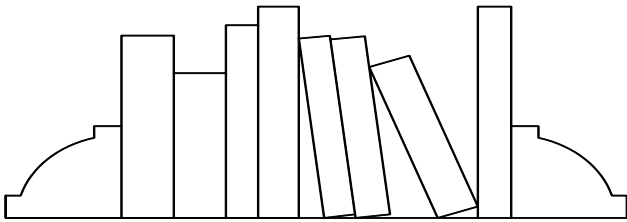


# Waste

## Lecture Outline:

18. TRASH—LIABILITY OR RESOURCE?
- A. The Solid Waste Crisis
1. Current Disposal Processes
  2. Landfill Problems
  3. Improving Landfills
  4. Federal Landfill Standards
  5. Incineration
  6. Costs and Problems Associated with Waste Disposal
- B. Solutions to the Trash Problem
1. Reducing Waste Volume
  2. Recycling
  3. Recycling Mandates
  4. Refuse to Energy Conversion



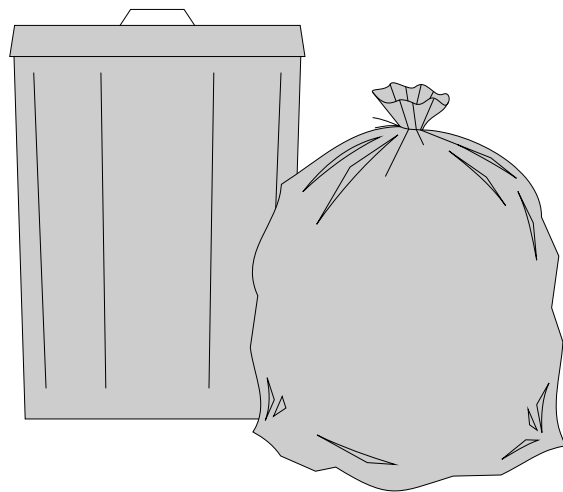
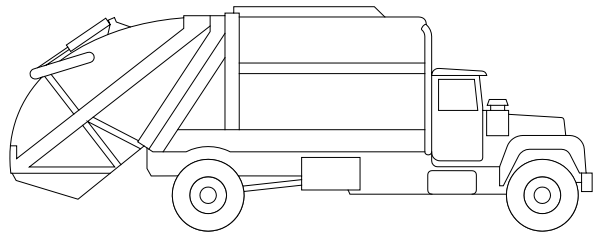
## Learning Objectives:

*When you are finished with this unit you should be able to:*

1. Describe the composition of trash in the USA.
2. Describe current methods of trash disposal.
3. Discuss current landfilling problems and state-of-the-art landfills.
4. Describe the current state of recycling in the USA.
5. Discuss viable solutions to the trash problem in the USA.

## Terms You Should Know:

- ❖ Municipal Solid Waste (MSW)
- ❖ Methane
- ❖ Tipping Fees
- ❖ Reprocessing
- ❖ Leachate
- ❖ Sanitary Landfills
- ❖ Incineration
- ❖ Waste to Energy (WTE)
- ❖ LULU
- ❖ NIMBY
- ❖ NIMTOO



## Reading Assignment:

Brennan and Withgott:  
Chapter 22; pages 616-632.

## 18. TRASH—LIABILITY OR RESOURCE?

### A. THE SOLID WASTE CRISIS

**Municipal Solid Waste (MSW)**—total of all materials thrown away as trash

In USA:

- >
- > 75,000 garbage trucks/day
- >

Waste Generation:

<b>Year</b>	<b>pounds/person/day</b>
1960	
1980	
2000	
2010	

MSW Trash Generation:

<b>State</b>	<b>per capita (t/p/yr)</b>
Alaska	
Idaho	
Oregon	
Washington	

Our Trash:

- Paper products
- Yard wastes

- Food wastes
- Plastics
- Metals
- Glass
- Wood
- Other

For Disposal—evolved from:

OPEN DUMPS (BURNING)

## 1. Current Disposal Processes

Today:

- Landfills
- Incineration
- Recycling

Today we use:

—

**SANITARY LANDFILLS** — covered daily with dirt to reduce vermin and odors

—

— today cited by environmental reasons

Other HDC's

- Japan —
  
- W. Europe —

## 2. Landfill Problems

- Leachate generation

—

- Methane production
- Poor decomposition
- 

a. Leaching—

noxious leachate:

b. Methane—  $\text{CH}_4$  produced with OM decomposition

—

—

—

c. Poor Decomposition

- plastics—inert

- 

d. Settling

- 

3. Improving Landfills

***Trying to fix a wrong answer??***

New design features to improve landfills

a.

b.

c. Refuse Position (Pyramid) and Capped

- 

d.

- new landfills will never go away

- no decomposition—a wrong answer?

4. Federal Landfill Standards:

a. Location restrictions

-

b. Composite liner requirements

–

–

c. Leachate collection and removal system

–

–

–

d. Operating practices

–

–

–

–

e. Groundwater monitoring requirements

–

f. Closure and post closure requirement

–

–

g. Corrective action provisions

–

–

h. Financial assurance

–

## 5. Incineration

- 130 facilities in USA (including Spokane)
- 110/130 facilities are Waste to Energy (WTE)

Pros of incineration:

✓

✓

✓

✓

Cons of incineration:

✓

✓

✓

✓

✓

## 6. Costs and Problems Associated with Waste Disposal

↑ costs—economic concern

—

—

Public opposition:

LULU—

NIMBY—

NIMTOO—

**Tipping fees**—costs assessed at the disposal site; exceed \$100.00 per ton nationally

—

—

—

—

## B. SOLUTIONS TO THE TRASH PROBLEM

### 1. Reducing Waste Volume

—

— use less

Cloth vs disposable diapers:



Returnable vs non-returnable bottles

- 10 states including OR and CA in the West
- who opposes?

–

–

–

2. Recycling

Recycling Rate (%)	Country
60%	
34%	
10%	

Recycling in the USA:

- 
- 
- Up to 80% of MSW is recyclable

Recycling Rates

State	Recycling rate (%)
Alaska	
Idaho	
Oregon	
Washington	

## MSW Recycling Rates, USA

Year	% of waste recycled
1960	
1980	
2000	
2010	

## Recycling Rates

Product	% recycled
Auto batteries	
Paper	
Yard trimmings	
Aluminum	
Glass	
Plastics	

- Impediments to recycling:
  - a. SORTING
    - 
    -
  - b. LACK OF STANDARDS
    - plastics not standard
    -
  - c. REPROCESSING
    - must be companies that can absorb waste materials and convert to saleable items

#### d. MARKETING

- someone must want to buy products

–

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#### e. HIDDEN COSTS

- short term costs are higher

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### 3. Recycling Mandates

#### a. Mandatory Recycling Laws

–

#### b. Banning the Disposal of Certain Items in Landfills

–

–

–

#### c. Mandatory Government Purchase of Recycled Materials

–

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#### d. Mandate that Packaging Materials be Recycled or Recyclable

#### e. Composting

#### 4. Refuse to Energy Conversion

- 
- limits future use of recyclable materials