Lesson Plan: Landfill Mining – Blackstock Landfill, Grade 11 Environmental Science (SVN3M)

Introduction

In the past, historic landfills were used as a means of final disposal for much of the waste we produce at home. This waste must continue to be monitored and managed long after the sites are closed. Waste management practices in Durham Region have evolved over the years. Students will explore the use of historic landfills and the importance of monitoring and managing these sites to mitigate potential environmental and human health impacts of waste. Students will demonstrate their knowledge through writing a report to Regional Council.

Learning Objectives

1. Demonstrate and understanding of historic landfills and landfill mining
2. Make connections between historic landfills and potential environmental and human health impacts
3. Access how waste management has evolved over time
4. Develop skills related to both inquiry and research through report writing

Resources Provided (located in the resource folder)

- Durham Owned Landfills Map
- Blackstock Landfill Mining Video

Questions

1. What is a historic landfill and what are the potential environmental effects of these sites?
2. Who is responsible for managing the Region's historic landfills and where are they located?
3. How are potential environmental and human health impacts monitored?
4. Who oversees landfill management beyond the Region?
5. What is landfill mining?
6. How does landfill mining recover resources?
7. What happens to waste materials in the ground vs what happens when they are recovered?

Activity

In the past, historic landfills were used as a means of final disposal for much of the waste we produce at home. In this activity, students are now members of the Region's Waste Management department. They have been asked to prepare a report to Regional Council the outlining how waste management has evolved from everything goes into the garbage, to the diversion programs we have in place today and the benefits of using landfill mining as a remediation tool.

Students will use the following template to complete their reports:

Student Name: (student name)

Date: (submission date)
Subject: (report title)
Recommendation: Receive for information

1. Purpose: (Why the report being submitted)
2. Background
    - How waste was managed in the past including a brief description of historic landfills
    - Why it is important to manage these sites today including:
        - A description of the potential environmental and human health effects of historic landfills
        - How might historic landfills influence climate change
3. Residential Solid Waste Management
    - How has waste management changed since the use of historic landfills in Durham Region?
    - What programs are in place to divert waste from final disposal options?
    - What are some of the environmental and economic benefits of waste diversion?
    - Where does the Region's garbage go today and what are the benefits?
4. Landfill Management
    - How Durham Region's landfills monitored and managed
    - How can landfill mining be used to mitigate potential environmental and human health effects of historic landfills?
    - What are the benefits of using landfill mining as a remediation tool?
5. Conclusion

Summary

Waste management is a growing and dynamic industry. Over time, how we manage waste has changed. Waste needs to be managed responsibly to protect the environment and human health. It is important to remember that how we choose to manage waste today impacts the future.

Curriculum Connections Expanded

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

Environmental Science, Grade 11, University/College Preparation (SVN3M)

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)
- A2. Career Exploration: identify and describe careers related to the fields of science under study, and describe the contributions of scientists, including Canadians, to those fields

B. Scientific Solutions to Contemporary Environmental Challenges

- B1. Relating Science to Technology, Society, and the Environment: analyse social and economic issues related to an environmental challenge, and how societal needs influence scientific endeavours related to the environment
- B2. Developing Skills of Investigation and Communication: investigate a range of perspectives that have contributed to scientific knowledge about the environment, and how scientific knowledge and procedures are applied to address contemporary environmental problems
- B3. Understanding Basic Concepts: demonstrate an understanding of major contemporary environmental challenges and how we acquire knowledge about them

C. Human Health and The Environment

- C1. Relating Science to Technology, Society, and the Environment: analyse initiatives, both governmental and non-governmental, that are intended to reduce the impact of environmental factors on human health
- C2. Developing Skills of Investigation and Communication: investigate environmental factors that can affect human health, and analyse related data
- C3. Understanding Basic Concepts: demonstrate an understanding of various environmental factors that can affect human health and explain how the impact of these factors can be reduced

E. Reducing and Managing Waste

- E1. Relating Science to Technology, Society, and the Environment: analyse economic, political, and environmental considerations affecting waste management strategies
- E2. Developing Skills of Investigation and Communication: investigate the effectiveness of various waste management practices
- E3. Understanding Basic Concepts: demonstrate an understanding of the nature and types of waste and strategies for its management

F. Conservation of Energy

- F1. Relating Science to Technology, Society, and the Environment: assess the impact on society and the environment of the use of various renewable and non-renewable energy sources, and propose a plan to reduce energy consumption
- F3. Understanding Basic Concepts: demonstrate an understanding of energy production, consumption, and conservation with respect to a variety of renewable and non-renewable sources