Lesson Plan: Historical Landfills and Perpetual Care, Grade 10 Science (SNC20 and SNC2P)

Introduction

In this lesson, students will have an opportunity to make connections between their personal waste production, waste disposal, the environment and investigate how waste management strategies in the Region have changed over time.

In the past, residential waste was often disposed of with little to no separation. The Region relied on local landfill sites for the final disposal of garbage. This means all waste from your home would go in a black bag destined for landfill, including all food waste. Even after closure, these historic landfills need to be managed to ensure the environmental integrity of these sites.

Learning Objectives

1. Demonstrate an understanding of the chemical processes that occur in closed landfills
2. Analyze potential safety and environmental concerns associated with chemical reactions in a historic landfill
3. Investigate how historic landfills contribute to climate change
4. Compare benefits and disadvantages of how organic waste was managed in the past virus how it is managed today in the Region

Resources Provided (located in the resource folder)

- Region Owned Landfills Map

Questions

1. How did the Region manage solid residential waste managed in the past virus how it is managed today?
2. What factors do you think influenced waste management factors over time?
3. Do you have a Region owned historic landfill in your community and where is it located?

Activity

1. Over the course of a week, students will keep record of all food waste items they have produced throughout each day.
2. Once the week is complete, explain to the students that all their combined food waste would have been sent to landfill in the past.
3. Investigate the potential implications of food waste being placed in a historic landfill, including:
    a. What gases are produced when organic waste breaks down in a historic landfill?
    b. What safety concerns might be associated with these gases? Explain the potential reactions.

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c. How do these gases contribute to climate change?
d. What processes might occur as precipitation (such as rain or snow melt) interact with organic waste in a historic landfill?

4. As a class compare benefits and disadvantages of how organic waste was managed in the past virus how it is managed today in Durham Region.
5. Discuss how organic waste could be managed better in the future.

Summary

In the past, residential waste was often disposed of with little to no separation. Waste management strategies in Durham Region have evolved significantly over the years with an emphasis on environmental integrity and sustainability in mind. How we choose to manage waste today impacts the future.

Expanded Curriculum Connections

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

Science, Grade 10, Academic (SNC2D)

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)

C. Chemistry: Chemical Reactions

- C1. Relating Science to Technology, Society, and the Environment: analyse a variety of safety and environmental issues associated with chemical reactions, including the ways in which chemical reactions can be applied to address environmental challenges
- C2. Developing Skills of Investigation and Communication: investigate, through inquiry, the characteristics of chemical reactions
- C3. Understanding Basic Concepts: demonstrate an understanding of the general principles of chemical reactions, and various ways to represent them

D. Earth and Space Science: Climate Change

- D1. Relating Science to Technology, Society, and the Environment: analyse some of the effects of climate change around the world, and assess the effectiveness of initiatives that attempt to address the issue of climate change
- D2. Developing Skills of Investigation and Communication: investigate various natural and human factors that influence Earth's climate and climate change
- D3. Understanding Basic Concepts: demonstrate an understanding of natural and human factors, including the greenhouse effect, that influence Earth's climate and contribute to climate change

Science, Grade 10, Applied (SNC2P)

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)

C. Chemistry: Chemical Reactions and Their Practical Applications

- C1. Relating Science to Technology, Society, and the Environment: analyse how chemical reactions are employed in common products and processes, and assess the safety and environmental hazards associated with them
- C2. Developing Skills of Investigation and Communication: investigate, through inquiry, the characteristics of simple chemical reactions
- C3. Understanding Basic Concepts: demonstrate an understanding of simple chemical reactions and the language and ways to represent them

D. Earth and Space Science: Earth's Dynamic Climate

- D1. Relating Science to Technology, Society, and the Environment: analyse effects of human activity on climate change, and effects of climate change on living things and natural systems
- D2. Developing Skills of Investigation and Communication: investigate various natural and human factors that have an impact on climate change and global warming
- D3. Understanding Basic Concepts: demonstrate an understanding of various natural and human factors that contribute to climate change and global warming