



Lesson Plan: Historic Landfills and Perpetual Care, Grade 9 Science (SNC1D and SNC1P)

Introduction

Students will have an opportunity to discuss and make connections about past waste management practices to the environment and human health. Students will put into practice their knowledge by participating in discussions and activities throughout the lesson.

Learning Objectives

1. Describe historic landfills and how waste was managed in the past
2. Identify and assess the potential environmental impacts from historical landfills
3. Investigate what happens to methane in the atmosphere and make connections to climate change and greenhouse gas
4. Investigate and access potential measures that could be put in place at modern landfills to protect the natural environment and human health

Resources Provided (located in the resource folder)

- Region Owned Landfills Map

Questions

1. What is a historic landfill and what are the potential environmental impacts of these sites?
2. How is landfill leachate generated and what chemical or biological processes may occur in the landfill?
3. How is methane gas created and how does it move through the natural environment from a landfill?
4. What is encroachment and how what effects might it have on a closed historic landfill?
5. What happens to methane in the atmosphere? How does this relate to climate change and greenhouse gas?

Activity

1. In the past, residential waste was often disposed of in a landfill with little to no consideration to the environment. As a class, discuss the potential consequences of past human behaviour regarding waste management on the natural environment.
2. Break students into small groups representing:
 - a. Surface Water
 - b. Ground Water
 - c. Air
 - d. Natural Vegetation

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3. Have students discuss and record their thoughts on what measures could be put in place in modern day landfills to protect the natural environment and human health. What issues are their measures addressing and how would they work?
4. Each group will then share their ideas with the class for an open discussion.

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

C. Chemistry: Atoms, Elements, And Compounds

- C1. Relating Science to Technology, Society, and the Environment: assess social, environmental, and economic impacts of the use of common elements and compounds, with reference to their physical and chemical properties

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)

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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

C. Chemistry: Exploring Matter

- C2. Developing Skills of Investigation and Communication: investigate, through inquiry, physical and chemical properties of common elements and simple compounds