



Lesson Plan 110106

Talkin' Trash (All About Landfills)

(Target: Grades 1-3)

Time Requirements:

45-50 minutes during science or art time

Objectives:

1. Create awareness for the types of waste we create and the options for its disposal
2. Stimulate critical thinking about choices we make for consumer products and support of our overall lifestyle
3. Challenge students to be mindful of the short and long term effects of the waste stream generated by the human race

Materials:

1. "Talkin' Trash Sorting Game" pieces and signs (included with this lesson)
2. 4 Shoe Boxes for use as Sorting Game repositories
2. Crayons, markers and scissors
3. "Talkin' Trash" Activity Page and Lesson Information Page (included with this lesson)

Methods:

1. (15 minutes) Distribute "Talkin' Trash" Lesson Information and Activity Pages to students. Read aloud the information in the lesson handout.
2. (10 minutes) Ask the students to complete the Activity Page.
3. (20 minutes) "Talkin' Trash" Sorting Game. Have students color and cut out trash items. Follow game instructions (included in this lesson plan).

Lesson Info: Talkin' Trash (All About Landfills)

1. What exactly is a landfill?

A landfill is a specially designed facility for the burial of municipal solid waste. In the past, landfills were poorly designed, poorly managed garbage dumps that created ongoing environmental problems as chemicals leached into the soil and air. Today's landfills are designed in such a way that leachates cannot leak down through the soil into the water table. This is accomplished by a layer of clay-like soil at the bottom of the landfill. The next layer up is a synthetic lining, usually made of plastic. All remaining layers alternate between soil and garbage.

2. How much of our trash is disposed of in landfills?

As of 1996, approximately 55% of all the United States' garbage resides in landfills, while 17% is incinerated, and 28% is recycled. The 28% that is recycled is greater than the EPA's initial goal of 25% recycling.

(Source: US EPA, Office of Solid Waste)

3. How does the trash in a landfill decompose?

There are three classes of bacteria and fungi that work to degrade garbage. Cellulolytic microbes initiate the process by breaking down the cellulose in paper, wood, and other

plant wastes. Then acidogens ferment these sugars into acids, which methanogens then convert into methane gas and carbon dioxide.

4. What types of materials are put in landfills?

Municipal solid waste landfills are filled with everything we throw away, from glass bottles to grass clippings and other yard wastes. The latter constitutes nearly 20% of all garbage landfilled. Disposable and non-durable products are major culprits in the growth of waste. In just one day, Americans throw away 150,000 tons of packaging material. This would fill 10,000 tractor trailer trucks, which would stretch 120 miles end to end. (Source: Garbage magazine)

5. What are the three main problems or environmental concerns associated with landfills?

Methane Gas, **leachate**, and **loose waste** are the three main challenges for landfills today. **Methane gas** is produced in a landfill by anaerobic decomposition. It can be collected using current technology and then used to generate electricity, or it can be purified and used as a power-generating fuel.

Leachate is a thick liquid that forms when garbage decomposes. At its best, it is similar to very strong sewage water; at its worst, it carries hazardous materials with it that were dissolved from the waste. Newer landfills have synthetic liners above a clay-like soil that help to prevent the leachate from leaking into the groundwater, causing contamination. Older landfills do not utilize this type of liner, and are therefore a threat to our groundwater—especially to nearby neighborhoods.

Loose waste is another problem. It attracts disease carrying vermin of all types, and it can fly away in the breeze. At the end of every working day, a "daily cover" must be applied to minimize these problems. Once the landfill stops accepting waste, a final multi-layer cover must be applied to keep liquids away from the waste. Vegetation is then planted to reduce the effects of erosion.

6. Are there products in my house that should not be sent to a landfill?

Many of the products we use in our homes are considered hazardous materials. A hazardous material is one that is toxic or will corrode metal, burn, or explode. Materials like oven cleaner, batteries, motor oil, paints, varnishes, thinners, fluorescent bulbs, mercury switches, etc., should not be sent to landfills because they are considered hazardous. These materials should be taken to a hazardous waste drop-off site. If every citizen convinces him or herself that "my hazardous materials are so small they won't matter," the total problem remains enormous.

- Compost yard and organic wastes. Use them as nutrients for other plants.
- Mulch leaves and grass clippings.
- Buy recycled paper products and products with less packaging.
- Buy durable products rather than disposable ones.
- Reuse jars and containers.
- Recycle oil and old tires.

Where does our trash go?

Every week the average family takes bags of trash to a dumpster, or rolls trash cans down to the side of the road. Then, some large truck comes along and takes it all away. Once it's gone, most of us stop thinking about our trash and where it has gone. But trash has to end up somewhere. That "somewhere" is a place called a landfill.

What is a Landfill?

A landfill is a very large area of open land that has been turned into a container for our trash. Large trucks and earth-moving equipment dig a large pit, and then cover the bottom of the pit with a layer of thick, waterproof clay. The clay is covered with soil, and then trash and soil are layered on top of each other, eventually filling up the pit. Once the pit is full, another layer of soil goes on top and then grass is planted to keep the soil from being carried away by the rain.

Is there enough room for all of our trash?

Even though there are millions of acres of land available for landfills, they create as many problems as they solve. First, people don't want to live in neighborhoods or shop at stores that are near to landfills. So most landfills are located in places far away from towns and cities. That means trash trucks have to drive long distances to dump the trash. As our populations grow, the distance between people and landfills get smaller, and at some point we will be living very close to all our trash.

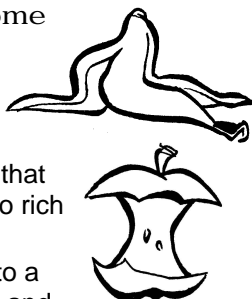
What can we do to reduce our trash?

There are some important steps we can take. First, we can reduce the amount of packaging on products sold at stores. Second, we can pass laws that require companies to use recyclable materials to make products and packaging. Third, we can learn about the different kinds of trash and where to properly dispose of them.

4 Main Types of Trash and What We Do with Them:

1. COMPOST - We can put some types of food scraps into a compost pile

- A compost pile is a place where grass and leaves are piled up or put into a very large container so that bacteria can break them down into rich soil fertilizer.
- Some types of food can be put into a compost pile, including vegetable and fruit scraps and peels, nut shells, coffee grounds, bread and grain scraps.
- By composting these food wastes, we can reduce the amount of trash in garbage trucks, which makes them use less fuel. Also, landfills won't fill up as quickly.



2. RECYCLING - We can sort out some trash and recycle it

- Recycling is one of the best ways to reduce the trash in landfills. We can recycle some types of trash, saving both natural resources and energy.
- Items that can be recycled include glass, aluminum, some types of plastics and most types of paper and cardboard.
- Most communities and trash collection companies now offer recycling options for your family!



3. HAZARDOUS WASTE - Some things are just too dangerous to throw in the trash

- There are many products available at stores that are made with dangerous chemicals such as petroleum and chlorine.
- The items that should go to a hazardous waste center include many kinds of paint, spray paint, paint thinner, solvents and cleaners, batteries, electronics (computers, TVs, mp3 players) and CDs, light bulbs, especially fluorescent tubes, and all sorts of bleaches.
- Communities have Hazardous Waste collection centers where these types of products can be dropped off.



4. TRASH FOR LANDFILLS - For some things, the only option is a landfill

- If it can't be recycled or composted, and if it isn't a hazardous material, it has to go to a landfill.
- Things that go into landfills are old clothes and fabrics, meat, cheese and dairy leftovers, disposable diapers, juice boxes, paper, plastic, and metals that can't be recycled.
- If we can reduce the amount of plastics and paper used in packaging and consumer products, we can reduce our need for landfills.





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ACTIVITY PAGE

MATCHING: Match the types of disposal solutions (A, B, C or D) with the trash items listed below them.

A. Compost Pile

B. Recycling Bins

C. Hazardous Waste

D. Landfill

_____ Disposable Diaper	_____ Plastic Ketchup Bottle	_____ Television Set
_____ Glass Food Jar	_____ Slice of Pizza	_____ Lawn Clippings
_____ Juice or Drink Box	_____ Nail Polish	_____ Bug Spray
_____ Plastic Soda Bottle	_____ Coffee Grounds	_____ Bottle of Bleach
_____ Can of Old Paint	_____ Electronic Robot Toy	_____ Computer
_____ Light Bulb	_____ Old Pair of Jeans	_____ Old Cheese
_____ Watermelon Rind	_____ Empty Milk Jug	_____ Paper Envelope
_____ Car Battery	_____ Paper Plates	_____ Old Tire
_____ Wooden Chair	_____ Apple Core	_____ Glass Soda Bottle
_____ Can of Hair Spray	_____ CD Player	_____ Used Markers
_____ Egg Shells	_____ Newspaper	_____ Old Hamburger
_____ DVD or CD	_____ Can of Spray Paint	_____ Aluminum Foil
_____ Coffee Grounds	_____ Leftover Lettuce	_____ Autumn Leaves
_____ Soda Can	_____ Chicken Bones	_____ Oven Cleaner
_____ Used Motor Oil	_____ Tooth Paste Tube	_____ Cardboard Box

ANSWER THE FOLLOWING QUESTIONS:

1. Why are landfills usually located far away from neighborhoods? _____

2. Why does a far-away landfill require us to use more energy? _____

3. When a landfill is created, what is layered at the very bottom? _____

4. What is one way we can reduce the amount of trash that goes into landfills? _____

5. Name two things that should never be thrown into a regular trash can... _____

GAME INSTRUCTIONS: Find 4 empty shoe boxes and put one of the signs below on the outside of each box. On the following pages, print out the various trash items and then cut them into pieces. Hand each student an item, ask them to color the item, and then have each student bring the item to the shoe box area and make a choice about which place the trash item should go. After all the trash items are in the shoe boxes, go through each box, holding up the item and asking whether it was put into the right place. This exercise will help students understand the various types of trash and give them a better understanding for how our economy, culture and lifestyles create various waste problems.

COMPOST

RECYCLE CENTER



LANDFILL

HAZARDOUS WASTE



