Objectives:

1. Develop an understanding of how water is used at home
2. Explore ways in which water can be saved and not over-used
3. Demonstrate an awareness and interest in conserving water at home

Materials:

Teaching Aids	Worksheets		Classroom Consumables
	Student Worksheets	Take It Home	
For the Teacher *Video Suggestion* *Heroes of Water Saving: Water Project H_2Ooooh! http://www.youtube.com/watch?v=kp_nyVPK4XQ&feature=related*	• Water Conservation Action Plan	• Water at Home	Refer to the list of materials at the end of the kit.

Vocabulary: audit

Suggestion:

Share a video to introduce the activity.

- A video created by Gruppo Alcuni in collaboration with the UNESCO Venice Office. It is an animated video that features a little yellow bird named Nameless. He quickly finds & shares water conservation ideas with his friends who all are misusing or wasting water. They respond with positive responses and promises to change their habits

  Heroes of Water Saving: Water Project H2Ooooh!
  http://www.youtube.com/watch?v=kp_nyVPK4XQ&feature=related

Water Talk:

1. Review water conservation strategies. Students take home the worksheet Water at Home to complete with their family.
2. Discuss the results of your family water audit:
   - Would you like to improve your habits?
   - What area can you make the biggest improvement?
   - Are you already doing a great job at conserving?
   - Explain where your family is the most successful with conservation.
   - How can you help others understand the importance of conservation?
3. Create an action plan to help improve and practice water conservation strategies at home. Hand out Water Conservation Action Plan.

Suggestion: Hand out Water Smart Certificates to reward students.

Abbotsford Mission Water & Sewer Services

PART #1: Work with your family and find out if you're Water Smart.

In the Kitchen and Laundry Room:

We use our dishwasher only when it's full.
YES or NO

We use our washing machine only when it's full.
YES or NO

We use a bowl of water or a plugged sink to rinse vegetables.
YES or NO

We fix leaks.
YES or NO

In the Bathroom:

We turn off the tap when brushing our teeth.
YES or NO

We take a shower instead of having a bath.
YES or NO

We use a low flow toilet.
YES or NO

We fix leaks.
YES or NO

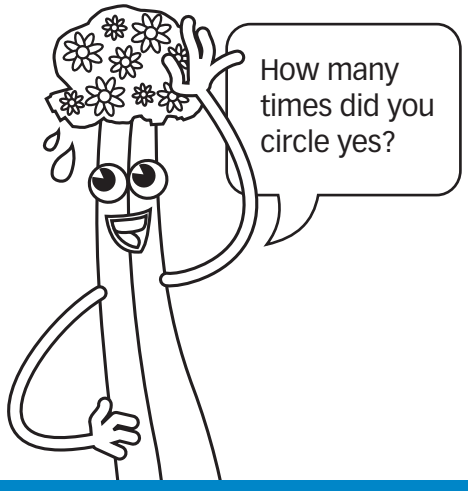
Outside:

We follow the water restrictions.
YES or NO

We use a bucket and sponge to wash our car instead of running the hose continuously.
YES or NO

We use a Rain Barrel to collect rain water.
YES or NO

We water our garden in the early morning.
YES or NO



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

7-11 You're starting to tap into water conservation.

0-6 Are you a water waster?

Name:_____

Abbotsford Mission
Water & Sewer Services

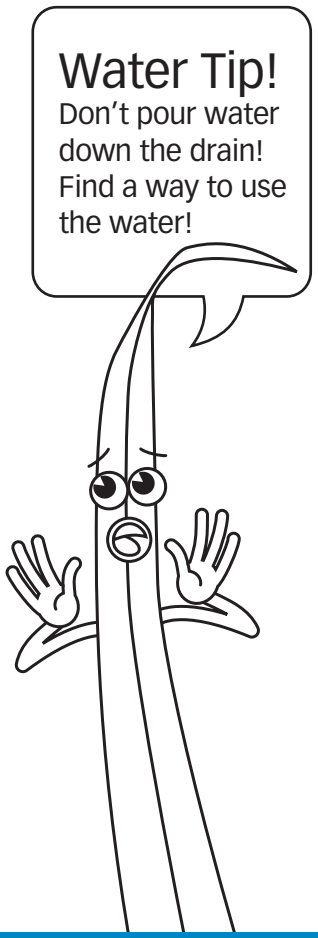
PART #2

Now with your family decide how you can become even more water smart! Read these additional suggestions or think of some of your own.

Other Ways to Conserve Water:

1. Use a bowl or put a plug in a sink to wash vegetables.
2. Use a dish squeegee to scrape dishes rather than rinsing
3. Only use a full washing machine when doing laundry.
4. Take a shower instead of a bath.
5. Fix any leaky faucets.
6. Use a rain barrel to collect rain water.
7. Water the garden in the cool hours of the morning.
8. Follow water restrictions.
9. Irrigate lawn with only 1 inch of water a week.
10. Use a bucket and sponge to wash your car.
11. Use a broom to clean the driveway instead of a hose.
12. Use a Moisture Meter for gardens.

Write a paragraph to share & explain what you learned after completing the audit.



Name:_____

Fill in the action plan by choosing at least three areas where you can improve your water conservation practices at home. Consider the problem, and what a possible solution might be, then decide the plan you might take to successfully improve your water conservation strategies. Share your plan with your family to MAKE IT HAPPEN!

AREAS THAT NEED TO BE MORE WATER-WISE *e.g. sometimes we water our garden during the day.*	**WATER-WISE SOLUTIONS** *e.g. we will water our garden only in the morning or evening.*	**WATER-WISE PLAN** *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*
In the Kitchen & Laundry Room		
In the Bathroom		
Outside		
Additional Ideas		

Name:_____

Activity 6:
Welcoming Rain in My World!
(suggested time 30 minutes plus time to design and complete poster)

Grades 4–5
For the Teacher

Learning Objectives:

1. Develop an appreciation for rain
2. Develop an initial understanding of water as a renewable resource
3. Gain an understanding of how rainwater was used to create the ice-rink at the Abbotsford Entertainment & Sports Centre (AESC)

Materials:

Teaching Aids	Student Worksheets	Classroom Consumables
For the Teacher 1L container filled with water (preferably rain water but for demonstration purposes tap water is appropriate)	• Welcoming Rain in My World! • Turning Raindrops into Puck Drops	Refer to the list of materials at the end of the kit.

Vocabulary: rainwater harvesting

Background Info:

Abbotsford & Mission receive an abundant amount of rain each year making rain a rich and readily available resource. With the average Abbotsford resident using 250 - 300 L, and Mission resident using 400-450 L of water per day, collecting and using rainwater conserves municipal water and energy. For instance, 25mm of rainfall collected on a 93m^2 area can collect over 2,000 L of water which can be used for non-potable water uses - garden/lawn irrigation, laundry, flushing toilets, and making arena ice. Harvested water contributes to water conservation and reduces water demands in urban area. (Source: AMWSC Our Water Matters)

Water Talk:

Review uses of water, water sources, conservation practices, and remind students of the Water Conservation Action Plan.

- Introduce rain in Abbotsford and Mission and the term Rainwater Harvesting
- Highlight that rainwater harvesting can serve as a supplement to municipal water. In times of low water availability, water held in rain barrels and cisterns may be used for gardening or other non-potable needs.
- Hold up a 1L container of "rainwater" and tell the students that you collected this rainwater during the last rainfall and elicit different ways rainwater can be used instead of tap water.

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

Students create a poster called 10 Ways to Welcome Rain in My World! Encourage students to depict rainwater uses at home, at school, and in the community.

A Field Trip Idea: Rainwater & Ice-Hockey in Abbotsford

Tell students that rainwater harvesting can be used to make ice rinks! Share the story behind the ice arena at the Abbotsford Entertainment and Sports Centre (AESC).

Hand out and complete the colouring sheet called Turning Rain Drops into Puck Drops.

Abbotsford Entertainment & Sports Centre (AESC)

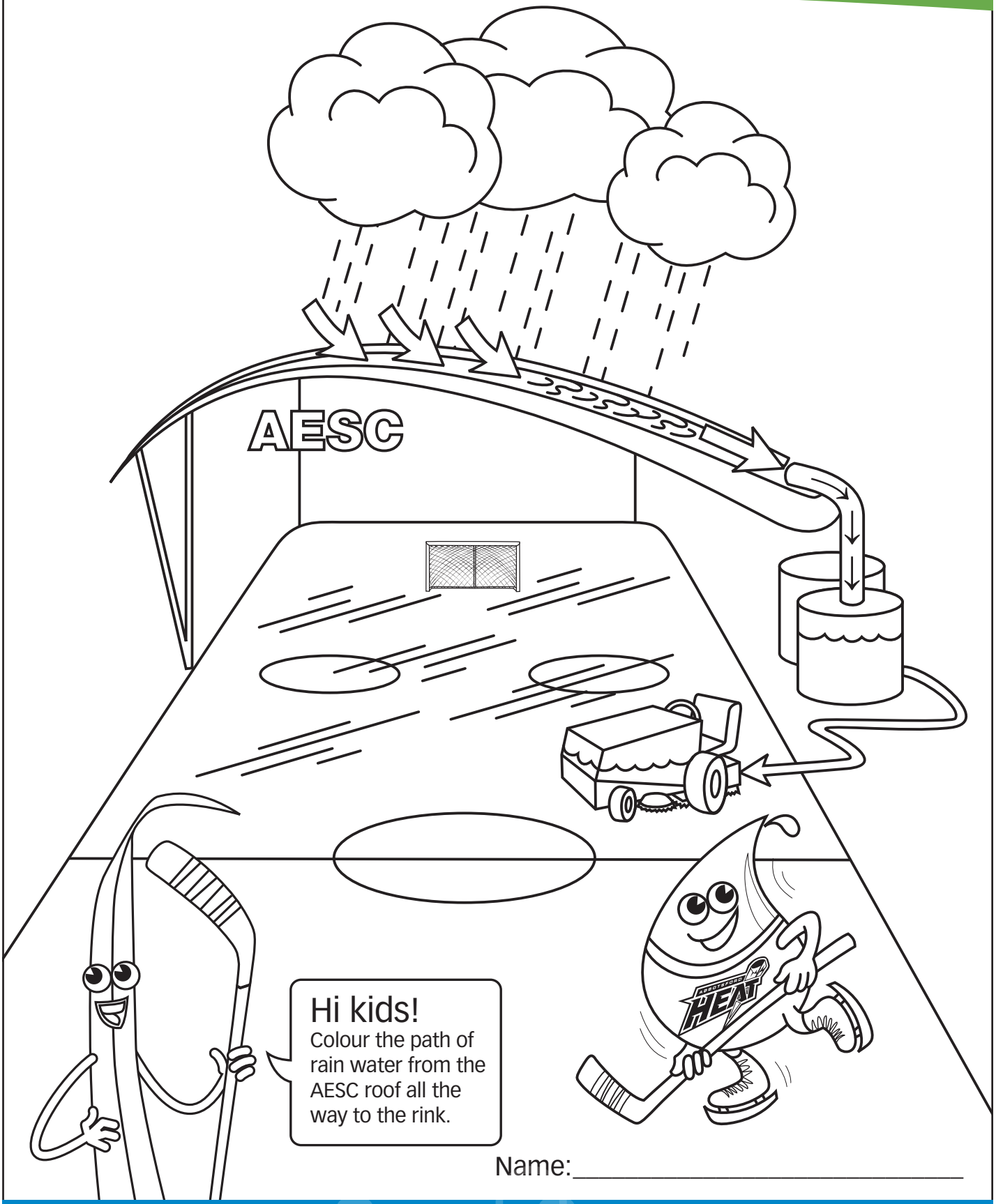
Consider taking your students to the AESC! The ASEC ice rink is made of rainwater. Yes, the Abbotsford Heat hockey team plays on rainwater ice!

Learn more at: http://www.abbynews.com/news/128332033.html

Did You Know:

- Approximately 1 Million Litres (ML) of water is used per hockey season to make ice for the arena (38,160L to build the initial ice surface; 370,000L (10,000L per game day x 37 home games); 420,000L during community rentals & practice days throughout the season)
- 15,120L (4,000 gallons) of rainwater is collected from a 1,208 m^2 (13,000 ft^2) area
- The rainwater is then filtered before use with primary filtration and secondary 1 micron filters
- The rainwater storage tank is plumbed into existing hot water boilers to supply the Zamboni with hot water
- Waste energy from the heating boilers is used to preheat the stored rainwater in the tanks
- The estimated municipal water saved via the rainwater harvesting system is approximately 830,000L per hockey season!
- The AESC rainwater harvesting system provides approximately 30,000 L (8,000 gallons) per inch of rain
- Rainwater makes better quality ice
- Water and sewer cost savings: $1226.74/year
- Energy cost savings: $1960.17/year
- Total savings: $3186.91/year
- Cost of the system: $27,000 installed
- Payback period: 8 years

For more information or to book a field trip:
City of Abbotsford Engineering
604-864-5514



Hi kids!

Colour the path of rain water from the AESC roof all the way to the rink.

Name:_____

Abbotsford Mission
Water & Sewer Services

our water matters

WATER SMART

is presented to

_____

for

_____

_____ SIGNATURE

_____ DATE

Classroom Consumables

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

- Our Water System poster
- Mr. Blade & Toothbrush poster
- Tattoos & Buttons
- It Takes Just One measurement tool
- Moisture Meter
- Hose/Faucet timer
- Dish Squeegee

For more information contact:
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 Environment Day
  http://www.unep.org/wed/
- World Water Day
  http://www.unwater.org/worldwaterday/
- Earth Day Canada:
  www.earthday.ca
- Earth Day in the World:
  www.earthday.org

Check out EcoKids!

Free, environmental education program offering curriculum-linked materials and activities for Canadian elementary schools promoting environmental stewardship *http://www.ecokids.ca/pub/games_activities/index.cfm*

Splash Out with Water Conservation Games, Videos, & Songs

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*

Videos & Songs

Fun family water conservation games and songs addressing the importance of water conservation

- **Save Water (Go Green!)**
  A catchy song and video that highlights some ideas concerning water conservation. *http://www.youtube.com/watch?v=a_nW4NT5KbA*
- **Energy & Water Conservation for Kids – Water Usage**
  A video created by Horizon Utilities Corporation Ontario, Canada that highlights several conservation strategies used at home and in the garden. It features talking objects (clothes on a clothesline, a lawn, a driveway) that each speak about how you can help save water.
  http://www.youtube.com/watch?v=LUXYjtHX8wA&feature=related
- **Energy Conservation for Kids – Water Usage tips**
  http://www.youtube.com/watch?v=Xz8sVG6GVWw&feature=related

More Water Cool Ideas to Inspire your Students to Conserve Water

At School

- Award each water-smart student a **Water Smart Certificate** (provided in this kit.)
- 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 Your Community & B.C.

- **Fraser Valley Regional Science Fair**
  http://sites.google.com/site/fraservalleysciencefairs/home
- **B.C. Drinking Water Week**!
  It happens in May every year! For more details visit www.drinkingwaterweek.org and www.ourwatermatters.ca
- **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

Teacher's Resources

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

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://www.goblue.org*

Living Water Smart – *www.livingwatersmart.ca*

Project Wet: Worldwide Water Education – *http://projectwet.org/*

Our Water Matters – *www.ourwatermatters.ca*

Walking the Talk - The BC Sustainability Education Network – http://www.walkingthetalk.bc.ca/

Waterbucket – *http://www.waterbucket.ca*

our water matters

www.ourwatermatters.ca