WATER WAYS!

POINTE-À-CALLIÈRE

PUBLIC HEALTH AND THE ENVIRONMENT IN MONTRÉAL, FROM THE 17TH TO THE 21ST CENTURIES

So you're coming to Pointe-à-Callière, the Montréal Museum of Archaeology and History, for our fun and exciting interactive *Water Ways!* workshop. It's a multidisciplinary workshop that takes a humorous look at different aspects of water management down through the centuries in Montréal. You can use the ideas in this teacher's guide and what your students learn at the Museum as a starting point for looking at their environment and water management yesterday, today, and tomorrow.

BEFORE YOUR VISIT

WATER WAYS! EXERCISE

Spark your students' interest in everyday water management and their upcoming trip to the Museum.

Objective:

→ To understand the difficulties with obtaining drinking water in the past, leading to a reflection on our water consumption today.

Competencies developed:

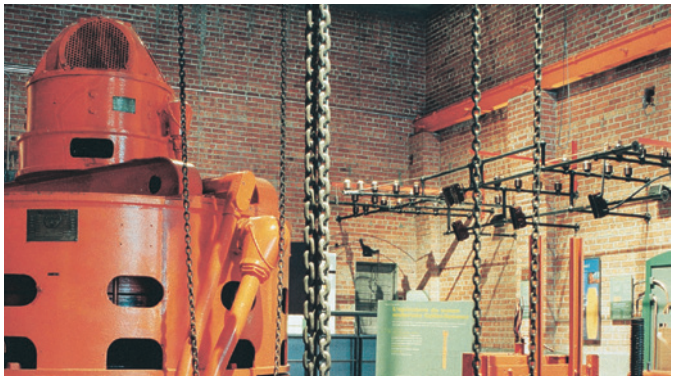
→ Use information

→ Exercise critical judgment

Materials required:

→ *Water Ways!* sheet

15 MINUTES



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INSTRUCTIONS :

1. Hand out the *Water Ways!* sheet to the students, or use it to lead a discussion and prepare for your trip to the Museum.

   Answers: 17th-century Montrealers fetched their water with a bucket from a river or well. Today, we get our drinking water from a tap. In the 17th century, each Montrealer used 10 to 17 litres of water a day, about one or two buckets. They dumped their waste and wastewater in the street or directly into the rivers. Today, water mains are pipes that bring drinking water directly to our homes. The sewer system takes wastewater away from our homes.

2. Talk with your students about water consumption today, in comparison with 17th-century habits, and the problems caused by wastewater. At the Museum, the interpreter-guide will lead you deep into the subject and answer any questions your students may have raised during the discussion in class.

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BACK IN THE CLASSROOM

Ask your students what they thought about their trip to the Museum. Did they enjoy it? What did they learn?

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FOR OR AGAINST? EXERCISE

Ask your students to use what they learned during their visit to the Museum in a debate on the future impact of the way we manage water today.

Competencies developed:

→ Use information

→ Exercise critical judgment

→ Communicate appropriately

Materials required:

→ *For or against?* sheet

30 MINUTES

FOR THE DEBATE + TIME FOR THE STUDENTS TO PREPARE

INSTRUCTIONS:

1. Ask the students to answer the questions on the sheet that the guide gave them at the Museum. This is an opportunity to review what they learned during their visit.

2. In the *What about me?* section of the sheet, the students are asked how water management can be improved today?

   Suggest that they hold a debate on one of the solutions that we've been hearing a lot about lately: making people pay for the water they use. It's very costly to manage water and sewer mains, and especially to maintain them. We also want to protect this valuable natural resource and avoid wasting water.

   Would the students be willing to pay for the water they use every day? Are they in favour of bottled water? Are they for or against paying for the water they use every day?

PREPARE FOR THE DEBATE:

- Form two teams: one in favour of paying for the water they use, and the other opposed to this idea. Decide which team is for and which is against by flipping a coin.

- Have the students prepare their arguments by referring to the ideas suggested in the *For or against?* sheet. Suggest that they approach the issue from a number of viewpoints: historical, technological, economic, social, environmental, etc.

- To make sure that all the students are included in the debate, you can assign different jobs to subgroups on each team. For example, some of them can be the speakers, others can present a skit before the debate to explain their team's point of view, and yet others can illustrate a few of their team's key arguments.

MODERATE THE DEBATE:

- The moderator gives each team equal time to present its arguments for or against, and then allows each team to rebut the other's arguments. At the end, each team has one minute to sum up.

- The moderator then asks all the students (and the audience, if you wish) to write down how they feel about the topic: are they for or against the idea of paying for the water they use? The winning team is the one that gets the most support.

Ask the students for their comments following the debate. What did they learn? Above all, what was the impact of the debate – did it change their opinion?

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WATER WAYS!

STUDENT: _____ **GROUP:** _____

Ville-Marie, 1642. Here you can see the first Montrealers building their homes. They didn't have any bathrooms, or even running water! How did 17th-century Montrealers get the water they needed?

_____

_____

_____

Compare: Today, we turn on the t _ _ to get as much hot or cold clean water as we want.

How much water did a 17th-century Montrealer use every day at home?

- ☐ 10-17 litres?
- ☐ 100-120 litres?
- ☐ 500-530 litres?

Compare: In Québec today, I use about 386 litres per day. Across the country, the average is 330 litres per person per day. In the United States, it's about 380 litres, and in France, 150 litres.

In the 17th century, there was no garbage collection and no sewer system to take away waste and wastewater. What did Montrealers do with their waste?

_____

_____

Just imagine the garbage piling up... it couldn't have been very healthy! Not to mention the smell...

What's the difference:

A water main is a set of pipes that brings d _ _ _ _ _ _ _ water directly to people's homes.

The sewer system takes w _ _ _ _ water away from people's homes.

At Pointe-à-Callière, the Montréal Museum of Archaeology and History, you'll learn about Montrealers' ingenious solutions over the years to obtain drinking water... and dispose of their wastewater! You'll even get to step inside a former sewer pipe – it's fRATscinating...

Did you know that Montréal was the second city in North America, after Philadelphia in the United States, to create a drinking water supply system in 1800?

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FOR OR AGAINST?

Are you for or against the idea of making people pay for the water they use every day?

To prepare your arguments for the debate, gather information from a number of sources. Look at the issue from different viewpoints: historical, economic, social, technological, environmental, etc. Try to predict the other team's arguments, so that you can be ready to counter them. Remember to offer your own solutions – ways of conserving this precious natural resource.

HERE ARE SOME IDEAS TO INSPIRE YOU

Think about the different ways we use water every day. Would making people pay for water reduce waste? What are some possible ways of making people pay for the water they waste?

How much water is used each time?

- Flushing the toilet:
  - Conventional model: 15 to 19 litres
  - Low-flow toilet: 6 litres
  - Dual-flush toilet: 3 and 6 litres
- Taking a bath: 160 litres
- Taking a shower:
  - 8-minute shower: 137 litres
  - 5-minute shower: 85 to 100 litres
  - With a low-flow shower head: half as much
- Brushing your teeth:
  - With the faucet running: 13.5 litres
  - Controlling the flow: 0.5 litres
- Washing the dishes:
  - Older dishwasher models: 40 litres
  - Newer models with an Energy Star symbol: 20 litres or less

Did you know that the bathroom is the place where we use most potable water? About 65% of our household consumption takes place in the bathroom.

Did you know that today's dishwashers are so efficient that they use almost half as much hot water as you use when washing dishes by hand under running water?

Sources:
Espace pour la vie Montréal. Reducing water consumption.
http://espacepourlavie.ca/en/reducing-water-consumption

CAA-Québec. At home. Tips and Tricks.
https://www.caaquebec.com/en/at-home/advice/tips-and-tricks/tip-and-trick/show/sujet/household-water-consumption-maison-ecoleau/

Hydro-Québec. 00Watt Educational Kit. The ENERGY WISE Squad.
http://www.hydroquebec.com/jeux/escouade-mieux-consommer/?lang=en

In Montréal, it is estimated that about 30% of the water produced is lost due to leaks in the distribution network, among other things. Of the 70% of the water that is distributed, 40% goes to residential sector consumption, while industries, businesses, and institutions represent 58%, and municipal use makes up the remaining 2%.

Source: 2014 Drinking Water Report – City of Montréal (online PDF document).

→ *Pressure gauge from the Youville Pumping / PAC 1998.5*
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FOR OR AGAINST? (CONT'D)

How can we reduce water consumption in the urban environment?

Water meters are devices that measure and record the quantity of water used. With this tool, municipalities can charge for daily water use. This is the "user pays" principle: the more water you use, the more you pay.

Certain people believe that installing water meters in every home in Quebec would get households to make better use of their drinking water. But researchers who looked into the question are now unanimous: the simple installation of meters does not have a significant impact on the volume of water used in homes.

To reduce citizens' water consumption, it would be more efficient and much less expensive to raise awareness of responsible water consumption and to adopt a system of fines for those who, for example, wash their driveways with a garden hose.

Some people and organizations also believe that it wouldn't be fair to install water meters in homes, notably because this would penalize certain low-income families. They also fear that installing water meters in homes would pave the way to the privatization of water.

However, installing water meters has proven to be efficient and financially viable in industries, businesses, and institutions (schools, hospitals, etc.). Industrial, commercial, and institutional consumption represents 75% of the water used in Montréal. Meters would allow us to know exactly how much water is being used and to take measures to prevent waste. Meters would also be helpful in locating leaks, thereby reducing costly losses.

Sources:

La vie en vert. Télé-Québec. Water meters for an end to waste (in French).
http://vieenvert.telequebec.tv/sujets/155/les-compteurs-d-eau-pour-mettre-fin-au-gaspillage

Eau secours. Coalition québécoise pour une gestion responsable de l'eau. Demystifying water meters (in French).
http://eausecours.org/wp-content/uploads/2012/06/brochure_demystifiercompteurs.pdf

City of Montréal. Montréal Water. Measuring water consumption.
Questions and answers – Installation of industrial-commercial-institutional water meters (in French).
http://ville.montreal.qc.ca/portal/page?_pageid=6497,113157632&_dad=portal&_schema=PORTAL

10 ways to reduce water consumption at home:

1. Check for leaky faucets and repair them if necessary.
2. Replace conventional toilets with models with a 6-litre tank or a dual-flush mechanism.
3. Turn off the tap when brushing your teeth or shaving to avoid unnecessary running water.
4. Add an aerator to sink faucets.
5. Take showers instead of baths, and limit shower time to 5 minutes.
6. Install a low-flow shower head.
7. Collect rainwater to water your plants.
8. Fill the dishwasher to capacity before starting a wash cycle.
9. Replace your older washing machine with a front-loading model.
10. Wash larger loads of laundry rather than several smaller ones.

Multiple sources.

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FOR OR AGAINST? (CONT'D)

It costs a lot to manage water and maintain water mains. Who should pay?

In early 19th-century Montréal, only those homeowners who could afford it had water delivered directly to their homes. They hired a private company and paid 3 pounds a year for this service – the equivalent of 2 to 3 weeks' work for a labourer. The first customers were wealthy businesspeople.

Source : Pothier, Louise, dir. L'eau, l'hygiène publique et les infrastructures. Montréal, Groupe PGV Diffusion de l'archéologie, 1996. .

En 1845, le service d'aqueduc a été repris d'une société privée par la Ville de Montréal. L'entreprise n'arrivait pas à gagner assez d'argent pour offrir le service, entretenir le réseau et faire des pro ts. La Ville a rendu ce service obligatoire au cours de la décennie suivante a n de répartir les coûts du réseau entre un plus grand nombre d'utilisateurs. Elle obtenait ainsi l'argent pour développer le réseau dans les différents quartiers.

Source : Fugères, Dany. L'approvisionnement en eau à Montréal. Du privé au public. 1759-1865. Montréal, Les Éditions du Septentrion, 2004.

Today, in most municipalities, homeowners pay a water tax. This pays for expenses related to water and sewage services, as well as for waste water treatment.

Montréal has a large water supply network that provides drinking water for a population of 1.9 million people. In all, over 4,300 km of main and secondary pipes run through Montréal's underground—the equivalent of a little over the distance of a round trip between Montréal and Miami. The average age of Montréal's sewer pipes is 57.7 years.

What happens to the water that runs down the drain in the kitchen sink or the bathroom... or the rainwater that goes down the sewers? All waste water from homes, factories, and businesses, and almost all the rainwater that falls on the island, is collected, purified, and returned to the St. Lawrence River.

There is only one waste water treatment plant serving the island of Montréal: the Jean-R.-Marcotte Plant, located on the east island. It is the third largest plant in the world. It can treat an amount of water equal to two Olympic stadiums every day. About 75% of the volume of household waste water in the Greater Montréal Region, and close to 50% of Québec's waste water, is treated at the plant.

The waste water treatment process in Montréal alone costs close to 60 million dollars per year, including maintenance of the treatment plant.

In 2018, the City of Montréal plans to install an ozonisation unit at the plant—at a cost of close to 100 million dollars—to improve the quality of waste water returned to the river. When this is complete, the treatment plant will be the largest of its kind to use ozone treatment.

This process will make it possible to reduce about 95% of the quantity of bacteria in the water and to lessen viruses and other contaminants, notably coming from the pharmaceutical and cosmetics industries. Ozonisation is aimed at preserving aquatic ecosystems and maintaining public health.

Sources :
http://ville.montreal.qc.ca/portal/page?_pageid=6497,54223591&_dad=portal&_schema=PORTAL

http://ville.montreal.qc.ca/portal/page?_pageid=6497,54245572&_dad=portal&_schema=PORTAL

http://ville.montreal.qc.ca/vuesurlesindicateurs/index.php?kpi=2536

http://ville.montreal.qc.ca/vuesurlesindicateurs/index.php?kpi=2537#variable-6902

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FOR OR AGAINST? (CONT'D)

Do you purchase bottled water for daily use?

The sale of bottled water has experienced dramatic increases in recent years. Over 89 billion litres of water are bottled and consumed each year around the world—that is, 2,822 litres per second. Quebecers are among the world's biggest drinkers of bottled water.

nd yet, bottled water really isn't any better for your health. Indeed, there aren't any studies that lead us to believe that bottled water is any safer than water from North American municipalities. Tap water is of very good quality, subjected as it is to strict hygiene regulations. And it's hundreds of times less expensive...

Did you know that a quarter of the bottles of water available on the market simply contain tap water with added chlorine?

The bottled water industry also generates considerable environmental impacts. Tens of millions of plastic bottles can be found in Québec landfills. And plastic bottles are only partially recycled, as only a small proportion of their material can be reused to make more bottles.

Producing a one-litre water bottle also requires up to 2,000 times more energy than the simple treatment and flow of tap water. Not to mention the tons of CO2 generated by the transportation of bottled water.

Sources:
Regard sur l'industrie de l'eau embouteillée en Amérique du Nord – Translated and adapted by Marc-Antoine Fleury for Développement et paix from Inside the Bottle: An Exposé of the Bottled Water Industry by Tony Clarke, Polaris Institute, September 2005.

Coalition Eau secours.

https://www.planetoscope.com/dechets/321-consommation-mondiale-de-bouteilles-d-eau-en-plastique.html

http://vieenvert.telequebec.tv/sujets/400/eau-embouteillee

http://www.canalvie.com/sante-beaute/nutrition/infos-et-conseils/quelle-eau-est-la-meilleure-en-bouteille-ou-du-robinet-1.960141

https://equiterre.org/solution/les-impacts-de-votre-consommation

http://www.lapresse.ca/vivre/sante/201705/02/01-5093892-boire-ou-non-leau-du-robinet.php

Canada

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Hydro Québec