Lesson 1: Landfill Reading and Problem Solving: EOG Review Activities

Grade Level:
3-5

Concepts Taught:
conservation of resources, interacting with expository text, problem solving, computation

Activity Time(s):
15 minutes (lesson); 30 minutes (follow-up)

Essential Questions:
- How does recycling help us?
- What items are recycled the most?
- What is the difference between a dump and a landfill?

NC CORE/Essential Standards:
Grade 3: ELA: Std 4, 5; Key Ideas & Details 2, 3; Integration of Knowledge 7, 8; Writing Std 4, 8; Speaking/Listening 1; Math 3.NBT.1, 3.OA.5, ; Soc Std 3.G.1.3; Science 3.L.2.4
Grade 4: ELA: Key Ideas & Details 1, 2; Range of Reading Level Std 10; Writing Std 2; Craft & Structure 5; Writing 5; Speaking/ Listening 1, 2, 3, 3.05; Math 4.OA.1, 4.OA.2, 4.NBT.4, 4.OA.3; Soc Std 4.G.1.2, 4.G.1.3; Science 4.L.1.3
Grade 5: ELA: Key Ideas & Details 1; Math 5.NBT.5, 5NBT.6, 5.MD.1; Soc Std 5.G.1.2

Objectives:
- Students will utilize reading comprehension skills to read selected articles about solid waste topics and answer multiple -choice format questions.
- Students will utilize various computational skills to solve mathematical word problems.

Materials:
transparency of recycling article and questions
article about landfills and corresponding questions (included), landfill word problems and answer key (included)

Part One: Reading Comprehension
1. Explain that reading expository text allows us to gain information about factual topics. Have students name expository topics they have read about before. Tell students that they will be reading an expository article about landfills and will be answering some questions about the article.
2. Display a transparency of the recycling article below entitled "Exhibit 3-Introduction to Recycling" and read it aloud.
3. Have students identify unfamiliar words and clarify their meanings. Answer corresponding questions as a group and discuss whether each answer is found within the text or through making an inference from the text.
4. Students should read the article about landfills and answer the corresponding questions. You may wish to review students' responses to these tasks as a whole group or to review each student's work individually.

Part Two: Math Problem Solving
1. Explain that problem solving allows us to find solutions to unknown problems.
2. Explain how mathematical operations help us find solutions. Have students tell what mathematical operations they are familiar with and tell when those operations would be used.

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3. Make a list of key words that indicate the use of certain operations (i.e. altogether means add, find the difference means subtract, etc.).
5. Students use mathematical operations to solve the word problems on the sheet included in this packet.

EXHIBIT 3—INTRODUCTION TO RECYCLING

WHAT IS RECYCLING?

Recycling means to use something again. Old newspapers are used to make new newspapers. Old aluminum cans are used to make new aluminum cans. Old glass jars are used to make new glass jars. There are many reasons why recycling makes sense.

Recycling Saves Landfill Space.

Americans make more trash each year. Most of the trash is buried in landfills. Recycling is one way to reduce the amount of trash that is buried.

Recycling Saves Money.

Getting rid of trash isn't free. Garbage trucks must pay to dump their loads at landfills. Recycling reduces landfill costs because less waste is buried.

Recycling Saves Energy.

It almost always takes less energy to make a product from recycled materials than it does to make it from new materials. Recycling aluminum cans, for example, uses 95 percent less energy than making aluminum cans from new materials.

One exception to the rule is plastics. Sometimes it takes more energy to recycle plastics than it does to use new materials.

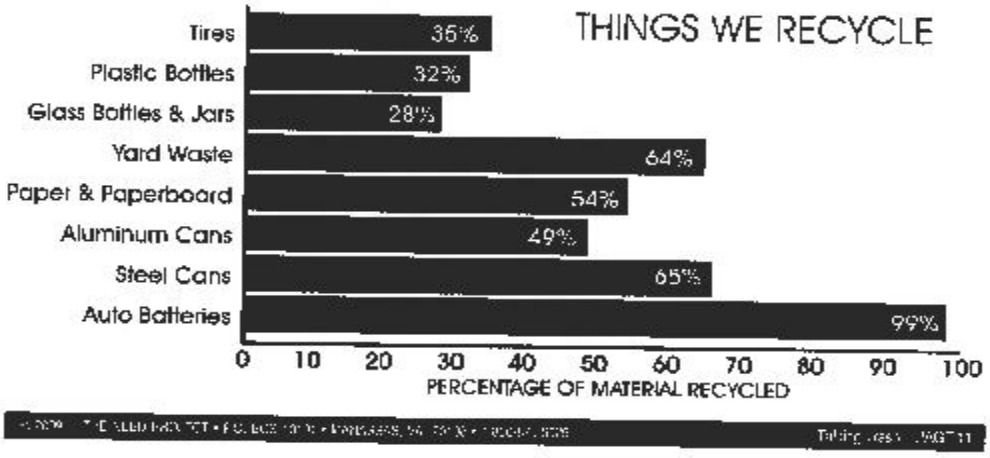
Recycling Saves Natural Resources.

Natural resources are valuable. Natural resources include land, plants, minerals, and water. By using materials more than once, we conserve natural resources.

In the case of paper, recycling saves trees, water, and energy. Making a ton of paper from recycled paper saves up to 17 trees and uses 50 percent less water.

Recycling Reduces Air and Water Pollution.

Using old cans instead of raw materials to make new aluminum cans reduces air and water pollution by 95 percent.



Source: NEED Book Talking Trash p11
http://www.need.org/needpdf/Talking%20Trash.pdf

Comprehension Questions for "Introduction to Recycling"

Respond to the following questions based on what you read in the article.

1. What does it mean to recycle?

a. to throw things in a trash can

b. to use something again

c. to grow something to place items in a recycling bin

2. Why is it important to recycle?

a. It saves landfill space.

b. It saves natural resources.

c. It saves money.

d. All of the above statements are true.

3. Which item has the highest percentage of material recycled?

a. glass bottles and jars

b. aluminum cans

c. auto batteries, paper and paperboard

4. Which material sometimes uses more energy to recycle?

a. paper

b. plastic

c. Glass

d. aluminum

5. Recycling does not:

a. create energy

b. save energy

c. save money

d. save landfill space

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Answers- Comprehension Questions for "Introduction to Recycling"

1. b., answer found within text
2. d., answer found within text
3. c., answer found within text
4. b., answer found within text
5. a., inference from reading text
6. a, inference from reading text

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EXHIBIT 8—LANDFILLS: BURYING TRASH

YESTERDAY AND TODAY

For hundreds of years, people used dumps to get rid of their trash. The dump was just a pit or field outside of town where people left their trash.

People tossed all sorts of waste into these dumps. The dumps were breeding grounds for flies, mosquitoes, and rats. Rainwater washed filthy, and sometimes poisonous, liquids from the dump into streams and groundwater supplies that people used for drinking, bathing, and clothes washing.

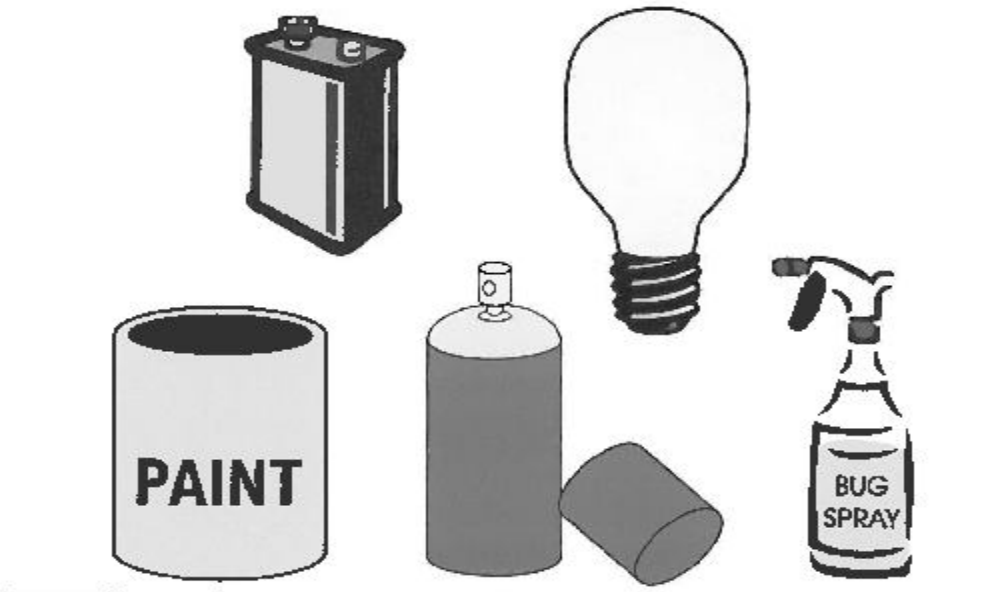
Today, we still bury our trash, but not in the open dumps of yesterday. About 55 percent of our garbage is hauled off in garbage trucks and put into landfills. Landfills are America's number one way of getting rid of trash.

Building new landfills is hard because people don't want trash buried near them. It is expensive, too. A new landfill costs about $10 million to build.

There will always be a need for landfills. Why? Because not all waste can be recycled or burned. How do you recycle a broken light bulb, and why burn it if it doesn't provide any energy?

Landfill burial is the only good way to dispose of some types of waste. Sometimes it's the safest way, too. The best way of taking care of some dangerous wastes—small batteries, paints, pesticides, and lightbulbs, to name a few—are landfills. The landfills are made to keep dangerous wastes from seeping into underground water supplies.

Some wastes with harmful chemicals, such as paints, should be taken to special facilities for disposal rather than placed in regular trash containers.



Source: NEED Book Talking Trash p21
http://www.need.org/needpdf/Talking%20Trash.pdf

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A MODERN LANDFILL

Today's landfills are very different from the dumps of the past. The landfills are lined with layers of clay or plastic to keep any liquid waste from escaping into the soil.

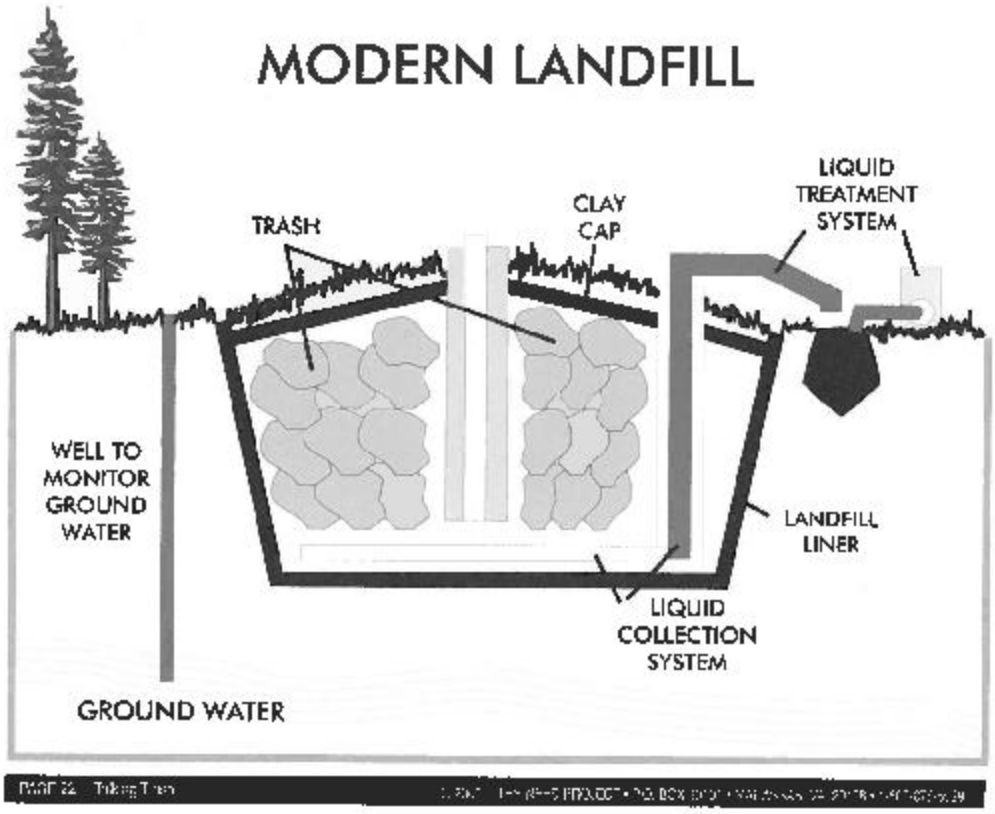
A network of drains collects the liquid and pumps it to the surface where it can be treated. Wells are drilled around the landfill to check the groundwater and make sure it is clean.

At the end of each day, workers spread a layer of earth—called the daily cover—over the trash to reduce odor and control pests. The workers seal each section of the landfill when it is full with another layer of clay and earth.

A FULL LANDFILL

When an entire landfill is full, workers seal the whole landfill with a final cover of clay and dirt, and then seed the area with native grasses. Workers continue to check the wells for years after a landfill is closed to make sure nothing is leaking into the water.

Closed landfills can be turned into parks, parking lots, golf courses, and ski slopes. Building homes and businesses on landfills isn't allowed, though, since it can take many years for the ground to settle.



Source: NEED Book Talking Trash p22
http://www.need.org/needpdf/Talking%20Trash.pdf

Comprehension Questions for "Landfills: Burying Trash"

Respond to the following questions based on what you read in the article.

1. What is a dump?

a. a landfill
b. a trash container
c. a pit outside of town where people leave trash
d. a store where people sell their trash

2. Why are landfills important?

a. because they hold trash that cannot be recycled or burned
b. because they are easy to build
c. because they are inexpensive to build because they have been around for many years

3. Which of the following describes one reason why building landfills is hard?

a. Landfills take up small amounts of land.
b. It takes a lot of people to build a landfill.
c. People want to live near landfills.
d. Landfills are expensive to build.

4. Which of the following is true of both landfills and dumps?

a. They have both been around for hundreds of years.
b. They both are designed around the idea of burying trash.
c. They both keep groundwater clean.
d. They both cost $10 million to build.

5. Landfills are NOT:

a. America's number one way of getting rid of trash
b. safe
c. Expensive

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d. open holes in the earth for dumping trash

6. Landfills of today are different than those of the past because:

a. They are bigger.

b. They have clay or plastic liners.

c. They are deeper.

d. They have water inside them.

7. According to the picture in the article, what is the purpose of clay when constructing a landfill?

a. to provide a foundation for the landfill

b. to hold the trash together

c. to provide a cap over the landfill when it is full

d. to make sure enough water seeps into the landfill

8. **What devices are used to check that groundwater is kept clean?**

a. flares

b. liners

c. daily covers

d. wells

9. Which of the following is NOT a purpose of the daily cover?

a. to reduce odor

b. to control pests

c. to keep the trash in the landfill dry

d. to get rid of unwanted soil

10. The main idea of this article is:

a. Landfills are important in keeping our environment clean and safe.

b. Landfills have been around for hundreds of years.

c. Landfills can be turned into parks when they are full.

d. Landfills are easy and inexpensive to build.

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Answers-Comprehension Questions for “Landfills: Burying Trash”

1. b.
2. a.
3. d.
4. b.
5. d.
6. b.
7. c.
8. d.
9. d.
10. a.

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Problem Solving

1. Many pieces of trash are taken to the landfill each day. On a recent visit to the landfill, David threw away 30 pieces of trash, Susan threw away 20 pieces, Sarah threw away 25 and Jane threw away the most at 50. **How many pieces of trash did Susan, Sarah and Jane throw away?**

2. Trash cans are used to hold trash until the garbage can be put in a truck and taken to the landfill. Janet wants to buy a trashcan that costs $50. She has $25 already and wants to save the rest in equal amounts for five weeks so she can buy it just in time for school to start. **How much must she save each week to buy the trashcan?**

3. Every second, one person comes to the Anytown Landfill. How many people come to the landfill in a **minute**? How many people come to the landfill in an **hour**?

4. Mary has some aluminum soda cans to recycle. Joan has 3 times as many. Mary already recycled 14 soda cans and now has half that many left. **How many aluminum soda cans does Joan have to recycle?**

5. Trucks deliver trash to the Anytown Landfill each day. The first trash truck delivered its load on August 20 followed by the hundredth trash truck on September 5. (There are 31 days in the month of August). **How many days later did the hundredth trash truck come to the landfill?**

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6. Most of the trash that is delivered to the Anytown Landfill is taken there by truck. Sue takes one pick-up truck load of trash to the landfill each day. About how many truck loads of trash would Sue take to the landfill in two weeks?

7. An exciting way to learn more about the landfill is by taking a landfill tour. There are 24 seats on a large school bus that will carry students on a tour of the landfill. If three students occupy each seat, how many students can the bus carry?

8. A couch is an example of an item that cannot be recycled. A couch manufacturer has some couches he wants to throw away. He has sixty-five couches and can only take 5 couches to the Anytowm Landfill at a time. How many trips to the landfill will the couch manufacturer make?

9. It costs $39.00 a ton for a business to get rid of trash at the Anytown Landfill. Power On has one ton of trash to throw away. How much change would Power On receive if they threw away one ton of trash at the landfill and paid with a fifty-dollar bill?

10. The landfill in Anytown, USA opened in January of 1982 and will close in December of 2007. How many years will the town landfill have been open?

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Answers to Word Problems:

1. 20 + 25 + 50 = 95

2. $50 - $25 = $25; $25/5 = $5

3. minute: 60 x 1 = 60 people
   hour: 60 sec. x 60 min. = 3600 sec. x 1 = 3600 people

4. Mary: 14 – 7 = 7; Joan 3x 7 = 21

5. August has 31 days, therefore 16 days would pass between Aug. 20 and Sept. 5

6. 7 pick-up truck loads (b/c there are 7 days in a week) x 2 weeks = 14 pick-up truck loads of trash total

7. 24 seats/3people per seat = 72 people

8. 65/5 = 13

9. $50.00 - $39.00 = $11.00

10. 2007 – 1982 = 25 years

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