CAREER PATHS

Virginia Evans
Jenny Dooley
Kenneth Rodgers

ENVIRONMENTAL ENGINEERING

Express Publishing

Table of Contents

Book 1

Book 2

Book 3

10 Waste Management 1

WASTE MANAGEMENT
The Good and the Bad

Waste management is critical for human and environmental health. Without proper waste management, people would just throw garbage in **open dumps**. Fortunately, many places have better ways to handle waste. However, even the best facilities face challenges.

Liquid **hazardous** waste is often stored in **surface impoundments**. However, these can leak and contaminate groundwater. Fumes may also add to air pollution. A better solution is **deep-well disposal**. This method is permanent and environmentally sound if managed properly.

Solid waste landfills are sites that handle municipal and **industrial solid waste**. A **composite liner** is placed under the landfill. The intention is to prevent water pollution. However, environmental agencies suggest that this is only a temporary barrier. On top of the liners is a series of **cells** which have **daily cover** over them. **Lifts** lead to multiple layers of cells.

Solid waste landfills are extremely common. But they are not without problems. Many of them have reached or are close to **disposal capacity**. As the population grows, this will become a bigger problem. In addition, landfills release flammable **toxic** gases as waste **decomposes**. **Methane recovery** can be accomplished with a series of pipes that suck the gas out. Meanwhile, underground **carbon storage** can prevent CO_2 from entering the atmosphere.

WASTE MANAGEMENT

Get ready!

1 Before you read the passage, talk about these questions.

1 Why is waste management important?
2 How do solid waste landfills handle waste?

Reading

2 Read the magazine article. Then, choose the correct answers.

1 What is the purpose of the article?
- **A** to compare types of waste management facilities
- **B** to describe waste management problems and solutions
- **C** to explain how solid waste landfills are created
- **D** to highlight the harmful effects of open dumps

2 What can be inferred about solid waste landfills?
- **A** They can be difficult to operate.
- **B** They often have hazardous liquids.
- **C** They may eventually pollute water.
- **D** They have too many cell layers.

3 Which of the following is NOT a problem with waste facilities?
- **A** They are quickly filling up.
- **B** They emit hazardous gases.
- **C** They are not compacted well.
- **D** They can catch fire.

Vocabulary

3 Match the words or phrases (1-8) with the definitions (A-H).

1 __ toxic
2 __ cell
3 __ lift
4 __ carbon storage
5 __ composite liner
6 __ methane recovery
7 __ disposal capacity
8 __ surface impoundment

- **A** the collection of a gas so that it can be used for another purpose
- **B** an area of compacted waste
- **C** a hole that holds liquid waste
- **D** a synthetic material placed over compacted soil
- **E** poisonous
- **F** the largest amount of waste a facility can hold
- **G** a layer put over cells when they are full
- **H** the capture and storage of CO_2 so that it doesn't pollute the atmosphere

4 **Choose the sentence that uses the underlined part correctly.**

1 Injecting liquid into underground rock is one way to get rid of waste permanently.
_ _ _ p - _ e _ _ _ _ s p _ _ a _

2 The manufacturing process creates a lot of garbage from industrial facilities.
_ _ d u _ _ _ _ a _ s _ _ _ d _ a _ _ _

3 Many poor countries have lots of large, unregulated areas where people throw trash.
_ _ e _ _ u _ _ s

4 Methane is an extremely dangerous greenhouse gas.
_ _ _ a r _ _ _ s

5 Some items in landfills may never break down.
_ _ c _ _ _ o _ _

6 The layer of soil put over cells prevents the wind from blowing waste around.
d _ _ _ _ _ o _ _ r

7 Most of the city's waste goes to a(n) place where waste is dumped and buried.
_ o _ _ _ _ _ s _ _ l _ _ _ _ _ l _

5 **Listen and read the magazine article again. What are some ways to manage hazardous liquid waste?**

Listening

6 **Listen to a conversation between an environmental engineer and a city planner. Mark the following statements as true (T) or false (F).**

1 __ The city's solid waste landfill already has a methane recovery system.

2 __ The landfill's daily covers keep garbage in place and control odors.

3 __ The engineer will make plans for a carbon storage system.

7 **Listen again and complete the conversation.**

Engineer: Okay. I think that a system for **1** _____ _____ would be very beneficial.

City Planner: I was under the **2** _____ that we had a system to do that.

Engineer: No, not **3** _____ _____ _____.

City Planner: I can't believe that. What safety features do we have in place?

Engineer: There's an impermeable **4** _____ _____ to protect the groundwater supply.

City Planner: Okay, but that's pretty standard with solid waste landfills. What else do we have?

Engineer: There's a system of applying **5** _____ _____.

City Planner: I'm not **6** _____ with that.

Speaking

8 **With a partner, act out the roles below based on Task 7. Then, switch roles.**

USE LANGUAGE SUCH AS:

I was under the impression that ...

Yes, that's right./No, not at this time.

Let's get going on ...

Student A: You are an environmental engineer. Talk to Student B about:

- what waste disposal methods your city currently uses
- what safety features the facilities have

Student B: You are a city planner. Talk to Student A about your city's waste management methods.

Writing

9 **Use the magazine article and the conversation from Task 8 to complete an informational flyer about your city's waste management programs. Include: the methods the city uses, their benefits, and their safety features.**