

Grade 4 Wastewater Detectives

Public Education and Outreach
peelregion.ca/enviroed



Teacher Note:

- In this lesson, students will learn about water and wastewater treatment, water in the community and the importance of drinking tap water
- Handouts for this lesson
 - All About Treatment
 - Water is....
 - Wastewater Detectives



Town of Caledon
City of Brampton
City of Mississauga



1.51 million
residents



**2 Water Resource
Recovery Facilities**
GE Booth & Clarkson



**2 Water
Treatment Plants**
Arthur P. Kennedy & Lorne
Park



15 Wells
Municipal

Teacher Note:

- **(Click-1)** Ask students – what city or town do they live in?
 - Let students know the city or town they mentioned is part of a larger area that is called the Region of Peel
 - **(Click-2)** The Region of Peel includes the Town of Caledon and 2 cities – City of Brampton and City of Mississauga
 - **(Click-3)** Peel has a population of 1.51 million people
- The Region of Peel provides services to residents. Can anyone share what services the Region of Peel may provide in our communities?
 - Recycling and Waste collection and disposal;
 - Maintenance of regional roads, including snowploughing in the winter and paving in the summer;
 - Operation of child care centres and homes for the aged
 - Ambulance services
 - Peel Regional Police services
 - **Peel Region also provides you with clean, safe drinking water and wastewater treatment**

- Region of Peel has
 - **(Click-4)** 2 water treatment plants in Mississauga,
 - **(Click-5)** 2 water resource recovery facilities, and
 - **(Click-6)** 15 municipal wells that treat water that we use daily
 - Most of these plants are located in Mississauga, close to Lake Ontario as it allows the Region to treat and clean water faster and more efficiently
- This short video coming up next, will look at how the Region of Peel invests in water. Listen for some interesting facts on water to share as a class after watching the video



Investing in our Water

Teacher Note:

- Watch video: 'Investing in our Water'
- <https://www.youtube.com/watch?v=XMr0JqGOX0A>
- To play video
 - Press the Play button
- Look at all the ways we use water every day from the video
 - Have students share their thoughts and have them come up with other ways we use water

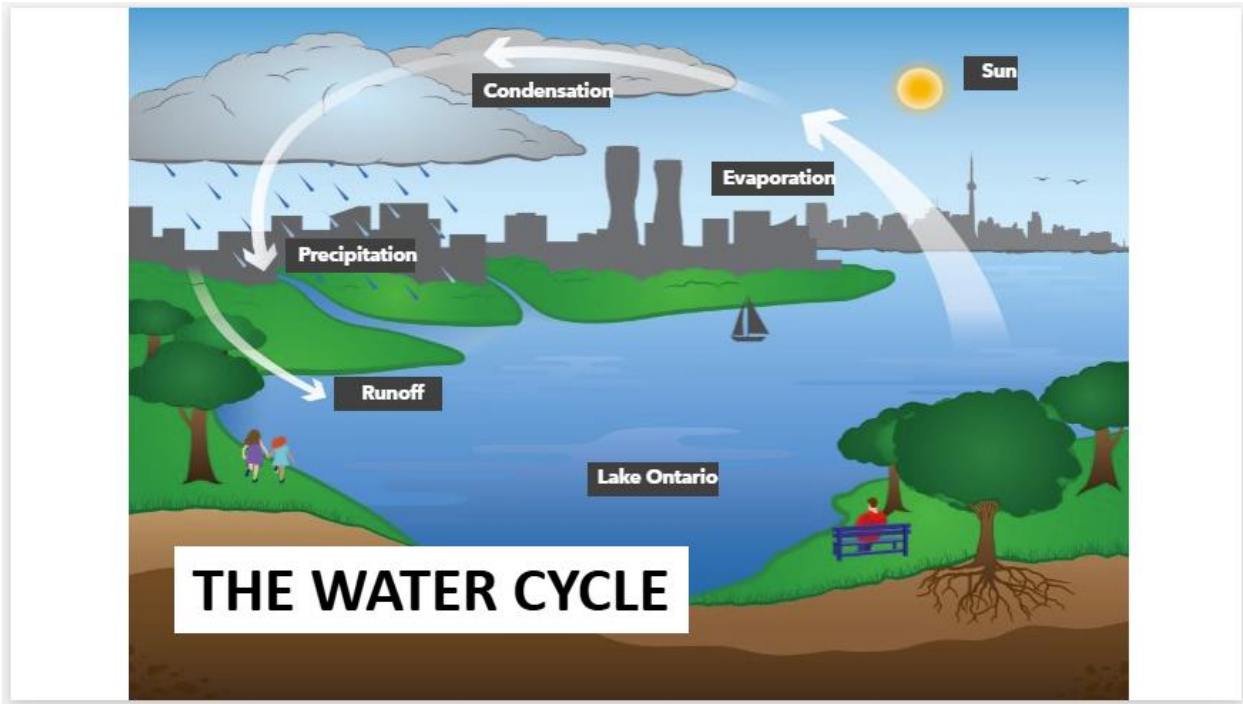
Worksheet: Water is

- Have the students come up with different words that describe water using the 'Water is' worksheet
 - Options: have students complete the worksheet individually, or as a class using chart paper or the board

Did you know?

- Did you know that the Region of Peel has over 200 staff who treat and maintain our water to make sure every time you turn on the tap, the water is fresh and healthy to drink?
- And every time you flush your toilets, or take a bath, there are also staff that work to make sure that dirty water gets cleaned before putting it back to the lake

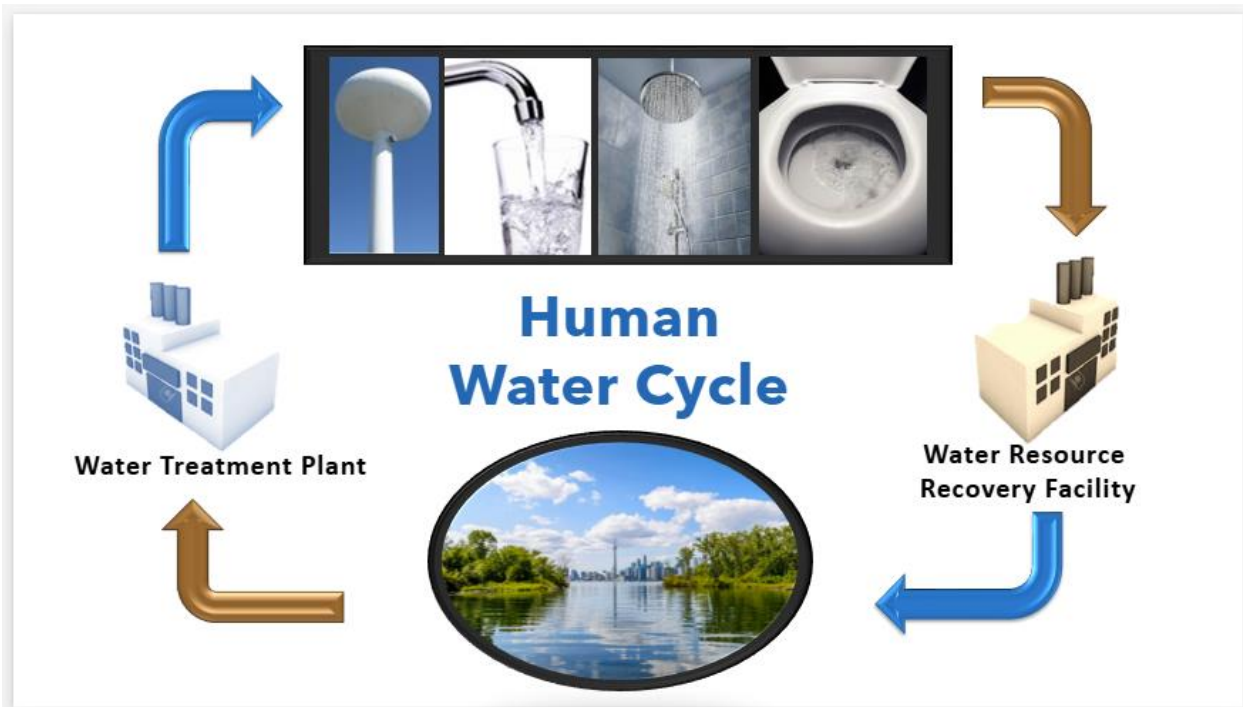
- They work to make sure all our water gets treated for everyone, 1.51 million people living and working in Peel
- In 2041 it is estimated that almost 2 million people will live in Peel. That means the Region will have to continue treating water for even more people in Peel, a task that the Region takes great pride in doing
- The Region of Peel is committed to providing safe and reliable drinking water to everyone



Teacher Note:

- Review the water cycle with the students
- Does anyone know where we get our water from?
 - Brampton, Mississauga and Bolton get water from Lake Ontario. Other people who live in Caledon get water from wells, either on their own property, or municipal wells that are owned by the Region
 - Water from Lake Ontario is fresh, which means that the water is not salty like the water in oceans and seas
- The water cycle is a continuous circulation of water from rivers, lakes and oceans into the atmosphere onto the land and back
 - **(CLICK-1) Sun:** the source of energy that drives the whole cycle
 - **(CLICK-2) Lake Ontario:** this is our water source
 - **(CLICK-3) Evaporation:** the sun heats up the water in lakes, rivers and oceans and turns it into vapour
 - **(CLICK-4) Condensation:** water vapour in the air gets cold and changes back into liquid form
 - **(CLICK-5) Precipitation:** the clouds get heavy and water falls back to the earth in the form of rain, hail, sleet or snow

- **(CLICK-6) Runoff:** moves water across land and makes its way to the nearest body of water such as a lake
- **This process is called the natural water cycle. But humans also change the path of water**



Teacher Note:

- **(Click-1) Ask:** Has anyone ever heard about the human water cycle? What could this be all about?
 - Have students share their thoughts
- **(Click-2) Ask:** Who remembers where our tap water comes from? (Answer: Lake Ontario)
- **Ask:** if I was thirsty, should I take a cup of water directly from the lake and drink it? (Answer: no)
- **Ask:** Why not?
 - Have students share their responses (i.e. water is dirty, not treated, has pet waste, trash in the water, bacteria and germs)
 - That's right! The water in Lake Ontario might have bacteria, viruses, and germs in it. All those things could make us very sick if not treated. **(Click-3)** So, the water goes to the wastewater treatment plant to get cleaned
- **(Click-4)** Once the water is cleaned, it is ready to be used in our homes and school.
- **Ask:** Does anyone know what happens to the water we use at schools and at homes? Do you think it goes directly back to the Lake (Answer: No)

- **(Click-5)** Ask: Why not? (Answer: germs, toilet paper in it, wouldn't be good for the fish etc.)
- **(Click-6)** That is why we have to send the water to get cleaned at the water resource recovery facility so it can be safely returned to the lake.
- The next few slides will cover how we treat all water and wastewater

Dew's Water Adventure

<https://peelregion.vids.io/videos/ac9cd9b41d19e1c225/dews-water-adventure>



Teacher Note:

- Animated slides that will cover and explain water treatment
- Please click on the link on the slide to get to the video
 - <https://peelregion.vids.io/videos/ac9cd9b41d19e1c225/dews-water-adventure>

Discussion Questions

- Before playing the slides
 - What is the purpose of a water treatment plant?
 - Before learning about water treatment, think about how we get water to our homes and schools
 - Have students share their thoughts on what they know, or heard about water treatment
- All About Treatment worksheet: Have the students match the stages of water treatment while listening to the animated slides

Dew's Wastewater Adventure

<https://peelregion.vids.io/videos/069cd6b81717e3c58f/dews-wastewater-adventure>



Teacher Note:

Animated slides that will cover and explain wastewater treatment

- Please click on the link on the slide to get to the video
- <https://peelregion.vids.io/videos/069cd6b81717e3c58f/dews-wastewater-adventure>

Discussion Questions:

- What is the purpose of a wastewater plant?
 - Have students share their thoughts on what they know, or heard about wastewater treatment, before showing the animated slides
- Why is it important that we treat the water we use?
 - Think of all the animal life and plants that live or are near the Lake.
 - If wastewater that is used never got treated, would you go for a swim, enjoy a boat ride, go fishing in water that is full of stuff we poured or flushed down from our home?
- How are communities shaped? What are some things you notice in your neighbourhood?
 - Park space, green space, roads, buildings, stores/malls, creek, schools

Worksheet: All About Treatment

- Have students complete the worksheet while listening to the animated slides about wastewater treatment
 - Take a few minutes to go over and cover the worksheet as a class



Teacher Note:

- **Ask:** Who has seen these before? Where do you usually see these?
 - **Answer:** on the streets, school property, parking lot
- **Ask:** what is the difference between these 2 sewers?
 - **(CLICK-1) Answer: Sanitary Sewers:** access point for trained professionals to go down to access the pipes. These trained professionals can open these and if you were there when they opened it, all you would see would be pipes. If there is a blockage or a break in the pipes, they might open this up to fix it
 - **(CLICK-2) Storm Drains:** used for rain/snow collection so the streets don't flood
- **Ask:** where do you think the water goes from the storm drains?
 - **Answer:** the water goes untreated directly to a stream, creek and eventually to Lake Ontario. All the water draining from our streets, lawns and driveways is untreated water
 - Discuss with the class the effects of this (pollution, garbage, chemicals, soaps all going to the Lake without getting treated)
- **Ask:** what do you think would be appropriate to put down the storm drains?
 - **Answer:** It is against the law to put anything down a storm sewer other than rainwater or snow, because it can be harmful to the aquatic life in the Lake. Therefore, it is important to not pour any motor oil, paint, or any other fluids that could potentially harm the aquatic life and pollute the water we depend on for so many things

Wastewater Detectives:

- 1) Dental Floss
- 2) Wet Wipes
- 3) Toilet Paper
- 4) Unused Medication
- 5) Cotton swabs/cotton balls
- 6) Bandages
- 7) Fats, oils, grease
- 8) Pet goldfish
- 9) Hair
- 10) Small toys
- 11) Hazardous products i.e. paint thinner
- 12) Paper towels
- 13) Rags
- 14) Diapers



Teacher Note:

- Have students refer to Water Detectives worksheet
- Get students to interview a classmate and ask them where each item goes
- Answers to questions:
 - 1) Dental Floss (GARBAGE)
 - 2) Wet Wipes (GARBAGE)
 - 3) Tissues (ORGANIC Bin – don't waste water by flushing down 1 tissue)
 - 4) Unused Medication (Community Recycling Centre or Pharmacy – don't flush it down the toilet as it will end up in our waterways)
 - 5) Q-Tips/Cotton Swabs (GARBAGE)
 - 6) Bandages (GARBAGE)
 - 7) FOGS – Fats, oils, grease (ORGANICS or GARBAGE – never pour down the drain, or flush down your toilet, oils and grease will block all your pipes and cause back-ups)
 - 8) Pet goldfish (GARBAGE – doesn't belong in our wastewater plant)
 - 9) Hair (ORGANICS or GARBAGE)
 - 10) Small toys (CRCs for donation – never flush toys down the toilet)

- 11) Hazardous products (CRCs)
- 12) Paper towels (ORGANICS)
- 13) Rags (GARBAGE)
- 14) Diapers (GARBAGE)

Discussion Questions:

- What are the most common things that people are flushing or putting down the drain?
- Discuss the results from the interview with the entire class
- Ask students if there were any surprises from student's answers
- Ask students if they or their family ever flushed items down the toilet, or drain that were on the list?



I don't flush - A Prescription for Clean Water

Teacher Note:

- After the Water Interview, discuss the results with the entire class
 - Ask students if there were any surprises from student's answers
 - Ask students if they or their family ever flushed items down the toilet, or drain that were on the list
- Watch the 'I Don't Flush – A Prescription for Clean Water'
<https://www.youtube.com/watch?v=HBQ87GzRQvc>
- To play video, press the Play button
- Did you know when fats, oils and greases are poured down the drain, they can cause major problems? Why? Discuss with a partner or with the class
 - The facts on FOGS:
 - Never pour FOGS down the sink, drain or toilet. FOGS can't be broken down during the wastewater treatment process
 - FOGS clings to pipes and build up over time
 - Cold weather solidifies FOGS
 - Blocked sewage (sewer backup) can surge up through sinks, floor drains and toilets. This makes for a stinky, messy cleanup!
 - To properly throw away FOGS, cool it, scrape it, then green bin it
- How would you teach this message to your family members and friends? What could you do to convince others to make changes?



Teacher Note:

- For more information on water education, please visit our new website:
<http://www.peelregion.ca/enviroed>

End of the lesson, ask students

- What have you learned today about water?
 - Have students share their findings
- Share with students that everyone including them, have a part in protecting and conserving water