



# Lesson Plan: Energy from Waste, Grade 11 Biology (SBI3U)

## Introduction

The Durham York Energy Centre (DYEC) follows strict monitoring and compliance protocols to avoid potential environmental impacts on local groundwater and surface water. The groundwater and surface water monitoring program provides an understanding of both groundwater and surface water quality during the construction and operation of the facility to ensure ongoing environmental management of the site. In this lesson, students will analyze groundwater and surface water data, determine trends, and make observations.

## Learning Objectives

1. Demonstrate an understanding of the waste reduction processes used by DYEC
2. Analyze the reports on environmental monitoring performed to ensure DYEC is meeting standards
3. Identifying the importance of environmental management and the importance to our local communities

## Resources Provided

- [Durham York Energy Centre Website](#)
- [Energy from Waste Process Overview](#)
- [Durham York Energy Centre Virtual Tour](#)
- [Durham York Energy Centre - 2020 Annual Groundwater and Surface Water Monitoring Report](#)

## Activity

1. Students will work through the virtual tour to understand the processes of household waste from their curbside through the DYEC facility
2. Students will research historical events that led to ground or surface water pollution and the effects on population or biodiversity (e.g., Grassy Narrows Mercury Poisoning)
3. Students will analyze the 2020 Ground and Surface Water Report
  - a) How do the graphs on pages 37-40 of the report correspond with the results stating analytical results for the required groundwater monitoring parameters have shown no significant trends since monitoring began in December 2011 except for some de-icing salt influence observed at MW1, MW2B, MW4, and MW5B?
  - b) Using the site location maps on pages 30 and 31 of the report, research what would the local biodiversity look like in the vicinity of the DYEC.

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- c) What potential impacts might the parameters measured in the groundwater monitoring program have if elevated concentrations were to occur in groundwater and surface water sources? How might they affect the biodiversity of the local ecosystem?
  - d) What design features were put in place to protect the groundwater or surface water sources and how do they work?
  - e) How do waste management programs and services protect our local biodiversity?
4. Students will create a dichotomous key of the local biodiversity. Included in this dichotomous key, students will identify the categories that may be affected without waste management initiatives

## Summary

The DYEC facility follows a strict environmental monitoring program that is protective of the environment and the community.

## Curriculum Connections Expanded

The Ontario Curriculum, Grades 11 and 12: Science, 2008 (revised)

### Biology, Grade 11, University Preparation (SBI3U)

#### A. Scientific Investigation Skills and Career Development

- A1. Scientific Investigation Skills: demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating)

#### B. Diversity of Living Things

- B1. Relating Science to Technology, Society, and the Environment: analyse the effects of various human activities on the diversity of living things
- B2. Developing Skills of Investigation and Communication: investigate, through laboratory and/or field activities or through simulations, the principles of scientific classification, using appropriate sampling and classification techniques
- B3. Understanding Basic Relationships: demonstrate an understanding of the diversity of living organisms in terms of the principles of taxonomy and phylogeny