

Lesson 1:

WE ARE ALL TRASHMAKERS

The first step is to understand what trash is and where it goes.
Trash doesn't just go away.

FOLLOWS TEKS:

112.14 Grade 3 Science:

Process: 3.2A, 3.2C, 3.2D; 3.4A

113.14 Grade 3 Social Studies:

3.11A, 3.11C; 3.12A-C

112.15 Grade 4 Science:

Process: 4.2A-C; 4.3A; 4.4; 4.7C

113.15 Grade 4 Social Studies:

4.17B

112.16 Grade 5 Science:

Process: 5.2 A-D, 5.2G; 5.3A; 5.4A

113.16 Grade 5 Social Studies:

5.18A; 5.23B





OBJECTIVE

Students learn about landfills and alternative options to decrease the amount of waste that ends up in them.

ASK STUDENTS

“What did you throw in the trash can last night? This morning?”

Have the class make a list of items and create a graph for a class tally.

“What is thrown away in the classroom?”

Have a few students look in trash cans in the classroom.

“What is thrown away in the cafeteria?”

List all items.

FACTS TO DRIVE THE DISCUSSION

- We throw things away but don't realize where “away” is.
- Waste can be **organic** like paper towels, grass clippings and leaves.
- Waste can be inorganic like metals, glass and plastic.
- In 2015, we produced 262 million tons of waste in the U.S.
- Only 35% of this waste was recycled or composted.
- Each person generates an average of 4.4 lbs of waste each day.
- **Ask students to estimate how much waste would be produced by the class in one year.**
- Most waste is landfilled (52%).
- Taking care of landfills means reducing the liquid that runs out of them (*leachate*) and capturing the methane gas from **decomposition**.
- Landfills also need to have adequate liners and all waste carefully tracked.

WORDS TO KNOW

Renewable

A natural resource that can be used repeatedly because it is replaced naturally (*wood, paper, leather, oxygen*)

Non-renewable

A natural resource that has a limited supply and cannot be replaced based on consumption rates (*petroleum - used in plastic, silver, copper*)

Organic

Derived from living organisms

Decomposition

The process by which organic substances are broken down into simpler matter

Biodegradable

Something that breaks down naturally and turns into soil

ACTIVITY - LANDFILL IN A JAR

Discussion:

Ask the students how long they think these items will “survive” in the landfill. Record predictions on the board from “quickest to decompose” to “last to decompose.” Ask them what evidence they are basing their predictions on (*past experience, stories from others, visits to landfills, knowledge of materials*).

What you will need:

- 6 large glass jars
(*Modification: reuse 2-liter plastic bottles and remove labels*)
- Soil
- Apple peels
- Newspaper clippings
- 1/2 aluminum can
(*Modification: aluminum foil*)
- 1/2 plastic bottle
(*Modification: plastic bag*)
- Pieces of Styrofoam

How to build the landfill:

1. Fill each jar 1/2 full of soil.
2. Place one item of trash in each of the jars.
3. Label jars as to contents.
4. Cover with soil and moisten.
5. Predict what will happen to each item in the jars.
6. Leave lid off and place out of direct sunlight for 4 weeks.
7. Monitor daily and take photos.

THINK ABOUT IT:

Engage students in classroom conversation, or put them into small groups or use as a response for journal entry to continue discussion.

1. How did Day 1 and the final day differ for each item “landfilled”?
2. Which items could be composted?
3. Which items could be recycled?
4. What are consequences if we don’t do enough recycling and composting?
5. Check back on the jars after 3 months and at the end of the school year.
Are there any further changes?
6. If the things we use are not made from recycled materials, where do the materials come from?
7. After learning how much goes into the landfill, what can we do?

Actual lifespans of these items in landfills:

- Apple peels: 2-4 weeks
- Newspaper: 2-4 weeks
- Aluminum can: 200 years
- Plastic bottle: 400 years or more
- Plastic bag: 1,000 years
- Styrofoam: Never decomposes

Adjust the activity: If you prefer to do this activity within one class period, bring samples of items, place them on the tables, and let students predict their decomposition rates and place them in order. You can ask them what evidence they are basing this on (*experiences, stories from others, visits to landfills and knowledge of materials*), then ask students to research this in pairs and report back to the group on one item.

To demonstrate landfill conditions more accurately, lids can be put on the jars. Landfills are often lacking oxygen which slows decomposition even more.

Extension: Great option as a science fair class project. Class can state the problem, form a hypothesis, track their results, and include their conclusion at the end of said project period. Class can form a control group and experimental group – lids vs. no lids, direct sun vs. shaded, watered vs. no water, etc.