

## 12.1 Solid Waste

### A. The Generation of Waste

- \_\_\_\_\_ is any discarded solid material
- Solid waste includes \_\_\_\_\_ to coffee grounds to \_\_\_\_\_
  1. Space and Waste
    - Many towns are running out of space to \_\_\_\_\_ of the amounts of waste that people create.
  2. Population and Waste
    - Human \_\_\_\_\_ and the amount to waste we produce grows \_\_\_\_\_
    - The amount of land available per person becomes \_\_\_\_\_
    - Average person in the US produces \_\_\_\_\_ pounds of solid waste per day.
    - It is getting \_\_\_\_\_ to dispose of the waste we create.

### B. Not All Wastes Are Equal

- \_\_\_\_\_ if it can be broken down by biological processes
- \_\_\_\_\_ and \_\_\_\_\_ matter are examples of biodegradable materials
- Products made from \_\_\_\_\_ are usually biodegradable such as newspaper, paper bags,
  1. Plastic Problems
    - Plastic is an example of \_\_\_\_\_ material
    - Plastics that we throw away may accumulate and last for \_\_\_\_\_ of years.

### C. Types of Solid Waste

- \_\_\_\_\_ waste is most of what we throw out on a day-to day basis.
- Manufacturing \_\_\_\_\_ and \_\_\_\_\_ wasted make up about \_\_\_\_\_ of the other types of solid wastes produced in the US.
  1. Municipal solid Waste
    - \_\_\_\_\_ which is the waste produced by households and businesses
    - This is about \_\_\_\_\_ of the total solid waste in US and amount to \_\_\_\_\_ million tons each year.
    - The amount of municipal solid waste is growing \_\_\_\_\_ than the amount of mining or agricultural waste.
  2. Solid Waste from Manufacturing, Mining, and Agriculture

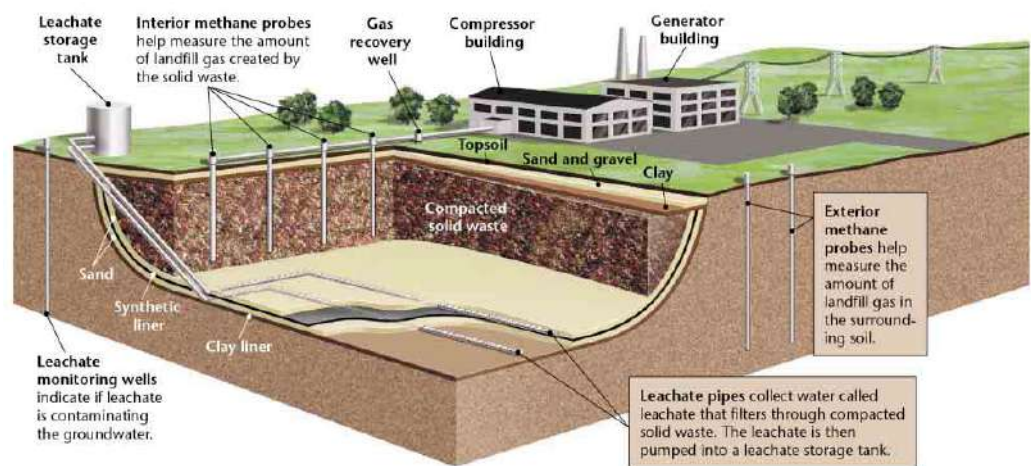
- \_\_\_\_\_ from manufacturing, mining, and agriculture make up most of the rest of the total waste produced in the US.
- This includes scrap \_\_\_\_\_, plastics, paper, \_\_\_\_\_, and ash.

#### D. Solid Waste Management

- Most municipal waste is sent to \_\_\_\_\_
- Now about \_\_\_\_\_ of waste is recycled

##### 1. Landfills

- More than \_\_\_\_\_ of the municipal and manufacturing solid waste created in the US ends up in \_\_\_\_\_
- \_\_\_\_\_ is a permanent waste-disposal facility where wastes are put in the ground and covered each day with a layer of \_\_\_\_\_, \_\_\_\_\_ or both



##### 2. Problems with Landfills

- \_\_\_\_\_ is a liquid that has passed through compacted solid waste in a landfill
- Leachate forms when \_\_\_\_\_ seeps down through a land fill and collects dissolved \_\_\_\_\_ from the decomposing \_\_\_\_\_
- If landfills are not monitored properly the \_\_\_\_\_ can flow into groundwater supplies and make water from nearby wells \_\_\_\_\_ to drink
- Second problem with landfills is the production of \_\_\_\_\_ (a flammable gas)
- Methane can seep through the \_\_\_\_\_ and into basements of homes up to \_\_\_\_\_ meters from landfill

##### 3. Safeguarding Landfills

- New landfills must be land with \_\_\_\_\_ and \_\_\_\_\_ liner and have systems for collecting and treating Leachate.
- Adding \_\_\_\_\_ increases the cost of building them.

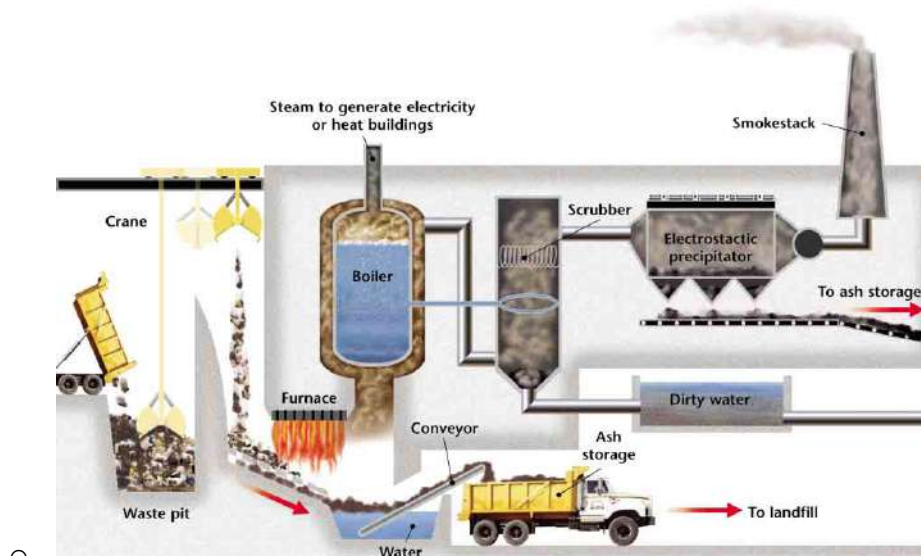
- Also find acceptable places to build landfills is \_\_\_\_\_

#### 4. Building More Landfills

- We are currently running out of \_\_\_\_\_ to build new landfills
- In 2005 the total number of landfills in US was \_\_\_\_\_
- The EPA estimates that the active landfills in \_\_\_\_\_ states will be filled to capacity within \_\_\_\_\_ years.

#### 5. Incinerators

- One options to reduce the amount of solid waste sent to landfills it to burn it in \_\_\_\_\_.
- Incinerator can reduce the weight of solid waste by \_\_\_\_\_
- But cannot \_\_\_\_\_ the maters that should not be \_\_\_\_\_ (cleansers, batteries, and paints)
- These items end up as \_\_\_\_\_ gases
- The \_\_\_\_\_ material takes up less space in landfill but is more \_\_\_\_\_.



how incinerators work

### 19.2 Reducing solid Waste

- \_\_\_\_\_ is any change in design, manufacture, purchase, or use of materials or product to reduce their amount or \_\_\_\_\_ before they become municipal solid waste

#### A. Reducing Solid Waste

##### 1. Buying Less

- Buy products that have \_\_\_\_\_, products that last longer, or \_\_\_\_\_ products

- For example if consumers bought products in \_\_\_\_\_ bottles beverage manufacturers would begin \_\_\_\_\_ with the refillable bottles.

## 2. Lasting Longer

- A return to products that last \_\_\_\_\_ and are designed to be easily \_\_\_\_\_ would both save \_\_\_\_\_ and reduce waste disposal

## B. Recycling

- \_\_\_\_\_ is the process of reusing materials or recovering \_\_\_\_\_ materials from waste or scrap.

### 1. Recycling: A series of Steps

- 1<sup>st</sup> the discarded materials must be \_\_\_\_\_ and \_\_\_\_\_ by type
- 2<sup>nd</sup> each type of material must be taken to a facility where it can be \_\_\_\_\_ and made ready to be \_\_\_\_\_ again
- For example: \_\_\_\_\_ is sorted by color and is crushed, \_\_\_\_\_ is sorted by type and made into a pulp with water
- 3<sup>rd</sup> the materials are used to \_\_\_\_\_ new product
- 4<sup>th</sup> the new products are \_\_\_\_\_ to consumers
- If more people buy products made from \_\_\_\_\_ there would be an increase in the \_\_\_\_\_ for these products

### 2. Composting

- \_\_\_\_\_ makes up more than \_\_\_\_\_ percent of a community's solid waste
- Yard waste is \_\_\_\_\_ and does not need to go to a landfill
- \_\_\_\_\_ a dark brown, crumbly material made from decomposed \_\_\_\_\_ and \_\_\_\_\_ matter that is spread on gardens and fields to enrich the soil.
- Compost is rich in the \_\_\_\_\_ that help plants grow
- If all \_\_\_\_\_ wastes were composted the amount of solid waste going to landfills could be \_\_\_\_\_.

## C. Changing the Materials We Use

- Changing the \_\_\_\_\_ we use could eliminate much of the \_\_\_\_\_ waste we produce
- Most of our waste could be \_\_\_\_\_ if such products were made of recyclable glass, cardboard, or aluminum containers

### 1. Degradable Plastics

- \_\_\_\_\_ plastic is made so that when left in the sun it becomes weak and brittle and eventually \_\_\_\_\_ into pieces

- \_\_\_\_\_ is made by blending the sugars in plants with a chemical agent to make plastic
- Green plastic is designed to degrade within \_\_\_\_\_ days of being thrown away

## 2. Problems with Degradable Plastics

- The \_\_\_\_\_ parts of degradable plastics remain but only in \_\_\_\_\_ pieces.
- Biodegradable plastics can remain in \_\_\_\_\_ for many \_\_\_\_\_ just like regular plastics

### 12.3: Hazardous Waste

- \_\_\_\_\_ is any waste that is a risk to the health of humans or other living things

#### A. Types of Hazardous Waste

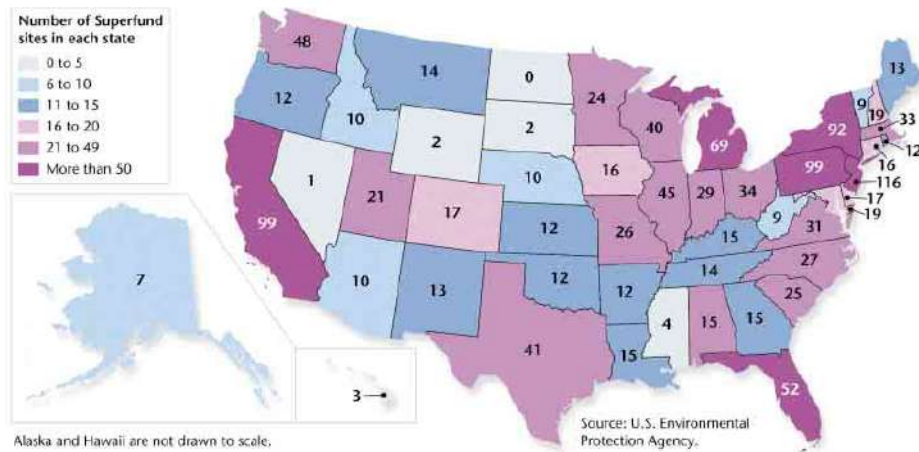
- Hazardous wastes may be \_\_\_\_\_, \_\_\_\_\_, or gases
- Often contain toxic, \_\_\_\_\_, or \_\_\_\_\_ materials
- \_\_\_\_\_ were passed o clean up old waste sites and regulate future waste disposal

#### B. Resource Conservation and Recovery Act

- The Resource Conservation and Recovery Act (RCRA) requires producers of hazardous waste to keep \_\_\_\_\_ of how their wastes are \_\_\_\_\_
- If the waste cause a problem in the \_\_\_\_\_ the producer is \_\_\_\_\_ responsible for the problem.

#### C. The Superfund Act

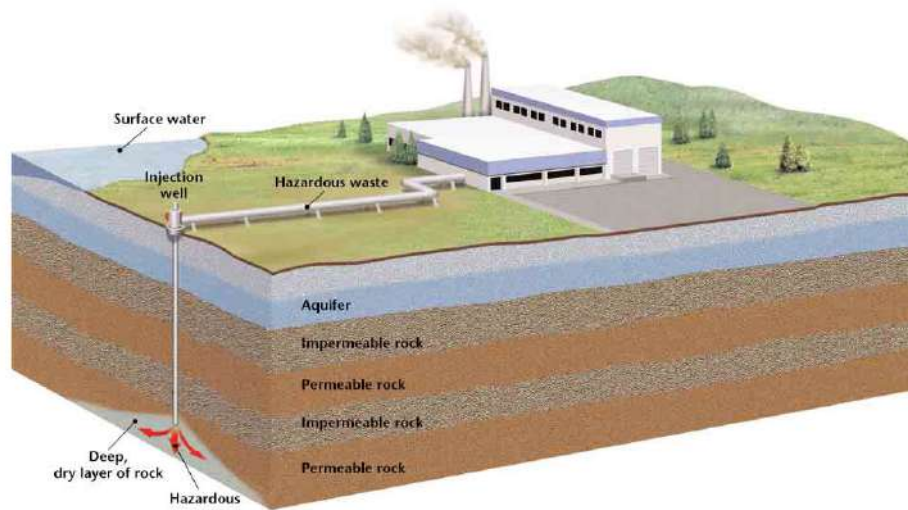
- Safe disposal for hazardous waste is \_\_\_\_\_ and companies may be tempted to \_\_\_\_\_ dump them to save money.
- 1980 the congress passed the Comprehensive Environmental Response, compensation and Liability Act (also called the \_\_\_\_\_)
- This act gives the EPA the right to sue the owners of hazardous waste sites who had \_\_\_\_\_ dumped waste.
- Superfund act created a fund of money to pay for \_\_\_\_\_ up \_\_\_\_\_ hazardous waste sites.
- As of \_\_\_\_\_ only \_\_\_\_\_ of the sites had been cleaned up.



## Superfund Sites in the US

### D. Hazardous Waste Management

- \_\_\_\_\_ million metric tons of hazardous waste is produced by US each year
- Preventing Hazardous Waste
    - One way to \_\_\_\_\_ hazardous waste is to \_\_\_\_\_ less of it
    - Many manufacturers have discovered they can redesign manufacturing methods to produce \_\_\_\_\_ or \_\_\_\_\_ hazardous waste.
    - Another way to deal with waste is to find a way to \_\_\_\_\_ it
  - Conversion into Nonhazardous Substances
    - Some types of wastes can be treated with \_\_\_\_\_ to make them less \_\_\_\_\_.
    - Treat acids with lime (a base) to form a salt which is less \_\_\_\_\_ to environment
    - \_\_\_\_\_ from petroleum refineries may be \_\_\_\_\_ by soil bacteria into \_\_\_\_\_ harmful substances.
  - Land Disposal
    - Most hazardous waste is \_\_\_\_\_ of on land in a \_\_\_\_\_ injection
    - \_\_\_\_\_ is where wastes are pumped deep into the ground and \_\_\_\_\_ into a dry layer of rock \_\_\_\_\_ the level of groundwater. The wastes are \_\_\_\_\_ with cement to prevent \_\_\_\_\_ of the groundwater.



○

Deep-well injection facility diagram

○

\_\_\_\_\_ (another land disposal facility) is basically a pond that has a \_\_\_\_\_ bottom. The waste \_\_\_\_\_ and settles to the bottom of the pond and the water evaporates from the pond.

○

Hazardous wastes in \_\_\_\_\_ or \_\_\_\_\_ form are often put into barrels and \_\_\_\_\_ in landfills

○

If maintained they should provide \_\_\_\_\_ ways to dispose of hazardous wastes.

○

If not maintained they can \_\_\_\_\_ and \_\_\_\_\_ the air, soil, or groundwater.

#### 4. Biologically Treating Hazardous Waste

○

Some hazardous waste can be \_\_\_\_\_, broken down, or their \_\_\_\_\_ reduced when treated with biological and chemical \_\_\_\_\_.

○

Certain \_\_\_\_\_ can be used to clean up an area that has been \_\_\_\_\_ with hazardous substance

○

Chemicals can be used to \_\_\_\_\_ and absorb hazardous wastes

#### 5. Incinerating Hazardous Wastes

○

Some hazardous wastes are disposed by \_\_\_\_\_

○

\_\_\_\_\_ is generally the most \_\_\_\_\_ form of waste disposal

○

They need \_\_\_\_\_ control devices and be carefully monitored

○

Left over ash must be \_\_\_\_\_

#### 6. Exporting Hazardous Waste

- \_\_\_\_\_ would get rid of hazardous waste by sending them to landfills in other \_\_\_\_\_
- Some hazardous wastes are exported to other \_\_\_\_\_ because they have the \_\_\_\_\_ to deal with the waste

#### E. Hazardous Wastes at Home

- Chemicals such as \_\_\_\_\_, pesticides, and \_\_\_\_\_ all create hazardous waste
- Hazardous materials poured down the \_\_\_\_\_ or put in the \_\_\_\_\_ end up in \_\_\_\_\_ - \_\_\_\_\_ landfills
- They should be \_\_\_\_\_ of in a hazardous waste landfill

##### 1. Disposing of Household Hazardous Waste

- Many cities have begun to provide \_\_\_\_\_ for household \_\_\_\_\_ waste
- Used \_\_\_\_\_ and motor oil are \_\_\_\_\_
- \_\_\_\_\_ can be blended and used for park maintenance

##### 2. Motor Oil

- It is \_\_\_\_\_ to pour used motor oil on \_\_\_\_\_ or throw it in trash
- One option for proper disposal is to take it to automobile \_\_\_\_\_ stations
- Some cities have \_\_\_\_\_ receptacles to recycle motor oil in