

Grade 5 Lesson Outline

Lesson Title: Water Inspectors	Duration: 40 minutes
Introduction:	
In this lesson, students will learn about the importance of water conservation and how water and wastewater are treated in Peel.	
How to use this resource:	
Refer to the list below for all resources required for this lesson: <ul style="list-style-type: none">• Grade 5 – Presentation PPT includes all slides, speaking notes and video links required for the lesson• All About Treatment worksheet where students will match the stages of water and wastewater treatment with definitions• Home Water Audit worksheet option 1 worksheet• School Water Audit worksheet option 2 worksheet <p>Print the following files before you begin the lesson:</p> <ol style="list-style-type: none">1. All About Treatment worksheet (1 per student)2. Water Audit at Home optional worksheet (1 per student)3. Water Audit at School optional worksheet (1 per class) <p>**Audits will need more than 1 period to complete</p>	
Key Messages:	
<ul style="list-style-type: none">• 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 <p>The water treatment plant makes sure our water is safe and healthy for everyone</p> <p>Complete a water audit to understand how much water is being used, reduce consumption and improve water conservation</p>	
Key Topics:	
<ul style="list-style-type: none">• Water Conservation• Water Treatment• Wastewater Treatment• Water Audit• Water Quality• Water in the Community	
Curriculum Connections:	

For a complete list of curriculum connections, refer to the Curriculum Connections for Grade 5

Science & Technology:

Understanding Matter & Energy: Properties of & Changes in Matter

- 1.2

Understanding Earth & Space Systems: Conservation of Energy & Resources

- 1.1

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
 - The Region of Peel is a level of municipal government and some of the programs and services that the Region of Peel provides to our communities include:
 - Recycling and Waste collections and disposal
 - Maintenance of regional roads, including snowploughing in the winter and paving in the summer
 - Health services
 - Ambulance services
 - Peel Regional Police and services and
 - **Peel Region also provides you with clean, safe drinking water and wastewater treatment**
 - Peel has a population of 1.51 million people, who make up this vibrant community where people live, work and play
 - Today, we are going to learn about how water is important to all living things, and how we use water everyday at school and at home
- Region of Peel has 2 water treatment plants, 2 water resource recovery facilities, and 16 municipal wells that treat water that we use daily
- The two water treatment plants are located in Mississauga, close to Lake Ontario as it allows the Region to treat and clean water faster and more efficiently

Slide 3: Video

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

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, staff also 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
- Every day the Region of Peel treats 570 million litres of water - That's enough to fill 228 Olympic sized swimming pools

- ____ Review the water cycle with the students
- Where do we in the Region of Peel get our water from?
 - Brampton, Mississauga and Bolton get water from the Lake. 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
 - **Transpiration:** is the evaporation of water through pores from the leaves of plants
 - **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**

Slide 5: Human Water Cycle

Discussion Questions:

- **Ask:** Has anyone ever heard about the human water cycle? What could this be all about?
 - Have students share their thoughts
- **Ask:** What happens when we use water to brush our teeth, shower, go the bathroom – where does it go?
- **Ask:** Do we send it directly to the Lake?
 - **Answer:** NO

Ask: 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?
 - Have students share their responses (i.e. water is dirty, not treated, has pet waste, trash in the water, bacteria and germs, toilet paper in it, wouldn't be good for the fish, etc.
 - The water in Lake Ontario might have bacteria, viruses, and germs in it. All those things could make us very sick if not treated.
 - That is why we have to send the water to get treated so it can be cleaned and made safe for us to drink.
- The next few slides will cover how we treat all that dirty water at our wastewater plant

Slides 6: Animated Water Treatment

- 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: Video

This short video will show footage of the Arthur P. Kennedy water treatment plant

- Video: Peel's tap water from the Arthur P. Kennedy water treatment plant
<https://www.youtube.com/watch?v=J9wY-qMrqZg>
- Length of video: 0.48 seconds

Did you know?

- That Arthur P. Kennedy Plant can treat up to 1.2 billion litres per day
- Every day the Region of Peel treats 570 million litres per day
- In the year, 2041 another 21 years from now, it is estimated that almost 2 million people will live in Peel. That means we will have to continue treating water for even more people in Peel, a task that the Region takes great pride in doing.

Discussion Questions:

- Do you think the Region of Peel can treat water for 2 million people? Explain your reasoning?
 - **Answer:** Yes, the Region of Peel can treat up to 1.2 billion litres per day. There's always room for more capacity to treat water per day in the Region. Forecasting for future population growth is something that the Region of Peel plans for
- Region of Peel is committed to providing safe and reliable drinking water to everyone

Slide 8: Animated Wastewater Treatment

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

Discussion Questions: (at the end of 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?

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 9: Video

This short video will show footage of the GE Booth water resource recovery facility

- Video: How the Region of Peel cleans your wastewater
<https://www.youtube.com/watch?v=4uxYZdnxuz8&feature=youtu.be>
- Length of video: 1.11 minutes **Did you know?**

- The Region of Peel treats 518 million litres of wastewater per day
 - That's enough water to fill 200 Olympic sized swimming pools

Slide 10: Where does the water go from here?

- Ask students who has seen these before and where do they mainly see them?
 - **Answer:** on the streets, school property, parking lot
- What is the difference between these 2 sewers?
 - **Sanitary Sewers: (on the right)** 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
 - **Storm Drains: (on the left)** used for rain/snow collection so the streets don't flood
- Where do you think the water goes from the storm drains? Does the water get treated?
 - **Answer:** No, the water leads directly to a stream, creek and eventually to Lake Ontario that is untreated
 - Discuss 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 11: Water Audit

Optional for students to complete a home water audit or a school water audit

- Refer to 'Home Water Audit' worksheet or
- Refer to 'School Water Audit' worksheet

This short video will help explain how to read a water meter

- Video: Reading your meter
https://www.youtube.com/watch?time_continue=11&v=xPapGbWk9rs&feature=emb_title
- Length of video: 2.27 minutes

School Water Audit:

- Learn how much water your school uses daily
- Students will work together to complete a water audit at their school and learn how much water is being used per day
- Students will need to get support from their Principal and Custodian to support with this water audit and to get access to the school's water meter to get readings
 - Refer to 'School Water Audit' worksheet
 - This activity will require a few periods to complete as students will need to track and complete the school water audit for an entire week
 - Have the students share the results with the school community (school announcements, or school newsletter)

Home Water Audit:

- Students will track how much water their entire family uses for a week
- Refer to 'Home Water Audit' worksheet
 - Have students share their results with the class

- Have them calculate the averages of similar family sizes

Slide 12: Conclusion

End of the lesson, ask students

- What have you learned today about water?
 - Have students share their findings?

Share with students that everyone, has 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](#)

Want to learn more about water and wastewater treatment, watch the following videos:

- Barry's Water Treatment Tour <https://www.youtube.com/watch?v=xc4zoS9EgY4>
- Length of video: 6:07 minutes

- Barry's Wastewater Treatment Tour <https://www.youtube.com/watch?v=vC42YTljxpM>
- Length of video: 8:16 minutes