

Grade 4 Lesson Outline

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| Lesson Title: Wastewater Detectives | Duration: 40 minutes |
| Introduction: | |
| In this lesson, students will learn about water and wastewater treatment, water in the community and the importance of drinking tap water. | |
| How to use this resource: | |
| Refer to the list below for all resources required for this lesson: <ul style="list-style-type: none">• Grade 4 – Presentation PPT includes all slides, speaking notes and video links required for the lesson• All About Treatment worksheet that has students match the stages of water and wastewater treatment with images• Water is... worksheet where students get to come up with different terms for water• Wastewater Detectives worksheet includes water knowledge questions students will ask classmates and family members | |
| Print the following files before you begin the lesson: <ol style="list-style-type: none">1. All About Treatment worksheet (1 per student)2. Wastewater Detectives worksheet (1 per student) | |
| Key Messages: | |
| <ul style="list-style-type: none">• All living things needs water• Water moves around the earth through the water cycle• We need to save water, so it stays clean for everyone in the community and the environment• The water treatment plant makes sure our water is safe and healthy for everyone• Personal actions, such as being careful what we pour down the drains at home and at school, can help keep our water clean for everyone. | |
| Key Topics: | |
| <ul style="list-style-type: none">• Water Conservation• Water Treatment• Wastewater Treatment• FOGS – Fats, Oils and Greases - proper disposal of items in the sewers• Water in the Community | |
| Curriculum Connections: | |

For a complete list of curriculum connections, refer to the Curriculum Connections for Grade 4

Science & Technology:

Understanding Life Systems: Habitats & Communities

- 1.1, 3.3 & 3.10

Social Science:

- Canada and World Connections

Lesson Outline:

Slide 2: The Region of Peel

- 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
 - Region of Peel includes the Town of Caledon and 2 cities – City of Brampton and City of Mississauga
 - Peel has a population of 1.51 million people, who live, work and play
 - 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 collections and disposal
 - Maintenance of regional roads, including snowploughing in the winter and paving in the summer
 - Ambulance services
 - Peel Regional Police and services and
 - **Peel Region also provides you with clean, safe drinking water and wastewater treatment**
 - __Region of Peel has 2 water treatment plants in Mississauga, 2 water resource recovery facilities for South Peel, and 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

Slide 3: Investing in Water

- Video: Investing in Water <https://www.youtube.com/watch?v=XMr0JqGOX0A>
- Length of video: 1.46 minutes
- 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 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

Slide 4: Water Cycle

- Review the water cycle with the students

- Discuss with students how water is so important to everyone
- 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
 - **Sun:** the source of energy that drives the whole cycle
 - **Lake Ontario:** this is our water source
 - **Evaporation:** the sun heats up the water in lakes, rivers and oceans and turns it onto vapour
 - **Condensation:** water vapour in the air gets cold and changes back into liquid form
 - **Precipitation:** the clouds get heavy and water falls back to the earth in the form of rain, hail, sleet or snow
 - **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**

Discussion Questions:

- **Ask:** Has anyone ever heard about the human water cycle? What could this be all about?
- Have students share their thoughts
- **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. So, the water goes to the water resource recovery facility to get cleaned.
- Once the water is cleaned it is ready to be used in our homes and school.
- 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) Why not? (answer: germs, toilet paper in it, wouldn't be good for the fish etc.)
- 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 water and wastewater

Slides 6: Dew's Water Adventure

- Dew's Water Adventure <https://peelregion.vids.io/videos/ac9cd9b41d19e1c225/dews-water-adventure>
- Length of video: 4.03 minutes
- **Discussion Questions:**
- 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

Worksheet: All About Treatment

Have students complete the worksheet while listening to the animated slides about water treatment

Answer Key: All About Treatment – Water Treatment

1. Region of Peel 2. Intake Pipe, 3. Ozone, 4. Carbon 5. UV, 6. Membrane Filters 7. Chlorine & Fluoride 8. Lab Testing and 9. Toast to Tap Water

Slide 7: Dew's Wastewater Adventure

- Dew's Wastewater Adventure <https://peelregion.vids.io/videos/069cd6b81717e3c58f/dews-wastewater-adventure>
- Length of video: 2.50 minutes

Discussion Questions:

- What is the purpose of a water resource recovery facility?
 - 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

Answer Key: All About Treatment – Wastewater Treatment

1. Region of Peel, 2. Water leaving homes, 3. Screening 4. Primary Settling Tanks, 5. Aeration Tanks 6. Secondary Clarifying Tanks 7. Lab Testing and 8. Final Outfall Pipe

Slide 8: Where does the water go from here?

Discussion Questions:

- **Ask:** Who has seen these before?
- **Ask:** Where do you usually see these?
 - **Answer:** On our streets, school property
- **Ask:** What is the difference between these 2 sewers?
 - **Answer: Sanitary Sewers: (on the right)** access point for trained professionals to go down to access the pipes where our wastewater goes. If there is a blockage or a break in the pipes, they might open it up to fix it
 - **Answer: Storm drains: (on the left)** used to collect rain/snow melt so the street doesn't flood
- **Ask:** Where do you think the water goes from the storm drains?
 - **Answer:** The water leads 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)
- What do you think would be appropriate to put down the storm drain?
 - It is against the law to put anything down a storm drain 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

Slide 9: Wastewater Detectives

Worksheet: Wastewater Detectives ____

- ____ Have students interview a classmate
- Questions cover what we can and cannot flush down toilets or pour down our drains at home and school
- Students will have to answer which items can be flushed down the toilet

Wastewater Interview Questions:

- 1) Dental Floss (**Garbage**)
- 2) Wet wipes (**Garbage**)
- 3) Toilet Paper (**Flush**)
- 3) Tissues (**Organics bin or garbage**)
- 4) Unused medication (**Community Recycling Centre or Pharmacy for proper disposal**)
- 5) Cotton swabs/cotton balls (**Garbage**)
- 6) Bandages (**Garbage**)
- 7) Fats, oils, and grease (**Let it cool to scrape and place in the organics bin**)
- 8) Pet goldfish (**Garbage**)
- 9) Hair (**Organics bin or Garbage**)
- 10) Small toys (**Donate to CRCs**)
- 11) Hazardous products i.e. paint thinner (**Drop off at CRC for proper disposal**)
- 12) Paper towels (**Garbage or organics bin**)
- 13) Rags (**Garbage**)
- 14) Diapers (**Garbage**)
- Optional: have the students graph the results using a bar chart

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?

Slide 10: Video: I Don't Flush – A Prescription for Clean Water

Video: I Don't Flush – A Prescription for Clean Water <https://www.youtube.com/watch?v=HBQ87GzRQvc>

- Length of video: 1.21 minutes
- **Ask:** 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
- **Answers:** 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?

Slide 11: Conclusion

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

Extension Activities:

- __ Looking for ways to extend your learning, check out our extension activities at peelregion.ca/enviroed and [Teach Green in Peel](#)