Grade 10 and 11: WHERE'S THE WASTE?

Students explore various aspects of waste management by developing a plan to reduce, collect and dispose of the types of waste produced by their community.

CURRICULUM CONNECTIONS

Related Outcomes

This lesson will contribute to the student's ability to

- identify and describe science and technology based careers related to the science they are studying;
- work as a member of a team in assessing and addressing problems;
- propose a course of action on social issues related to science and technology, taking into account human and environmental needs and sustainability.

Related Coursework

This lesson works well in classes studying

- careers related to biology, chemistry, math, computers, social studies, and geography;
- decomposition, carbon cycle, or biodiversity;
- public policy, public health, and community planning;
- pollution, waste, and sustainability.

PREPARATION

Learning Objectives

During this lesson, students will

- identify and categorize examples of household and school-based waste as either recyclable, hazardous, scrap, or residual;
- explain the impact of waste and various waste management methods on the community and environment by discussing the EnviroConcern, Waste Management;
- assess their community's waste management system in terms of its approach to reducing, collecting, and disposing of the types of waste the class identified in their homework;
- propose a waste management plan for reducing, collecting, and disposing of their assigned category of waste in their community;
- incorporate the skills and expertise of various environmental occupations into their proposed plans;
- describe, orally or in writing, how the skills of various environmental occupations apply to the development and implementation of a waste management system.

Total Time 145 minutes, excluding in the optional class presentations

**The initial homework assignment should be assigned at least one day before the lesson.*

Material Required

- Copies of the EnviroConcern, Waste Management. Print an original from My EnviroConcerns in the Select-A-Career section of the Aboriginal EnviroCareers website/CD-ROM (one per student)
- Copies of the EnviroCareers listed in Waste Management (one package for each of the 4 groups)
- Overhead or chalkboard
- Computers with Internet access (one per group)—optional
- Various school staff willing to be interviewed about the types of waste they dispose of in the school

DELIVERY

TIME	PROCESS	TEACHER'S NOTES
Day One 10 minutes	1. **Introduction: Exploring the Categories of Waste** *(Homework and Discussion)*	
Day Two 40 minutes	1.1 Explain the homework assignment to be completed for the next class: "Make a list of the garbage or potential waste items (i.e. items that will eventually be disposed of) in and around your home. Categorize your items as either recyclable, hazardous, scrap or residual waste."	
	1.2 Distribute the EnviroConcern Waste Management. Explain: "Waste management refers to the way in which a community deals with the types of waste it produces."	
	1.3 Read the EnviroConcern aloud. Discuss the following questions a. Why is waste management such a big issue today? b. What's the difference between a dump and a landfill? c. How can waste affect the environment? People in a community? d. What are the key things a waste management system should do?	
	1.4 Write the following headings on the board or overhead a. Reduce b. Collect c. Dispose	
	1.5 Debrief the homework activity asking students to a. Share items from their waste lists and identify each item as recyclable, hazardous, scrap or residual waste. b. Describe how the community's waste management system currently handles each item. Record their responses on the board under the correct heading. Direct students to record a copy of the list in their notebooks. Continue exercise until students have generated 10-15 items.	1.1 If required, explain each category • recyclable and compostable waste—can be reprocessed and remade into other items or re-used, e.g. aluminium cans, grass clippings; • hazardous waste—contains corrosive, toxic, ignitable, or reactive ingredients and requires special handling to protect human health and the environment, e.g. cleaning products, paints, oil; • scrap waste—consists of everyday "big-ticket" items such as furniture and appliances or building materials which may have value as scrap or can be re-used; • residual waste—consists of solid waste that doesn't fit into the other categories, so generally is disposed of, such as non-recyclable packaging. Alternatively, research how your municipality categorizes waste and adjust the activity accordingly.
75 minutes	2. **Main Activity: Developing a Waste Management System** *(Interview, Inquiry, and Problem Solving)*	1.3.c If necessary, ask leading questions to help students infer reduce waste, collect waste, and dispose of waste from the last paragraph of the EnviroConcern.
	2.1 Introduce the main activity: "In a small group, you will identify as many examples of your assigned waste category as possible that is produced by our school. You will develop a waste management solution for dealing with this waste. Solutions must incorporate the expertise and skills of at least three related EnviroCareers."	2.1 Students should review each of the EnviroCareers provided to identify potential strategies, considerations, and/or additional information for their systems. For example, the EnviroCareer waste management director explains that some big waste items like refrigerators contain hazardous waste as well. Students might use this information to create
	2.2 Divide the class into four groups of four to six students each. Assign one of the four waste categories, recyclable, hazardous, scrap or residual, to each group.	
	2.3 Explain the following procedure	

a. Each group has 10 minutes to identify as many examples of their type of waste in the school as possible by interviewing key school personnel and examining garbage and the types of products used in the school.
- Groups should break up to complete each part of the investigation.
- One group member should remain behind to begin researching the EnviroCareers and/or waste management methods using the Internet.
- Groups should record their findings as they go.

b. Groups return to the classroom to review each member's findings and conduct further research. Groups also review the EnviroCareers provided to identify considerations and strategies to incorporate into their systems.

c. Groups have 50 minutes to develop a waste management system for their type of waste. Their systems must involve methods for
- reducing the amount of waste created;
- collecting the waste produced;
- properly disposing of waste collected.

d. Each group has 10 minutes to present their systems to the entire class. Presentations must explain how the group applied the expertise and skills of the related EnviroCareers. (optional)

2.4 Distribute copies of the EnviroCareers to each group.

2.5 Facilitate the activity.

40 minutes (optional)

3. **Closure and Evaluation: Drawing Conclusions**
(Presentation, Discussion and Homework)

20 minutes

3.1 Invite each group to report their findings to the class.

3.2 Debrief the activity by discussing the following questions
a. Which EnviroCareers most influenced your system? In what way?
b. How much do you think it would cost to implement your system?

Homework

c. What part of your system would you most like to see the community implement? Why?
c. What impact do you think your system would have on the community and the environment?

3.3 Assign homework: "Using the Aboriginal EnviroCareers website or the EnviroCareers provided, identify at least five environmental practitioners your group would need to hire to implement its waste management system. Explain how each a specialized strategy for handling waste falling into one or more waste categories.

2.3.a Inform school staff that students will be investigating the types of waste produced in the school. Ask relevant staff if students can visit their classes or offices briefly to ask questions about the items they throw out.

2.3.b If students require additional research, suggest the following resources
- Sustaining the Environment and Resources for Canadians website: www.environmentandresources.gc.ca
- The Green Lane, Environment Canada website: www.ec.gc.ca
- First Nation Approaches to Waste Management, First Nations Emergency Services Society website: www.fness.bc.ca

2.3.d If preferred, have groups submit a polished version of their solutions as a written assignment instead of presenting their solutions orally.

Evaluation Considerations
Use a standard group project or teamwork rubric.

As well, be sure to evaluate students' abilities to
- distinguish between different types of waste and their impacts on the environment;
- explain how various EnviroCareers apply to the development and implementation of a waste management system;
- explain the impact of various waste management methods on the environment and the community.

practitioner would contribute to the plan."

3.4 Optional: Expand this lesson into a class project. As a class, analyze each group's proposed system based on the viability, economics, and sustainability of its strategies. Taking into account the human, economic, and environmental characteristics of the community, select strategies from each group's systems to create an integrated waste management system. Include strategies for all four waste categories.

3.3 Discuss students' homework responses in a subsequent class ror review individually.

SUGGESTIONS FOR ADAPTATION

- For Grade 12, have students do an in-depth analysis of the strengths and weaknesses of specific waste management techniques such as landfills, dumps, various methods of managing hazardous chemical waste, incineration, and other energy producing methods.