

POLLUTION

SECTION 2-TRASH IN YOUR CLASS

From *Hands on Science* by Linda Poore 2003.



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OBJECTIVES

In this activity students expand their study of litter to the problem of trash disposal and our overflowing landfills.

Students will measure the amount of trash produced daily in their classroom.

Students will calculate how long it would take to fill their entire classroom with trash.

Students will explore ways to reduce the amount of trash produced in their classroom.

MATERIALS

- 1 plastic garbage bag
- 1 cardboard box, 2ft x 1ft x 1ft
- 1 Landfill chart
- 1 measuring stick

BACKGROUND INFORMATION

A *landfill* is more than just a hold in the ground for dumping trash. Landfill sites must be carefully chosen and then constantly monitored.

In most sanitary landfills, trash is compacted, spread over a small area, and covered with a layer of dirt. The bottom of the landfill site is lined with plastic or concrete to prevent liquid waste from leaking into the surrounding soil and into the water table.

Even with careful planning, however, landfills can be a source of pollution. Solid particles as well as gas produced in the fill (such as methane) can escape into the air. Chemicals can leak through holes or cracks in the liner and leach into the soil and water table. Most landfills have probes to detect such leaks, and a system of pipes through which the liquid waste is pumped and then treated.

Because landfill space is at a premium, it is increasingly important for each and every one of us to reduce the amount of trash we produce. This activity puts the problem in perspective by demonstrating to students just how much trash they as a class produce and how quickly it accumulates.

GUIDING THE ACTIVITY

1. Begin a discussion by asking, **Where does trash go after it is taken from our homes?**

Some students may suggest the local dump, a larger bin, an incinerator, or even the ocean.

Ask, **What is a landfill?**

Many students may say that a landfill is a big hole filled with trash.

Write the term *landfill* on the board and direct the students' attention to the Landfill chart. Explain that a **landfill** is a waste disposal site especially designed to protect the surrounding land, air, and water from the trash it contains. Point out the synthetic liner and the system of probes, pipes, and pumps that help prevent contamination of the surrounding soil and water table by toxic leakage, as well as the dangerous buildup of methane gas. Point out that methane gas is a by-product of organic decay. This colorless, odorless gas is extremely flammable and must be vented from below the surface of the landfill. It can then be collected and used to generate electricity.

2. Ask, **How much trash do you make each day?**

Students estimates will vary widely. Point out that Americans average approximately four pounds of trash per person, per day. You may wish to tell the students that if all the trash that Americans generated in one day were loaded onto trucks, the line of trucks would stretch from Los Angeles to San Francisco (a distance of about 610 km [380 mi]. If students are interested, tell them that studies have shown that over 80 percent of household waste could be recycled.

Write a few of the students' estimates on the board. Then have the class break into teams of three or four to discuss their estimates.

Tell students that over one-third of all the trash produced in this country consists of paper. Then ask, **What do you think would happen if no one removed the paper trash we produce every day in this classroom? How long do you think it would take to fill this entire room with paper trash?**

3. Explain to the students that they are going to measure how much trash they produce in class each day and then calculate how long it would take them to fill their classroom with trash. Draw a chart on the board (or on a sheet of chart paper) like the one in Figure 201. Tell them that they will record the volume of trash produced every day for the next 10 days.

TRASH PRODUCED	
DAY	VOLUME
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
TOTAL	
AVERAGE DAILY VOLUME=	

- Place a plastic garbage bag near the class wastebasket. At the beginning of the day, instruct students to place all of their paper trash (writing paper, construction paper, newspaper, and so forth) into the plastic bag, and all other nonpaper trash into the class wastebasket.

At the end of the day, choose two student volunteers to measure the volume of paper trash produced by the class that day. Tell them to set the plastic garbage of paper trash into the cardboard box and compact the bag so that it conforms to the shape of the box.

To find the volume of trash, have the students measure the length, width, and height of the trash in the cardboard box and multiply these numbers together (length x width x height). Write the answer on the chart.

When the students have finished measuring, remove the compacted trash from the box and dispose of it properly. Once again, set the now-empty garbage bag next to the class wastebasket for the next day's collection. Repeat this procedure every day for the next nine days.

- At the end of the tenth day, calculate the total volume of trash produced in 10 days. Then divide by 10 to find the average daily volume of trash produced. Fill in these figures on the chart.
- Now invite student volunteers to measure the length, width and height of the classroom. Write the three figures on the card and have the students multiply them together to find the classroom volume.

Next, have the students divide the classroom volume by the average daily volume of trash produced. The result is the number of days it would take the students to fill their classroom with trash.

1. Length x width x height of trash in box = Each day's volume of trash
2. Each day's volume of trash for 10 days = Total volume of trash
3. Total volume of trash \div 10 = Average daily volume of trash
4. Length x width x height of classroom = Classroom volume
5. Classroom volume \div average daily volume of trash = Number of days to fill the classroom with trash

GUIDING THE ACTIVITY

Ask, **What comparison can you make between our classroom and a landfill?**

Try to elicit from students that, like the classroom, landfills fill up with trash quickly too.

Give students a chance to ponder this idea. Then ask, **What could we do to reduce the amount of trash that we, as a class, produce?**

Students may suggest using both sides of a sheet of paper, saving scraps for use in art projects, or even starting their own recycling program if the school does not already have one. Write student suggestions on the board and discuss which of these suggestions they could reasonably follow throughout the year.