

Critical Thinking Questions – Introduction to Solid Waste Management Solutions

I. Solid Waste Composition, Generation, and Management

1. Any solid, semi-solid, liquid, or contained gaseous materials discarded from industrial, commercial, mining, or agricultural operations, and from community activities.
 - a. Municipal solid waste (MSW)
 - b. Industrial waste – a variety of non-hazardous materials that result from production of goods and services

Sources of solid waste include:

- Residential
- Commercial
- Institutional
- Industrial
- Construction and demolition
- Municipal services
- Treatment facilities
- Agricultural
- Medical

2. Resource Conservation and Recovery Act (1976)
 - a. Protecting human health and the environment from the potential hazards of waste disposal.
 - b. Conserving energy and natural resources.
 - c. Reducing the amount of waste generated.
 - d. Ensuring that wastes are managed in an environmentally-sound manner.

RCRA C: Hazardous Waste

RCRA D: Solid Waste

3. They have increased.
4. Food waste decreased and then increased back to 1960 values. Yard waste and paper have decreased along with glass. Plastics have increased significantly since 1960. Textiles and wood have increased as well. The primary component of MSW is paper.

II. Municipal Solid Waste Recycling

1. Answers may vary. A Solid Waste Management Facility Where Solid Waste Materials Are Received, Separated,
2. Advantages
 - Conserves resources for the next generation.
 - Prevents emissions of many greenhouse gases and water pollutants.

- Saves energy.
- Supplies valuable raw materials to industry.
- Creates jobs.
- Stimulates the development of greener technologies.
- Reduces the need for new landfills and incinerators. What are the advantages and disadvantages of MSW recycling?

Disadvantages

- Environmental impacts
- Not always economical
- Cannot recycle everything

III. Composting and Combustion

1. Composting: volume reduction, rapid stabilization of putrescibles, production of a useful product, landfill diversion
Combustion: Produced usable energy and reduced the overall volume and mass of the waste.

2. Advantages

- volume reduction
- energy recovery

Disadvantages

- public distrust
- difficult to operate
- cost
- air pollutants

IV. Municipal Solid Waste Landfills

1.
 - composite liner: Layer of compacted clay soil and a high-density polyethylene plastic liner.
 - leachate collection system: system at the bottom of the landfill that diverts leachate to a sump and is pumped from the bottom to either holding tank, lift stations, or to an on-site treatment facility.
 - gas collection system: system that collects landfill gas to either be flared or used as a renewable energy source.
 - final cover: Cover system that is installed after a cell is closed which includes a soil layer and composite liner.
2. Answers may vary.
3. Answers may vary but should highlight that leachate because less biodegradable over time, ammonia-N concentration increases, pH should stabilize around neutral.
4. Answers may vary.
5. Post-closure care is a 30-year period (can be longer or shorter) where a landfill is monitoring for groundwater, gas, and leachate quality as well as waste settlement during

this time. Landfills can be used as parks, energy parks, golf courses.