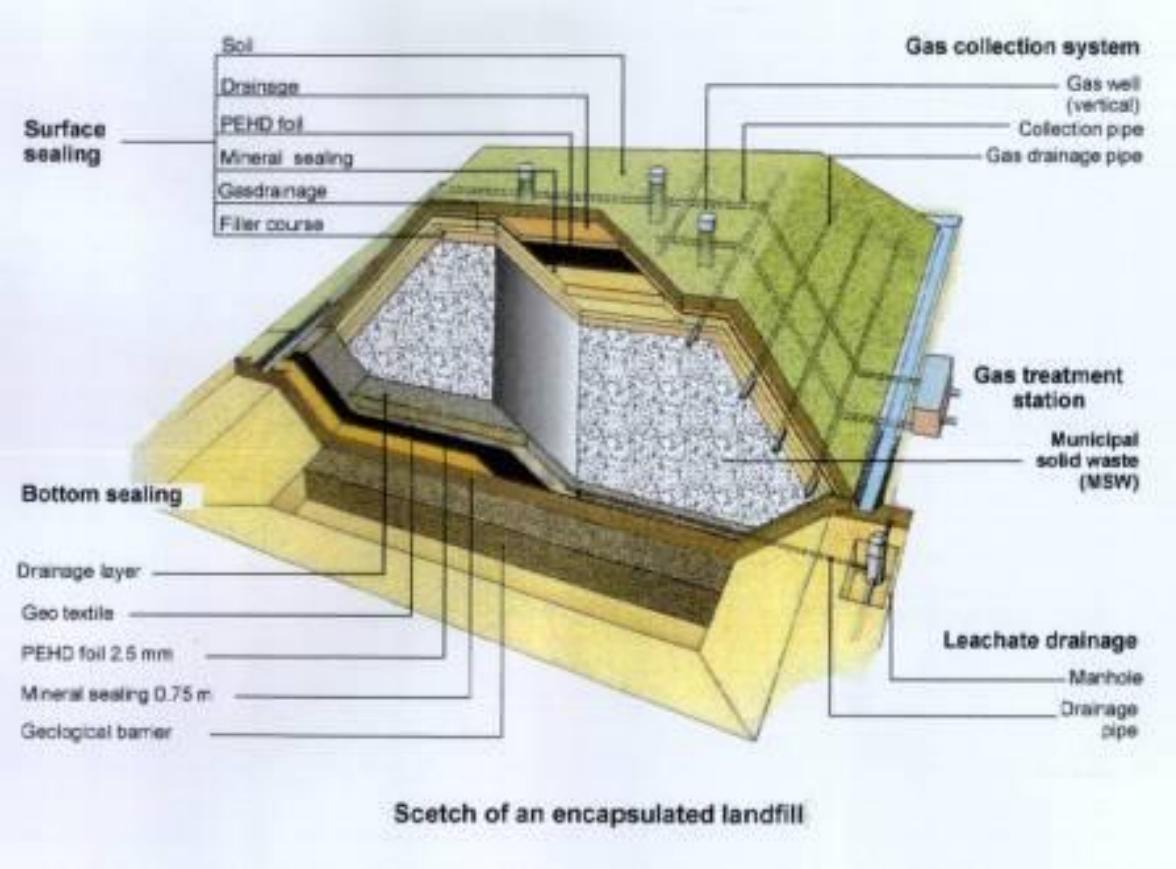
Landfills and Recycling

What happens to the trash we throw out every day? Some trash, such as paper goods, aluminum cans, plastics, and glass are recycled in many communities. The rest go to landfills.

The basic idea of modern landfills is that of a capsule. That is, the waste is separated from the surrounding soil, water and air and liquid gaseous emissions should be kept back. The structure "landfill" has to operate as long as any serious pollution of the environment may be expected.



Scetch of an encapsulated landfill

The capsule and the incorporated structures, such as gas and leachate collection systems, manholes, pipes etc., are subjected to stress in view of various influences:

- mechanical influences such as the load of the waste, movements and settlements
- physical influences such as temperature and moisture.
- bio-chemical influences such as digestion and decomposition processes, and dissolution

These stress factors vary with time and they can hardly be influenced after the waste has been disposed of and compacted.

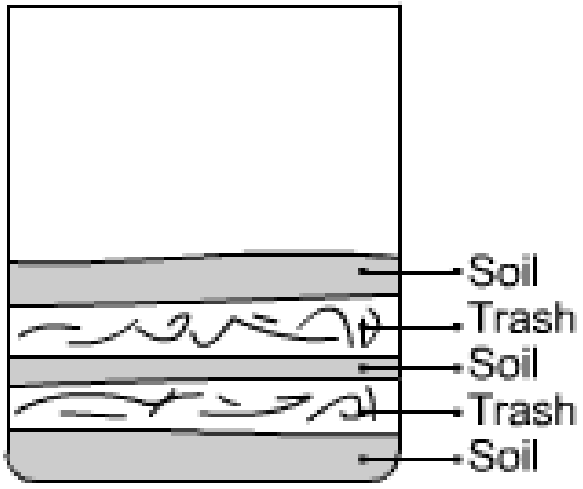
In this investigation, a number of trash items will be buried in a simulated landfill to understand how trash decomposes and to learn the importance of the principles of recycling, reducing waste, and reusing materials.

.**Materials Needed**

A one-gallon milk container with the top cut off
soil – top or garden soil from a garden center and local soil
various trash objects – wood splints, newspaper, copy paper, paper shopping bag, plastic shopping bag, paper coffee cup, foam coffee cup, starch packing peanuts, plastic packing peanuts, aluminum beverage can piece, steel can piece, cotton fabric or string, synthetic fabric or string, fruit peels (e.g., orange, banana, etc.), and other typical trash items.
ruler
water
large spoon, scoop, or small garden shovel
newspaper
Optional: camera or cell phone with camera.

Procedure

1. Assemble the various objects that are to be buried in your landfill. List these on the data pages Avoid a large amount of food wastes to minimize any gases and odors from the mini-landfill. If a camera is available, take a photograph of the objects.
2. Predict which objects will biodegrade or decompose the fastest. List these on the data pages.
3. Cover the bottom of the milk container with approximately 3 cm of soil.
4. On top of the soil, create a trash layer by adding some of the various items that you collected in step 1, above. Take a photo of the trash layer.
5. Cover the trash with a layer of soil about 2 to 3 cm thick and sprinkle with water to make the soil moist. Avoid a large excess of water.
6. Create a second trash layer by adding some of the various items that you collected in step 1, above. Take a photo of the second trash layer.



7. Cover the trash with a layer of soil about 3 cm thick and sprinkle with water.
8. Sprinkle the entire pile with water. Again, avoid a large excess of water.
9. Check on your miniature landfill every class. Add any water, as needed to keep the soil moist, but not wet.
10. At least once each week, use a spoon or spade to turn over the two layers of trash in the pile. If needed, add additional soil to cover any exposed trash, Add water as needed to keep the soil moist.
11. At the end of 6 weeks or other time period selected, empty the contents of the landfill onto several layers of newspaper.
12. Examine each item and note any differences in appearance from when you started the landfill. Record your observations on the data pages. If you have a camera, take a photograph of the objects.
13. Discuss your findings and if your predictions were correct.

Report Form

Landfills and Recycling

Name(s) _____ Course _____

Data and Results

Date the mini-landfill was created _____

What items were selected for the landfill? (If you have a photo of the objects, attach it to this report.)

What items would you expect to be biodegradable?

Observations of the landfill.

> List the date the landfill was observed, any actions taken (e.g., turning over the soil and materials, adding water, etc.), and any observed changes.

Observations of the landfill (continued)

Results

Total time the landfill was in operation _____ weeks

How do the items from the landfill appear? (If you have a photo of the objects, attach it to this report.)

Questions

1. Which items biodegraded or decomposed the most? Why?

2. If you were to continue your landfill, how long would you estimate that it take for all items to biodegrade or decompose?

3. Why is it important to reduce the amount of trash in a landfill?

4. Could a landfill be created in space (e.g., on the moon, an asteroid, or just in orbit around the Earth)? Why or why not?