



LANDFILLS

Student Handout 1
Activity M.v/H.m

Name: _____

Background

Even as the United States moves ahead with other methods of waste disposal and moves toward an integrated approach to solid waste management, there will still be a need for landfills. Within the EPA's approach, the goal is not to get rid of landfills, but to reduce our need for them significantly. At the same time, we need to ensure that they pose no danger to the environment. The aim is to make landfills a safe, but final resort for a small portion of the municipal solid waste stream.

Modern sanitary landfills differ significantly from the open dumps of old. They even differ from the landfills of only a few years ago. Sanitary landfills use technology to contain the waste and prevent the leaching out of potentially hazardous substances. These substances can be carried in the rainwater that passes through the trash contained in an improperly-designed landfill. The resulting liquid runoff is called leachate.

To prevent groundwater contamination, layers of compacted clay and thick plastic cover the bottom of the landfill. Running horizontally between and above the liners, a system of perforated pipes collects the leachate that has percolated through the trash. These pipes channel the leachate to a treatment center where toxins are removed. Numerous wells surround the landfill site, providing a means to monitor the quality of nearby groundwater.

Each day, trash is brought to the landfill. It is unloaded, spread in a layer and covered with soil. This soil cover eliminates odors and discourages scavengers such as birds and rodents. Pipes sunk vertically through the layers of trash and soil collect the methane gas that is produced naturally from decaying refuse. If not collected in pipes, this gas can form in pockets and become explosive. Some sites burn off this gas, while others use it to produce electricity.

After a landfill has reached its capacity, it is sealed with an impermeable clay cap. A drainage ditch around the perimeter carries away rain water. Depending on the local geography former landfills may be converted into golf courses, airports, or wildlife refuges.

Biodegradability

When garbage is disposed of in a landfill, it does not readily biodegrade, or break down. In

order for biodegradation to occur three things must be present: water, air, and sunlight. Because of the lack of moisture, air, and light in modern, carefully controlled landfills, garbage is basically entombed under layers of dirt, clay and/or plastic. Scientists who have dug deep into landfills have even found newspapers that are decades old but can still be read!

The purpose of a sanitary landfill is not to eliminate garbage, but to give it a final resting place. At present, 73% of our trash is now being buried in 5,500 active landfills across the country. However, the EPA has set a national goal to reduce this number of landfills significantly. Many of them will soon reach capacity.



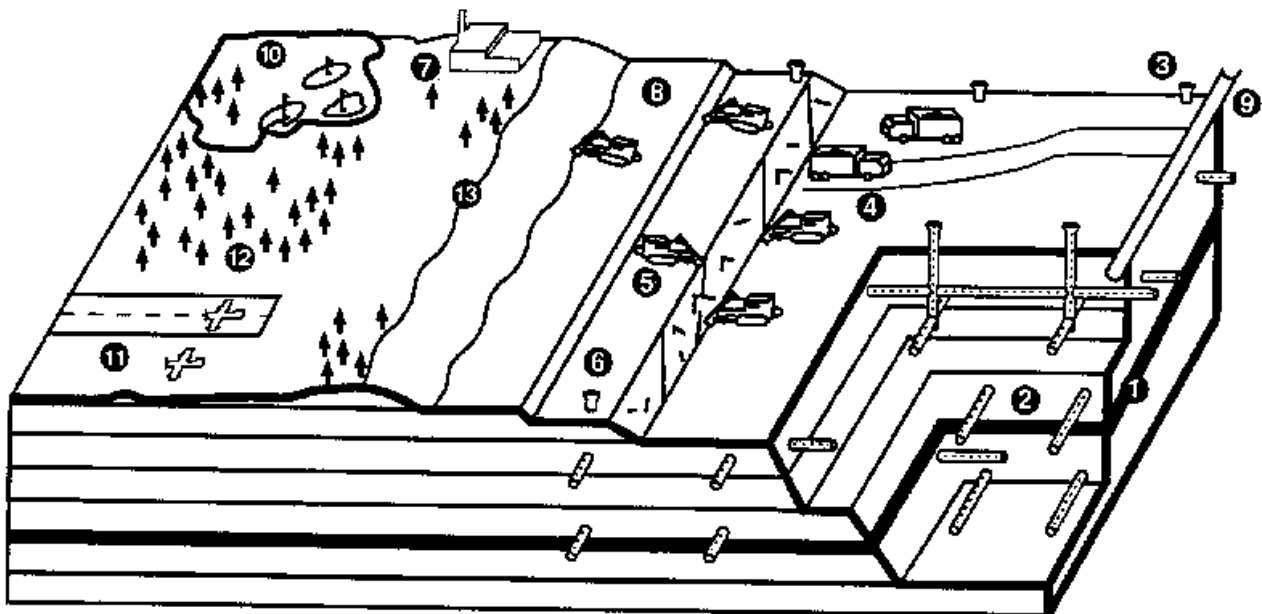
HOW A LANDFILL WORKS

Student Handout 2

Name: _____

Modern landfills are designed to be safe places to put MSW.

1. The landfill is lined with high density plastic and compacted clay.
2. A system of pipes with holes runs above and through this lining. These pipes collect any liquid that drains from the landfill.
3. Groundwater underneath the landfill is monitored for contamination by wells surrounding the site.
4. Each day, trash is unloaded and pushed into place.
5. At the end of the day, the trash is covered with dirt to reduce the smell and discourage scavengers, such as gulls.
6. Pipes sunk into the landfill collect methane gas.
7. The gas can then be burned to produce electricity.
8. When the site is filled, it is sealed with clay.
9. A drainage ditch around the site carries away rainwater.
- 10-13. The top of a landfill can be a place for a golf course (10), an airport (11), or a wildlife refuge (12). These would be built on a final layer of dirt (13).





LANDFILL WORKSHEET

Student Handout 3

Name: _____

1. How does a modern sanitary landfill differ from an open dump?
2. What is leachate and what happens to it in a modern sanitary landfill?
3. What is biodegradability and does it occur in a modern sanitary landfill?
4. How much of our nation's MSW now goes into modern sanitary landfills?
5. Draw a diagram of a modern sanitary landfill



A TRIP TO A LANDFILL

Student Handout 4

Name: _____

On your visit to a local landfill, keep your eyes open! Your trip should provide the answers to the following questions:

1. Is the garbage from your home and school taken here?
2. Why was the landfill located on this site? What tests were done before the site was opened? When did it open?
3. Who manages the landfill?
4. What is the life expectancy of the landfill?
5. How much solid waste is disposed of in the landfill per day, per week, per year?
6. What is the fee for using the landfill?
7. Are any of the materials being put in the landfill hazardous?
8. How is the site managed for the control of blowing trash, odors, noise, animals, erosion, surface run-off and leachate?
9. Are groundwater tests performed regularly at the site? What are the results?
10. What will happen to the landfill after it closes?