EXTRA CREDIT ASSIGNMENT!!!
Packaging, Food Containers and Solid Waste

Examining what we throw away…
Examining what happens to it…

Background Information:

A history of MSW (Municipal Solid Waste):

For hundreds of years, people have used garbage dumps to get rid of their trash. Yesterday's garbage dump was nothing more than a pit or field just outside of town where people left their garbage.

People tossed all sorts of waste into these dumps. The dumps were breeding grounds for disease-carrying pests such as flies, mosquitoes, and rats. Rainwater flushed filthy, and sometimes poisonous, liquids from the dump into nearby streams and groundwater supplies that people used for drinking, bathing, and clothes washing. Later, some towns spread dirt to contain the dumped waste and to discourage vermin. This helped, but it was little more than a cover-up for unsanitary dumping.
Today, we still bury our garbage, although not in the open dumps of yesterday. About 55 percent of our garbage is hauled off in garbage trucks and packed into sanitary landfills—making land filling America's number one way of getting rid of its trash. (The other 45 percent is either recycled or burned.)

Although the nation as a whole has plenty of space to build landfills, some areas in the Northeast may be running out of room for new landfills. Obtaining permits to build new landfills has become increasingly difficult because of public opposition—people don't want landfills built in their backyards. And besides, a new landfill costs up to $10 million to build.

That's why some communities are looking for new ways to deal with solid waste —recycling and burning, for instance. But there will always be a need for landfills. Why? Because not all waste can be recycled or burned. How do you recycle a broken light bulb, and why burn it if it doesn't provide any heat energy?

Landfill burial is the only feasible way to dispose of some types of waste, and sometimes it's the safest way, too. Generally, the best disposal method for hazardous wastes—batteries, paints, pesticides, and the like—are state-of-the-art landfills. These landfills are designed to prevent hazardous wastes from seeping into underground water supplies.

Now that open dumping is illegal, deciding where to put a landfill requires careful planning. Skilled engineers inspect potential landfill sites. They look at a number of things including:

- the geology of the area
- the nature of the local environment
- how easy the site is to reach
- how far the site is from the area that generates the waste.

Work on a landfill site begins only after the site passes strict legal, environmental, and engineering tests. It is not a quick procedure; landfills can take five years to complete.

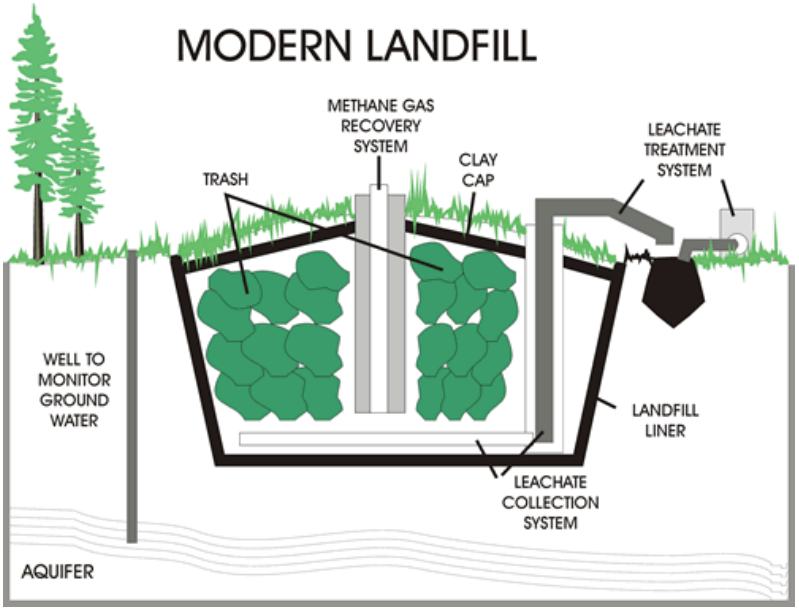
A Modern Landfill

Today's landfills are very different from the open dumps of the past. For one thing, new landfills are situated where clay deposits and other land features act as natural buffers between the landfills and the surrounding environment.
Second, the bottom and sides of modern landfills are lined with layers of clay or plastic to keep the liquid waste, called leachate, from escaping into the soil.

A network of drains collects the leachate and pumps it to the surface where it can be treated. Ground wells are also drilled into and around the landfill to monitor groundwater quality and to detect any contamination. These safety measures keep ground water, which is the main source of drinking water in many communities, clean and pure.

To protect the environment even more, the landfill is divided into a series of individual cells. Only a few cells of the site (called the working face) are filled with trash at any one time, minimizing exposure to wind and rain.

At the end of each day's activities, workers spread a layer of earth—called the daily cover—over the waste to reduce odor and control vermin. The workers fill and cap each cell with a layer of clay and earth, and then seed the area with native grasses.



A Full Landfill

When a landfill is full, workers seal and cover the landfill with a final cap of clay and dirt. Workers continue to monitor the ground wells for years after a landfill is closed to keep tabs on the quality of groundwater on and around the site.

Old landfill sites can be landscaped to blend in with their surroundings, or specially developed to provide an asset to a community. Closed landfills can be turned into anything from parks to parking lots, from golf courses to ski slopes. Building homes and businesses on these sites is generally not permitted, though, since it can take many years for the ground to settle.

Biodegradation

You have probably seen all sorts of consumer products, from paper bags to egg cartons, claim that they are biodegradable. What does biodegradable mean and are the claims true.

Biodegradation is a natural process. It happens when microorganisms, such as fungi or bacteria, secrete enzymes that chemically break down or degrade dead plants and animals. In other words, biodegradation is when waste decays or rots.

Most organic wastes are biodegradable under normal environmental conditions. Given enough time, the waste will disintegrate into harmless substances, enriching the soil with nutrients.

A landfill is not a normal environmental condition, though, nor is it intended to be. Instead, a landfill is more like a tightly sealed storage container. A landfill is designed to inhibit degradation to protect the environment from harmful contamination. Deprived of air and water, even organic wastes—like paper and grass clippings—degrade very slowly in a landfill.

Landfill Energy

Did you know that landfills can be a source of energy— like coal or petroleum?

Here's the story.

Organic waste produces a gas called methane as it decomposes, or rots. Methane is the same gas that is in natural gas, the fuel sold by natural gas utility companies. Methane gas is colorless and odorless. Natural gas utilities add an odorant so people can detect seeping gas, but it can be dangerous to people or the environment. New rules require landfills to collect methane gas as a pollution and safety measure.

Some landfills simply burn the methane gas in a controlled fashion to get rid of it. But the methane can be used as an energy source. Landfills can collect the methane gas, treat it, and then sell it as a commercial fuel; or they can burn it to generate steam and electricity.

Lab Activity:

The Fast Food Stakeout!!

In the following activity, we will hopefully work to consider some of the following questions: So how much do we throw away? What type of materials are the most common in our trash? What sources are major contributors to MSW? Is there any relationship between the size or value of a product and the amount of packaging or trash thrown away after using or consuming? How much of this trash is biodegradable? What will the trash that we dispose of look like in 5, 10, 100, or 1,000 years? _

Task:

At some point over the next four days (before Tuesday), you should plan on spending 30 minutes at a local fast food restaurant.

ATTENTION: Since you will be out and in the community – you are guests!! Be courteous, be kind, be thoughtful, be descrete. You are observing only!!!

Procedure:

You will need a notebook and a writing implement. During your "stakeout" you will take notes on the types of trash that individuals place into the trash bins. Make your own data table to collect information. You should include **at least** the following information in your data table (try not to be too nosy, but get what you can in terms of accurate information):

- Time and date of "stakeout"
- Packaging type: such as burger box, soda cup, french fry box, napkins, etc
- Number of items in each category
- Uneaten food? Approximate amount of each type of food (1/2 soda, etc).
- Material type for each item: such as plastic, foil, paper, cardboard (be careful of things like soda cups with may be cardboard, but with plastic covers and straws)
- Leave space to add information about the mass and volume of the item of trash (we will do this in the lab)
- Leave space for nutritional information about the food item: # of grams and # calories. You will research this information on the website of that restaurant. www.bk.com for example has nutritional information on each of its products.

* If it is a "takeout" facility, watch to see what packaging products are used for the items that people take with them.

***Note: if you decide to have a meal, save the packaging. This includes: bags, cartons, cups, napkins, ketchup containers, etc. and bring it to class. We will take measurements on volume and mass during class on these items.**

Summary:

The following analysis and discussion should be completed using a maximum of 4 pages. Please choose 3 out of the 4 topics to discuss and analyze in your conclusion.

Topics to consider…

Assessing the waste:

What material appeared to comprise the greatest percentage of the solid waste at your restaurant? Does the type of fast food affect the type of waste produced? Is there any relationship between mass or caloric content and the amount of packaging? Which packaging items had the greatest mass and/or volume?

Assessing the fast food industry:

Do some quick math… based on your time in the restaurant, how much trash is produced by consumers in that store each day? Each year? How many restaurants are there in that chain/name brand? Extrapolate more to determine the amount generated each day for all stores. Each year? How valid is this approximation? What are issues with these assumptions? How might we more accurately make an approximation? Could we make this assessment/study in a cost effective manner? Should we even be concerned with waste from fast food restaurants? Are there bigger areas where we could get more effective reductions? Are there other wastes from this industry that might be more important to consider reducing?

What happens to waste:

Do some research – What happens to solid waste Portland? which materials are less (more) likely to biodegrade? How long would the process take for each material? What are some solutions? Could we recycle more? If so is recycling of that product viable (economically and otherwise)?

The bigger picture:

Are certain materials "better" than others for use in packaging? You will need to examine this word, "better" from the perspective of different stakeholders (business owners, customers, public, environmental organizations): economics, employee productivity, satisfaction of customers, environmental, human health, local vs. national interests, and others. Make recommendations – How should we proceed? What changes need to be made?