


Lesson 12. Solid Waste



ENV H 311: Lesson 12

Solid & Hazardous Wastes

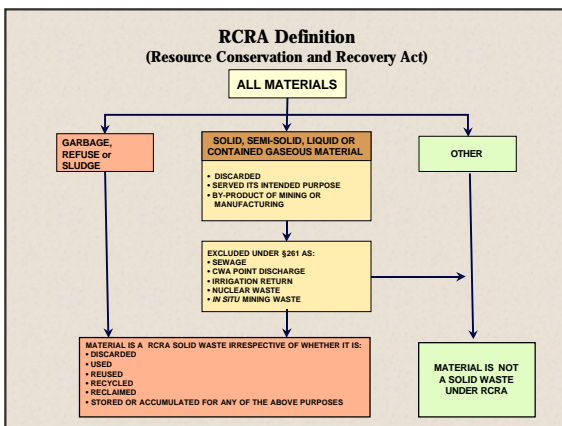
February 10, 2005

Chuck Treser
University of Washington
Dept. of Environmental and Occupational Health Sciences

Lesson Overview

- ❖ Definition
- ❖ Garbage
 - Generation & Storage
 - Collection & Transport
 - Disposal Options
 - Landfills
 - Incineration
 - Alternatives
- ❖ Hazardous Wastes
- ❖ Recycling



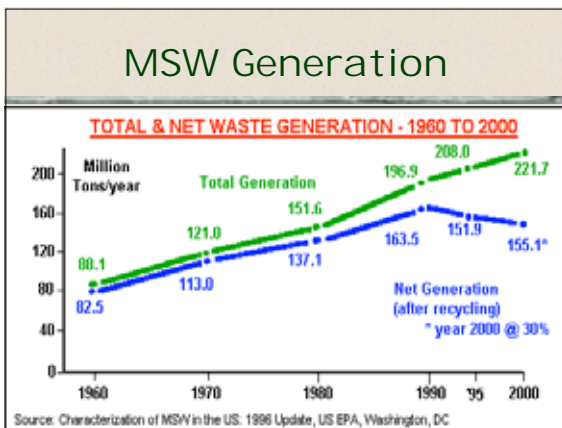


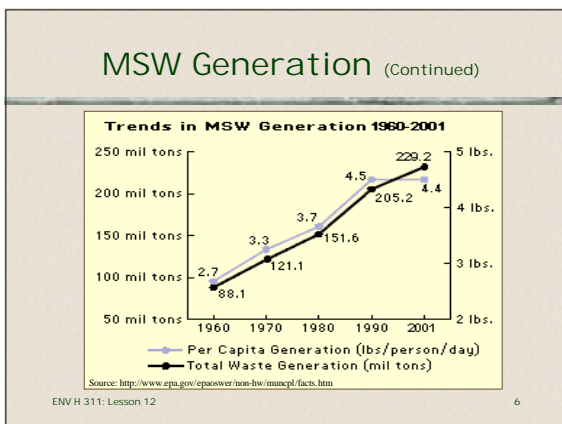
Garbage

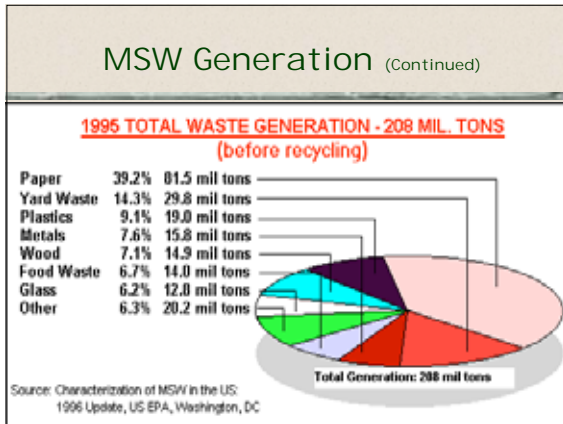
❖ **Municipal Solid Waste (MSW)**

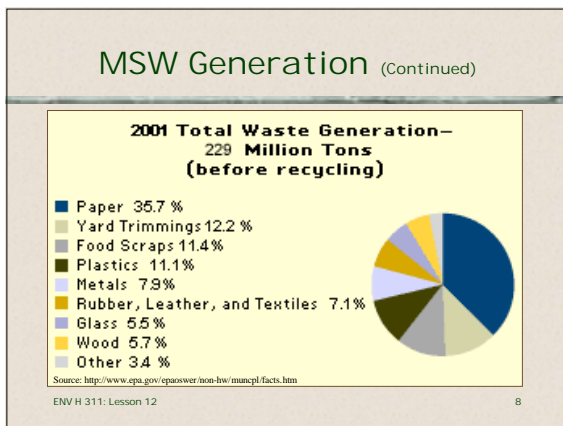


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Storage

- ❖ Residential
- ❖ Commercial
- ❖ Compaction

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Residential Storage



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The image shows a residential area with a house, a hedge, and a sidewalk. In the foreground, there are several black plastic bags of trash and a grey trash bin. A person is partially visible near the bin.

Commercial Storage



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The image shows a narrow alleyway between brick buildings. A row of green commercial trash bins is lined up along the wall. A person is visible in the distance.

Inadequate Capacity



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The image consists of two side-by-side photographs. The left photo shows a narrow alleyway with a yellow truck and several overflowing trash bins. The right photo shows a close-up of a trash bin overflowing with white bags and cardboard boxes.

Compaction



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Collection & Transport



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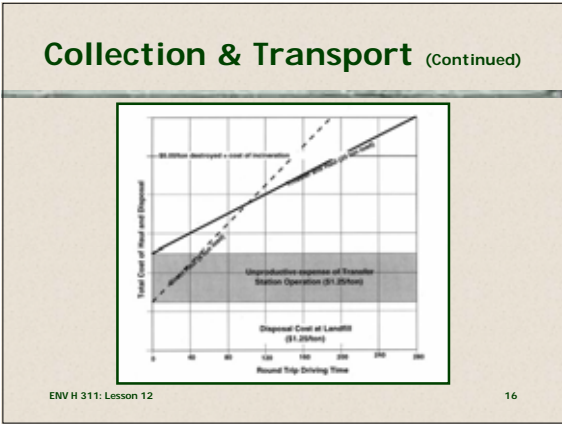
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Collection & Transport (Continued)



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Transfer Stations (Continued)



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Transfer Stations (Continued)



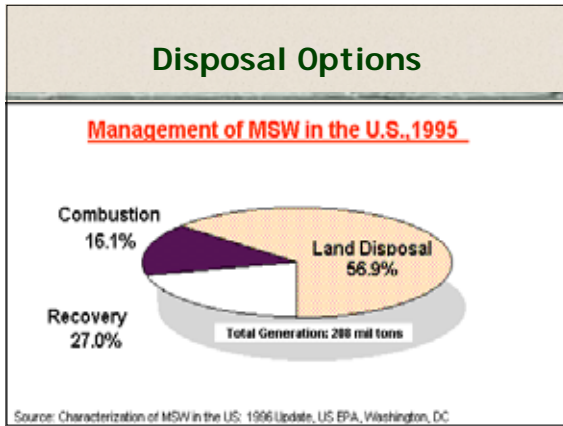
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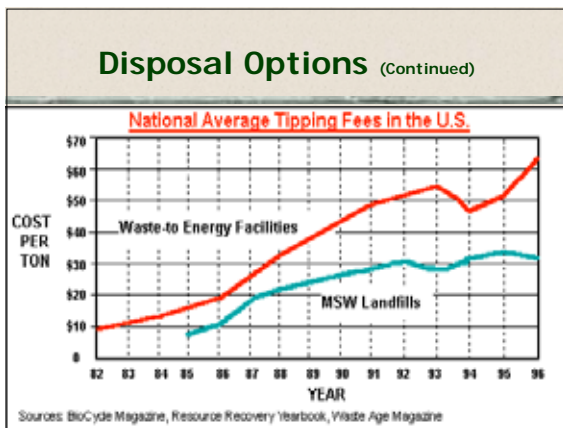
Disposal

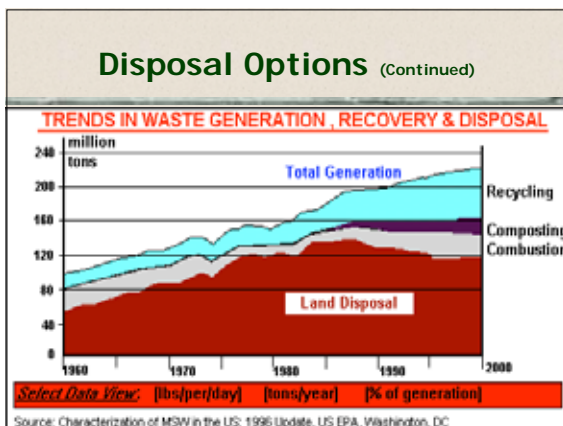
Disposal Options:

- ❖ Sanitary Landfill
- ❖ Incineration
- ❖ Other
 - Composting
 - ~~Ocean Dumping~~

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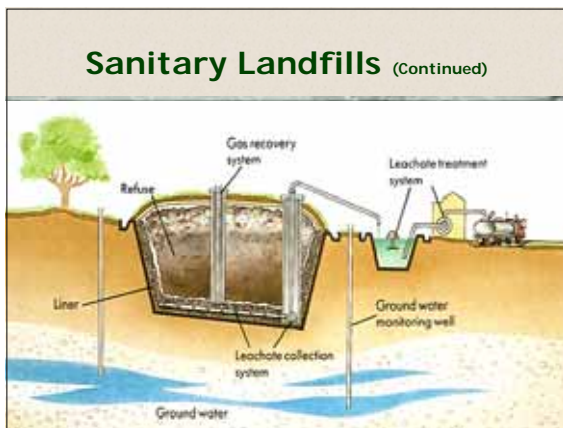
Sanitary Landfills

Cedar Hills Landfill
Issaquah, Washington

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Sanitary Landfills (Continued)

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Sanitary Landfills (Continued)



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Sanitary Landfills (Continued)



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Sanitary Landfills (Continued)



ENV H 311: Lesson 12 30

Sanitary Landfills (Continued)



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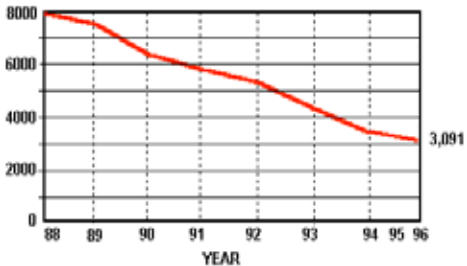
Sanitary Landfills (Continued)



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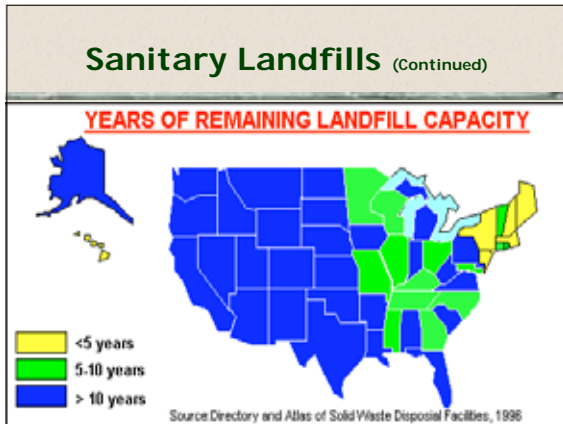
Sanitary Landfills (Continued)

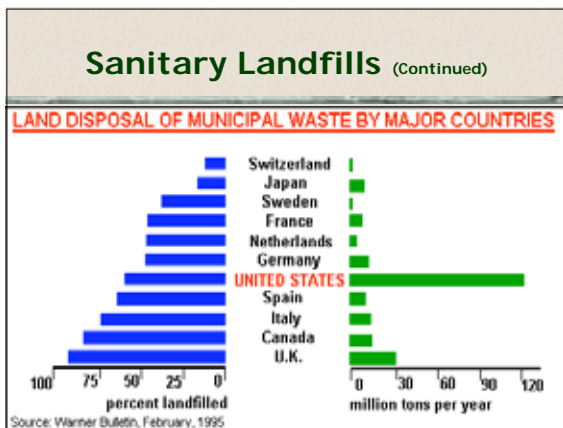
Number of Landfills in the U.S.

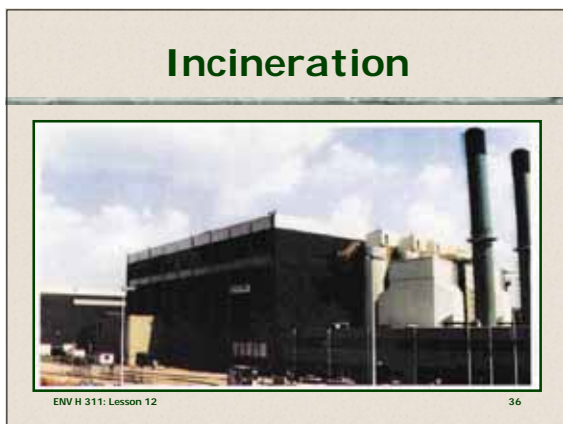


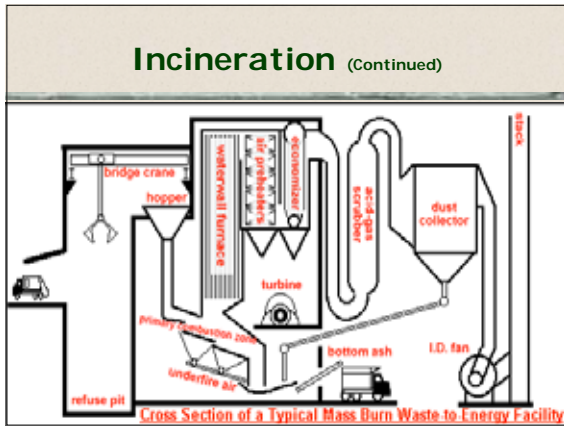
YEAR	Number of Landfills
88	8000
89	7500
90	6500
91	6000
92	5500
93	5000
94	4500
95	4000
96	3,091

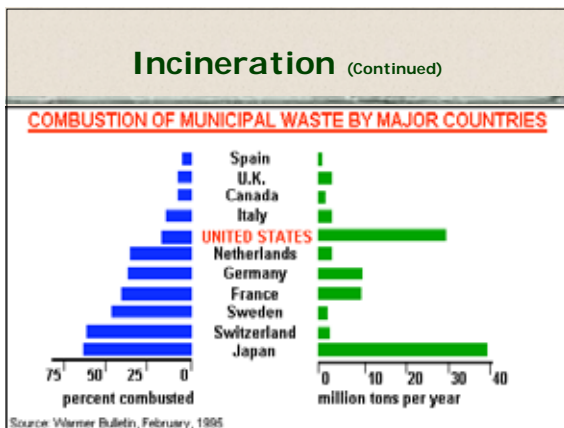
Sources: BioCycle Magazine, Apr. 1989-97











Regulation of MSW

- ❖ Resource Conservation & Recovery Act (RCRA)
 - Increasingly stringent requirements for MSW
 - Essentially equivalent to Hazardous Waste TSD
 - Subtitle C: Hazardous Wastes

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Hazardous Wastes



**A
Special
Case**

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Hazardous Wastes

- ❖ Listed waste
- ❖ Listed process
- ❖ Characteristic Waste
 - Corrosive
 - Ignitable
 - Explosive
 - Toxic



Source: RCRA Subtitle C

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Sources of Hazardous Wastes

- ❖ Industry
- ❖ Agriculture
- ❖ Community
 - Parks & Recreation
 - Public Utilities
 - Residential

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Health Hazards

- ❖ Community Exposures
 - Groundwater contamination
 - Attractive Nuisance/Vectors
- ❖ Occupational Exposures
 - Sharps (Toxics and/or Biologicals)
 - Ergonomics

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Regulation

- ❖ Since RCRA, Hazardous Wastes have been regulated from “cradle to grave”
 - Generation
 - Transport
 - Storage
 - Treatment & Disposal

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HW Disposal Options

- ❖ Pretty much the same as other Solid Wastes:
 - Haz. Waste Landfills
 - Incineration
 - Deep Well Injection

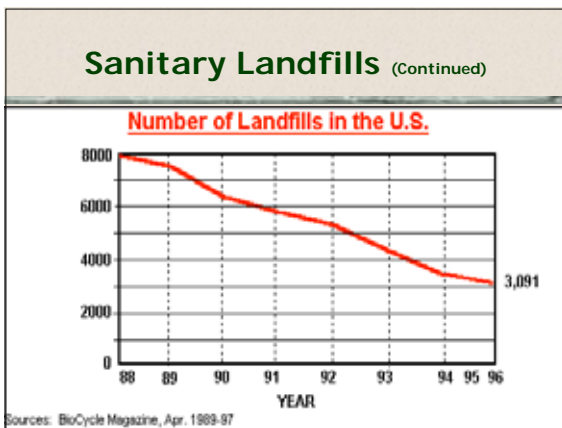
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Other MSW Options



Reduction, Reuse and Recycling

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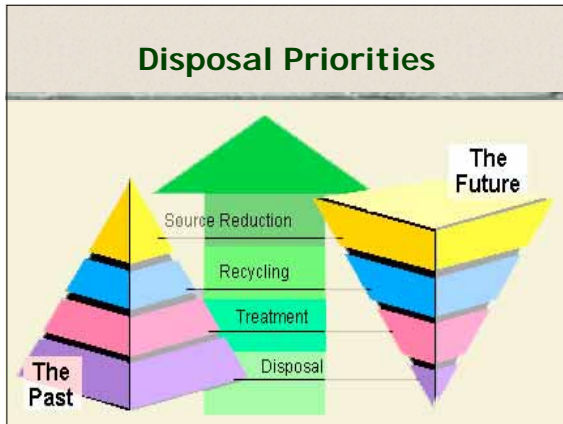


Alternatives



- ❖ Waste reduction
- ❖ Reuse
- ❖ Recycling

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Waste Reduction

- ➔ Use less
- ➔ Just in Time Inventory
- ➔ Reduced Packaging
- ➔ Household Hazardous Waste Collection

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Waste Reuse

- ❖ Reuse of an item for the *same* purpose
 - ➔ Bottle Recycling
 - ➔ Shopping Bags
 - ➔ Repair consumer goods

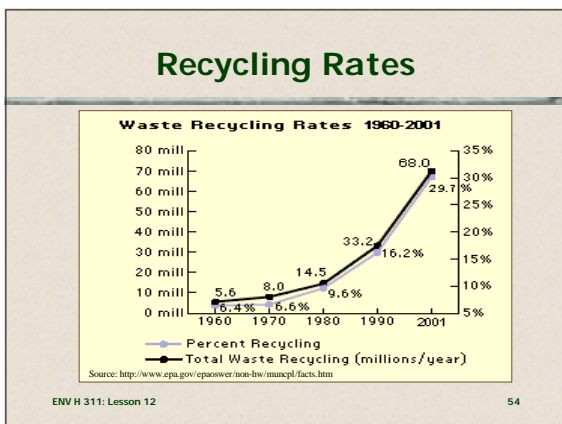
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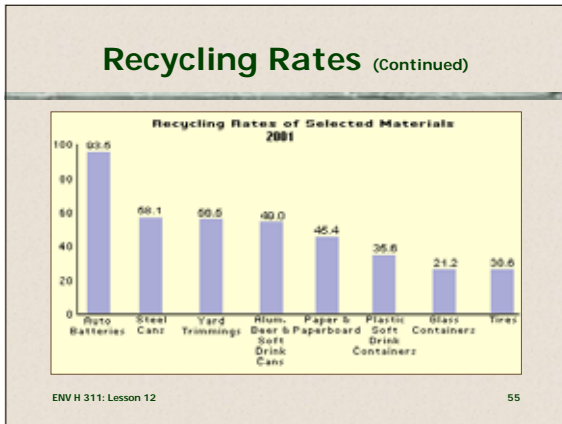
Waste Recycling

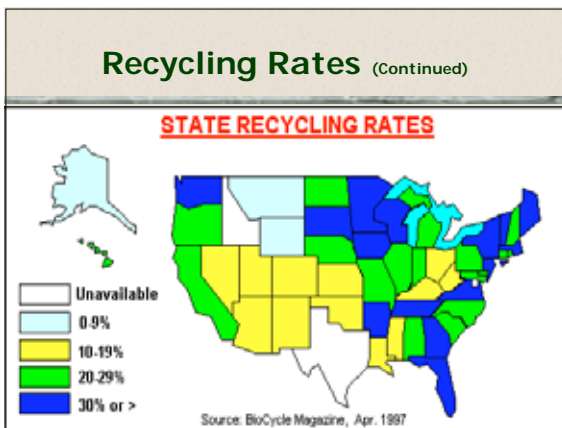
- ❖ Reuse or conversion of an item for a different purpose
 - Recycled products
 - Composting
 - Energy recovery

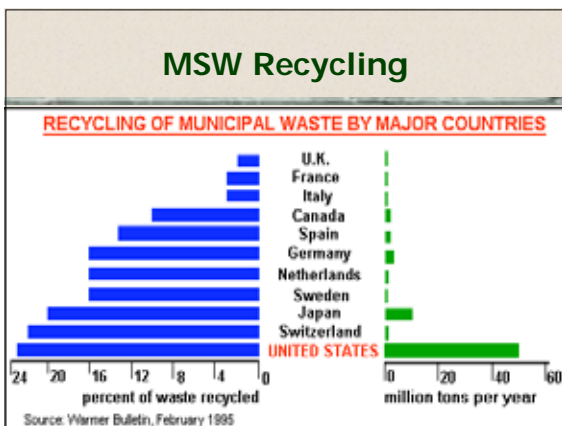
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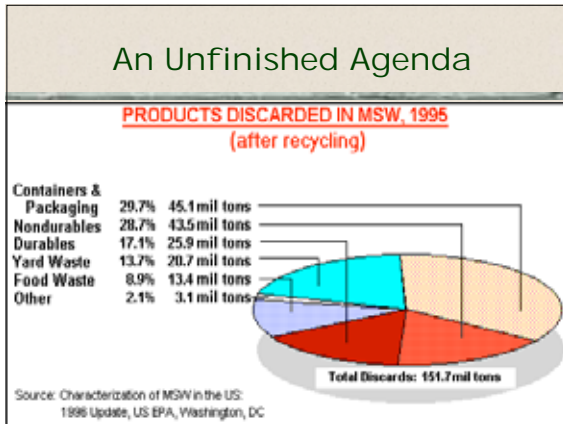















- ### Summary
- ❖ Generation of MSW
 - ❖ Potential Health Hazards
 - ❖ Collection & Transport
 - ❖ Treatment & Disposal Options
 - > Landfilling
 - > Incineration
 - > Composting
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Summary

- ❖ By State Law in Washington, solid waste programs are to include (in priority order):
 - Waste Reduction
 - Waste Reuse
 - Waste Recycling
 - Waste Disposal
 - Waste to Energy Incineration
 - Landfill of the residual

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Questions



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Web Resources

- ❖ U.S. Environmental Protection Agency
 - <http://www.epa.gov/epaoswer/osw/hazwaste.htm>
- ❖ Household Hazardous Wastes
 - <http://outreach.missouri.edu/owm/hhw.htm>
- ❖ King County Local Hazardous Waste Program
 - <http://www.metrokc.gov/hazwaste/house/>

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Next Lesson

**Workplace
Health & Safety**

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