

CH 21 - Solid and Hazardous Waste

Solid Waste

- Solid waste is any unwanted or discarded material that is not a liquid or gas
- The United States has 4.6% of the world's population and produces about _____% of the world's solid waste

Sources of Solid Waste

- About 98.5% of the solid waste in the U.S. is industrial solid waste from _____, oil and natural gas production, _____, and industrial activities
- The remaining 1.5% of solid waste in municipal solid waste (garbage) from homes and businesses

Hazardous Waste

- Hazardous waste is any discarded solid or liquid material that
 - Contains one or more _____ compounds at levels that exceed established limits
 - Catches fire easily
 - Is reactive or unstable enough to explode or release toxic fumes
- Hazardous wastes may be detoxified by
 - _____: breakdown by microorganisms
 - Phytoremediation: breakdown by natural or genetically engineered plants in artificial marshes or greenhouses
- _____ waste, or "e-waste" represents only about 2% of total waste in landfills, but comprises 70% of overall toxic waste. This includes discarded cell phones, computers, printers, televisions etc. E-waste has high levels of many toxic metals, including _____, copper, _____, silver and gold.

Not Hazardous Waste?

- Under the U.S. legal definition of hazardous waste, the following are NOT included:
 - Radioactive wastes
 - Toxic materials discarded by _____
 - Mining wastes
 - Oil and gas-drilling wastes
 - Liquid waste containing _____ hydrocarbon compounds
 - Cement kiln dust produced when burning hazardous wastes
 - Wastes from small businesses and factories

Love Canal

- Niagra Falls, NY--Twenty five years after the Hooker Chemical Company stopped using the _____ as an industrial dump, 82 different compounds, 11 of them suspected carcinogens, have been percolating upward through the soil, their drum containers rotting and leaching their contents into the backyards and basements of 100 homes and a public school built on the banks of the canal.

Hazardous Waste Regulation

- 1976, Resource Conservation and Recovery Act, RCRA (“RICK-ra”)
 - Requires the _____ to identify hazardous wastes and set standards for their management
- 1980, Comprehensive Environmental Response, Compensation, and Liability Act, CERCLA, the Superfund Program
 - Identifies and cleans up abandoned hazardous waste dump sites
 - Implements “polluter-pays” principle allowing the EPA to sue any parties they consider liable for the pollution. However, the Bush administration did not renew this tax to corporations, which has led to smaller number of cleanups and payment by _____.

Dealing with Waste

- There are two ways to deal with waste
 - Waste _____ (high-waste approach) manages unavoidable increases in waste
 - Waste _____ (low-waste approach) acts to reduce waste and pollution, reuse, recycle and compost, and then chemically or biologically treat what’s left before burying the rest

A Sanitary Landfill

Producing Less Waste

- Producing less waste is the best choice because such methods
 - Save energy and virgin materials with a lower input of _____
 - Reduce the environmental effects of extracting, processing, and using resources
 - Improve worker health and _____ by reducing exposure to toxic and hazardous materials
 - Decrease pollution control and waste management costs
 - Are less costly on a life cycle basis
- Methods of producing less waste include
 - Decrease _____
 - Redesign manufacturing to use less materials and eliminate unnecessary packaging
 - Redesign manufacturing to produce less waste and pollution
 - Use of less hazardous cleaning materials by individuals (baking soda, vinegar, borax)
 - Develop products with a longer _____
 - Incorporate trash taxes

Recycling

- Primary recycling, or _____-loop recycling, occurs when wastes discarded by consumers are recycled to produce new products of the same type (newspaper, aluminum)
- Secondary recycling, or _____-loop recycling, occurs when waste materials are converted into different products
- Primary recycling reduces use of virgin products by 20-90%
- Secondary recycling reduces use of virgin products by a maximum of 25%
- Critics of recycling contend that
 - It is being done regardless of _____ to the communities
 - It does not make sense if it costs more than sending the waste to a landfill
 - The U.S. is not running out of _____ space
 - It does not make economic sense for cheap and plentiful materials like glass and plastic
- Three factors hinder recycling efforts
 - Failure to include the environmental and health costs of raw materials in the market prices of consumer items
 - More tax breaks and _____ for resource-extracting industries than for recycling industries
 - Lack of large, steady markets for recycled materials