



Lesson Plan: Landfill Mining – Blackstock Landfill, Grade 9 Science (SNC1D and SNC1P)

Introduction

Historically the Region of Durham relied on local landfill sites for the disposal of garbage which, even after closure, needs to be managed to ensure the environmental integrity of these sites. Students will explore the use of historic landfills and link their own waste behaviors and experiences to waste management. Students will think critically about the potential environmental impacts of various waste materials and make connections to the natural environment.

Learning Objectives

1. Describe historic landfill and identify potential issues caused by historic landfills
2. Describe the basic landfill mining process
3. Identify how landfill mining recover resources
4. Explore what happens at the Durham York Energy Centre
5. Assess the impact of landfill mining on sustainability of terrestrial and/or aquatic ecosystems, and evaluate the effectiveness of landfill mining to mitigate negative impacts

Resources Provided (located in the resource folder)

- [Blackstock Landfill Mining Video](#)
- Map of Durham Region Owned Landfills

Questions

1. What is a historic landfill and what are the potential environmental effects of these sites?
2. What is methane and why is it important to mitigate?
3. What is landfill mining and why is it used?
4. Where was the waste transported to that was capable of incineration or burning?
5. What happens to the waste at the Durham York Energy Centre and what type of electricity would this generate?
6. How does landfill mining recover resources?
7. How does landfill mining affect the sustainability of the local ecosystem?

Activity

1. In the past, waste was often disposed of in a landfill with little to no separation. That means all the waste leaving your home today would go into a garbage bag for disposal without using the programs we have in place today such as composting and recycling.
2. In small groups, students will make a list of all the items they can think of that they have thrown out at home and school in the last week.

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3. Students will then organize their list into the following categories:
 - a. Household Hazardous Waste
 - b. Organics
 - c. Plastics
 - d. Metals
 - e. Glass
 - f. Paper/Cardboard
4. As a class, have an open discussion exploring what might happen to these materials in a landfill. How could they potentially impact the environment around them? Could they get into the water, air, or soil? What would influence the breakdown or movement of these materials?
5. As a class, assess the impact of landfill mining on sustainability of terrestrial and/or aquatic ecosystems, and evaluate the effectiveness of landfill mining to mitigate negative impacts.

Summary

Waste does not just disappear once it leaves your house. It needs to be managed responsibly to protect the environment and human health. How we choose to manage waste today impacts the future.

Curriculum Connections Expanded

The Ontario Curriculum, Grades 9 and 10: Science, 2008 (revised)

Science, Grade 9, Academic (SNC1D)

A. Scientific Investigation Skills and Career Exploration

- 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. Biology: Sustainable Ecosystems

- B1. Relating Science to Technology, Society, and the Environment: assess the impact of human activities on the sustainability of terrestrial and/or aquatic ecosystems, and evaluate the effectiveness of courses of action intended to remedy or mitigate negative impacts
- B2. Developing Skills of Investigation and Communication: investigate factors related to human activity that affect terrestrial and aquatic ecosystems, and explain how they affect the sustainability of these ecosystems
- B3. Understanding Basic Concepts: demonstrate an understanding of the dynamic nature of ecosystems, particularly in terms of ecological balance and the impact of human activity on the sustainability of terrestrial and aquatic ecosystems

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Science, Grade 9, Applied (SNC1P)

A. Scientific Investigation Skills and Career Exploration

- 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. Biology: Sustainable Ecosystems and Human Activity

- B1. Relating Science to Technology, Society, and the Environment: analyse the impact of human activity on terrestrial or aquatic ecosystems, and assess the effectiveness of selected initiatives related to environmental sustainability
- B2. Developing Skills of Investigation and Communication: investigate some factors related to human activity that affect terrestrial or aquatic ecosystems, and describe the consequences that these factors have for the sustainability of these ecosystems:
- B3. Understanding Basic Concepts: demonstrate an understanding of characteristics of terrestrial and aquatic ecosystems, the interdependence within and between ecosystems, and the impact humans have on the sustainability of these ecosystems