PABLO

INTRODUCTION TO ENVIRONMENTAL STUDIES

Waste Management

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SOLID WASTE MANAGEMENT

HISTORY OF WASTE MANAGEMENT


GRAMM

Types of Waste

Municipal Waste

Bulky Waste

Bio Waste

Wood Waste

WEEE Waste

Harzadous Waste

Industrial Waste

Demolition Waste

Car Waste

Paper Waste

Facts about Sanitation in Ghana

Poor sanitation and bad hygiene costs Ghana USD290m yearly – World Bank

Approximately 19,000 people including 5,100 children under the age of five die each year of diarrhoea, nearly 90% of which is directly attributed to poor water, sanitation and hygiene (WASH) services.

Faecal contamination of the environment is the root cause of an annual average of 1,800 cases of cholera affecting people

Introduction

Large amount of waste is generated each day and it is estimated that about 2,800 metric tons of MSW are generated daily in Accra alone.

Waste collection involves picking of waste from the sources, hauling and offloading at transfer stations or disposal sites.

Collection, transfer and transportation plays a critical role in the general waste management system.

It takes about 60-80% of the cost of waste management and thus the need for proper management of the collection system.

Introduction

Waste collection methods depend on the area in question such as residential, commercial, industrial or agricultural set-up.

Each method requires a compatible container with different sizes and vehicle for the activities.

Separation of recyclable components at source is very important to aid recycling.

Individuals send recyclable waste to drop-off, take back and recycling centres to enhance waste management.

Special vehicles are used to collect recyclable, special and commingled wastes

Definition of waste management

Solid waste management refers to the collecting, storing, treating, and disposing of solid material that is discarded or is no longer useful.

Improper disposal of MSW can create unsanitary conditions, which can lead to environmental pollution and outbreak of vector-borne disease.

Sources of solid wastes

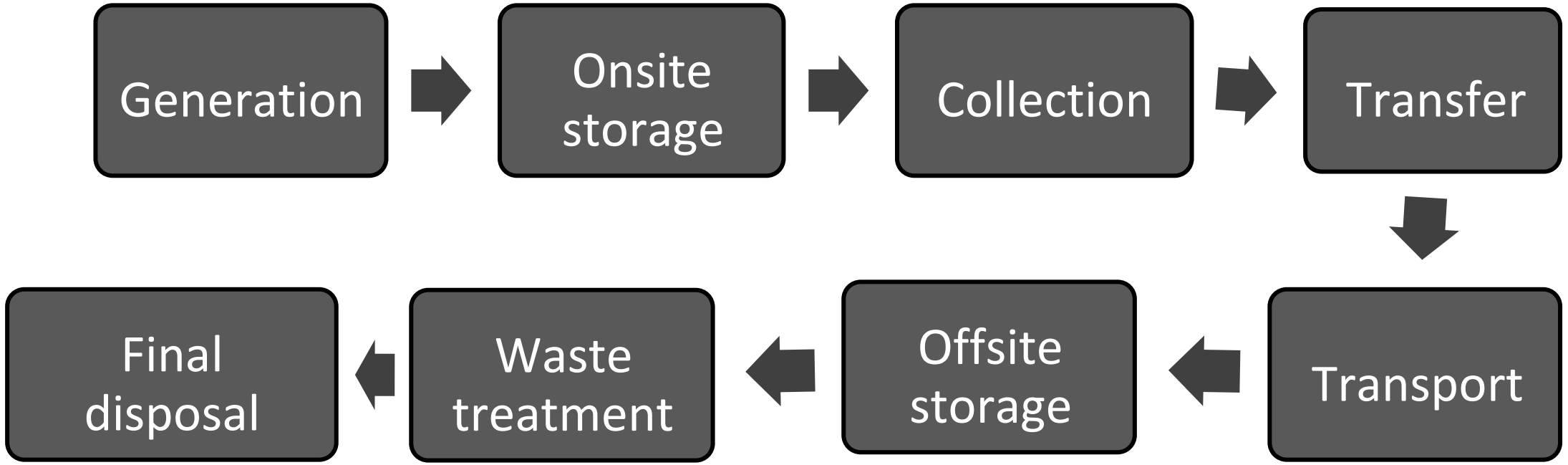
Households; agricultural fields; industries and mining, hotels and catering; roads and railways; hospitals and educational institutions; cultural centers and places of recreation and tourism, etc.

Classification of Solid Wastes

1. Municipal Waste
2. Hospital Waste

3. Hazardous Waste

Waste collection stages

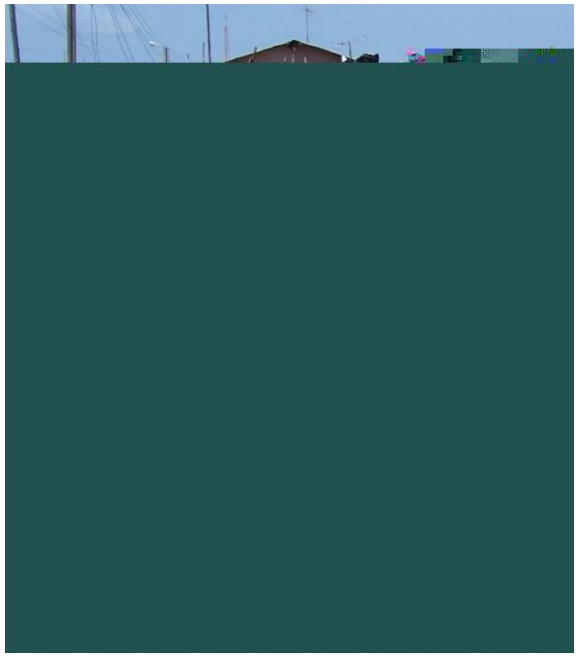


Instrument for waste collection


RECYCLING
ONLY


CLOTHING
CLOTHING
CLOTHING


Colour Glasses

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University
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Container for recyclables

Haul container

stationary container

Container types

1,100 L container

Ways for effective Solid Waste Management

- Sanitary landfills
- Composting
- Landfills
- Incineration and pyrolysis (combustion in the absence of oxygen)
- Vermiculture or earthworm farming
- Bioremediation or the use of micro-organism (bacteria and fungi)
- Reuse, reduce, and recycle

Solid Waste Management

Waste management

- high waste approach
- Burying, burning, shipping

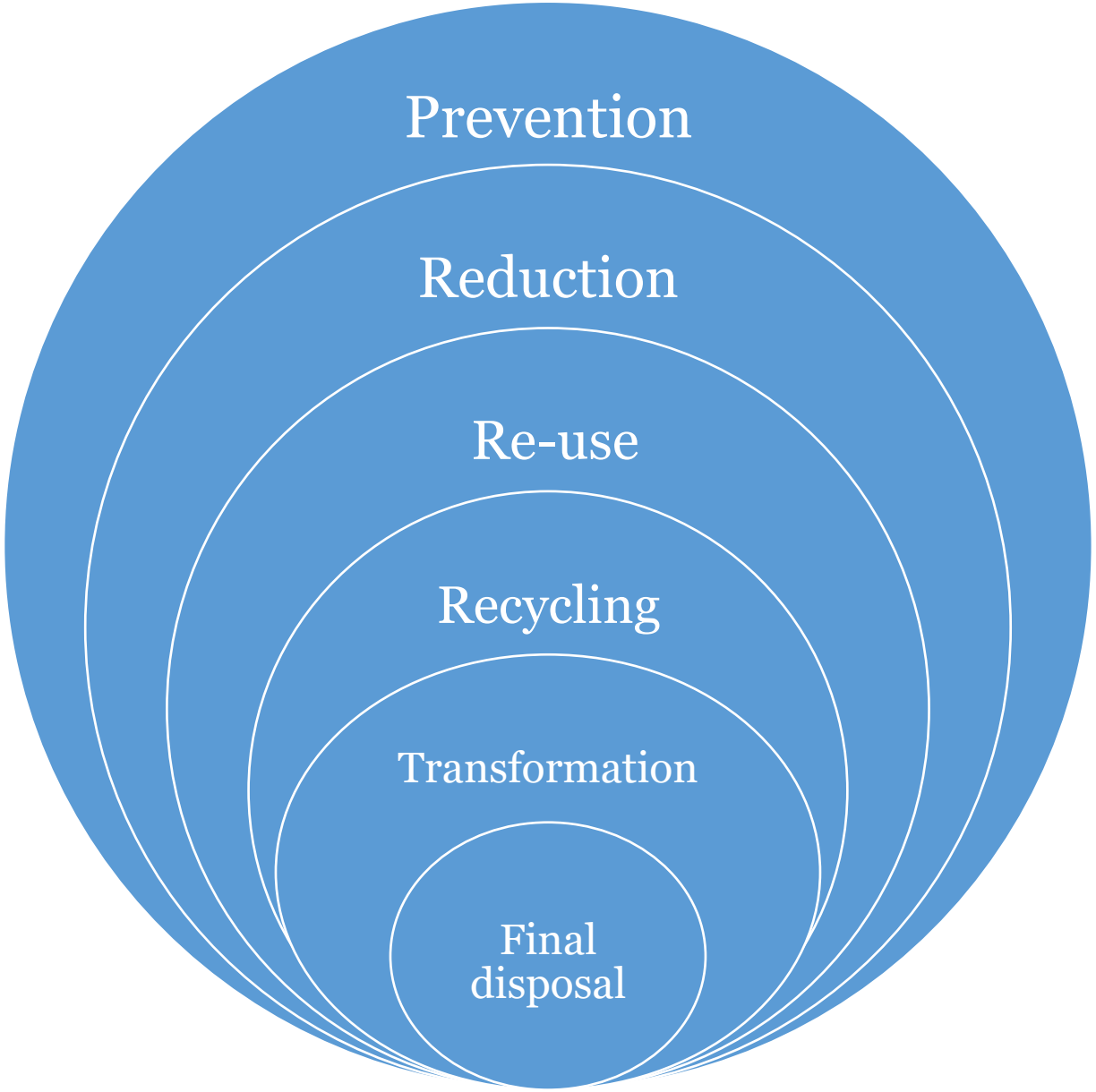
Waste prevention

- low waste approach

Reduce, reuse, recycle

Nature does not generate waste.

Waste management hierarchy

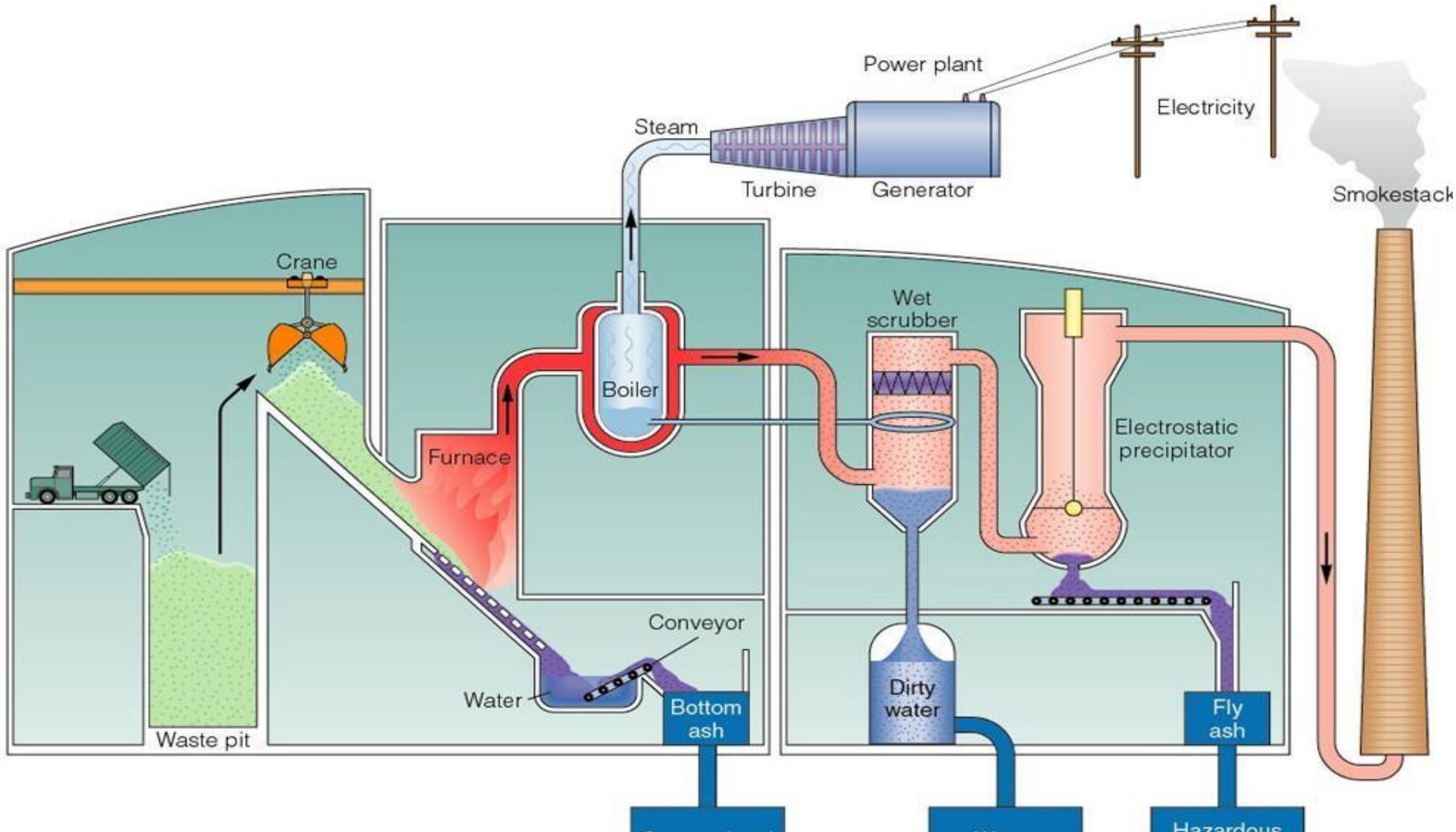

Prevention
Reduction
Re-use
Recycling
Transformation
Final disposal

Important of reuse

- Extends resource supplies
- Saves energy and money
- Reduces pollution
- Creates jobs
- Reusable products

Incineration of Wastes

- Mass burn incineration
- Air pollution
- Waste to energy


Power plant
Electricity
Steam
Turbine
Generator
Smokestack
Crane
Wet scrubber
Boiler
Furnace
Electrostatic precipitator
Conveyor
Water
Bottom ash
Dirty water
Fly ash
Waste pit

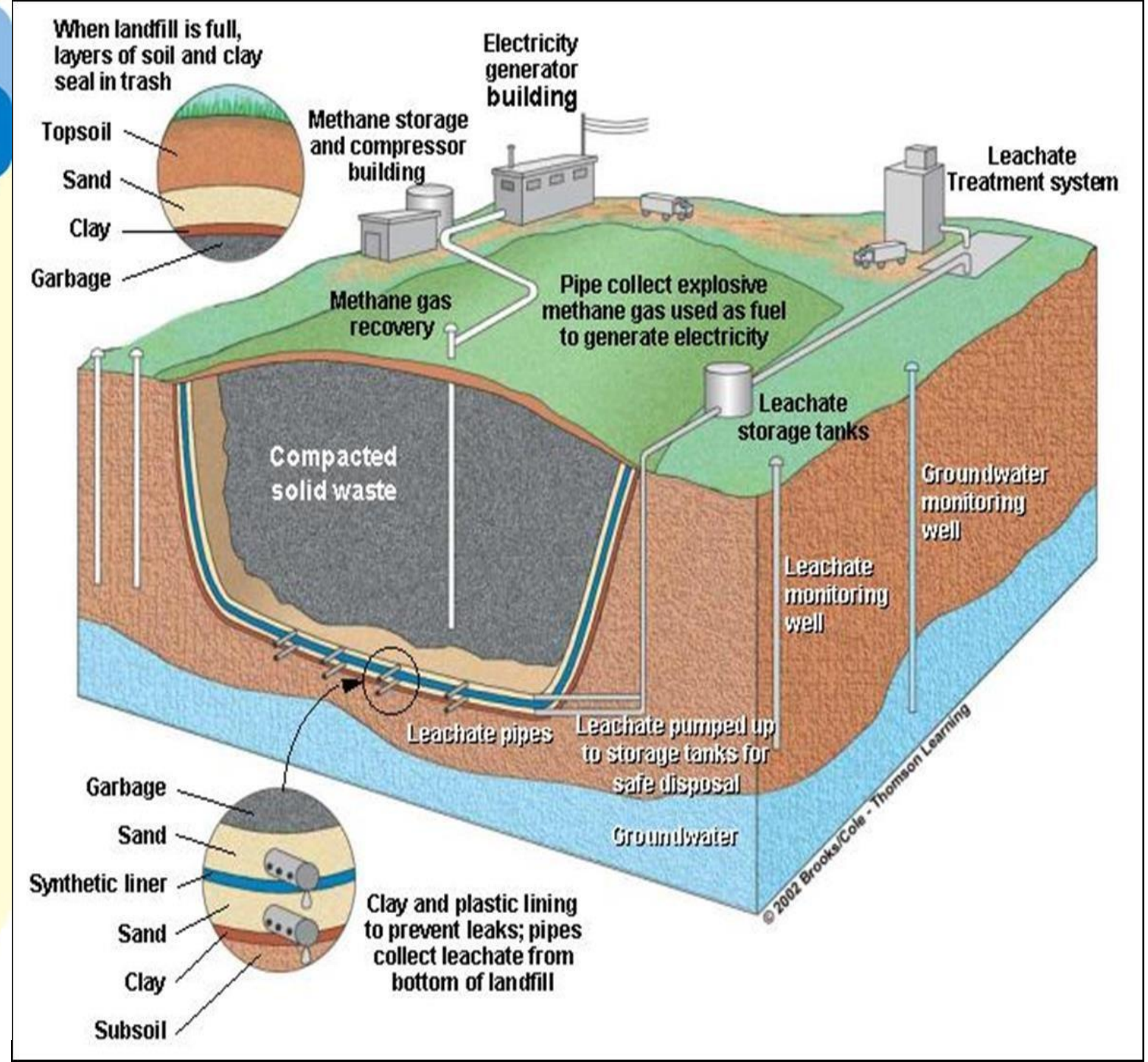
Burying Wastes

- Landfills most common method of waste disposal - cheap and convenient.
- Open pits no longer acceptable.
- Complex impermeable bottom layers to trap contaminants
- Daily deposits are covered by layer of dirt.
- Methane gas and leachate monitoring wells

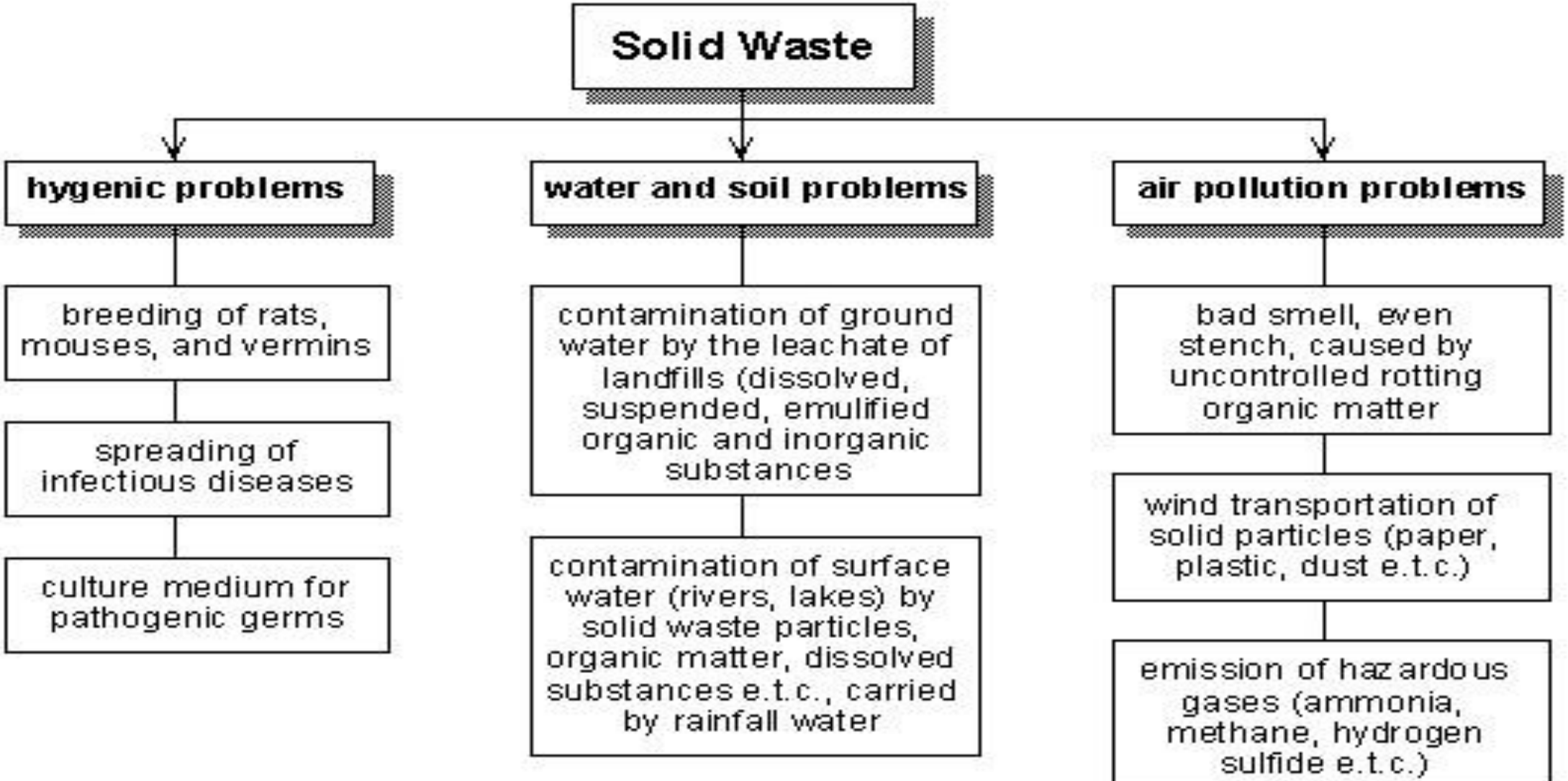
Trade-Offs

Sanitary Landfills

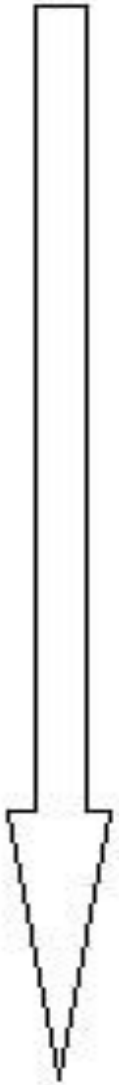
Advantages	Disadvantages
No open burning	Noise and traffic
Little odor	Dust
Low groundwater pollution if sited properly	Air pollution from toxic gases and volatile organic compounds
Can be built quickly	Releases greenhouse gases (methane and CO_2) unless they are collected
Low operating costs	Groundwater contamination
Can handle large amounts of waste	Slow decomposition of wastes
Filled land can be used for other purposes	Discourages recycling and waste reduction
No shortage of landfill space in many areas	Eventually leaks and can contaminate groundwater



Environmental challenges of solid waste



Elements of waste management system



Waste generation

- material that is identified as no longer being of value, should be gathered together for disposal (not thrown away!)
- as activity, it is not very controllable (at present)

waste handling, separation, storage, processing at the source

- activities before waste is placed in containers for collection (separation at source, internal reuse and recovery, separated collection, proper on-site collection, tranportation to container sites)

waste collection

- gathering solid waste from source sites (hauling),
- transportation site where the vehicle is emptied (transfer station, landfill disposal site e.t.c.)
- waste collection often accounts > 50% of disposal costs!

transfer and transport

- transfer of waste from smaller collection vehicle to larger transport equipment at a transfer station
- subsequent transport to the processing or disposal site

Separation, processing, transformation of solid waste (+ marketing of products)

- waste materials from curbside collection, drop off, buy back centers will be processed at special sites,
- simultaneous materials recovery, detoxification, mass and volume reduction, energy recovery,
- mechanical, biological, chemical processes of very wide variety are included

disposal

- final functional element, is the ultimate fate of all solid waste,
- a modern landfill is an engineering facility (!) for disposal without nuisances or hazards to the public health and environment

Hazardous Waste (HW)

It is defined as any substance, in solid, liquid or gaseous form which causes danger or is likely to cause danger to health and environment.

The hazardous waste requires to be disposed of in a secured manner due to their characteristic properties.

Characteristics of HW

- Contains at least one toxic compound
- Catches fire easily

- Reactive or explosive
- Corrodes metal containers

Characteristics of hazardous waste

1. Ignitability
2. Corrosiveness
3. Reactivity
4. Toxicity

Hazardous waste management rules are notified to ensure safe handling, generation, processing, treatment, package, storage, transportation, use reprocessing, collection, conversion, and offering for sale, destruction, and disposal of hazardous waste.

What Harmful Chemicals Are in Your Home?

Cleaning

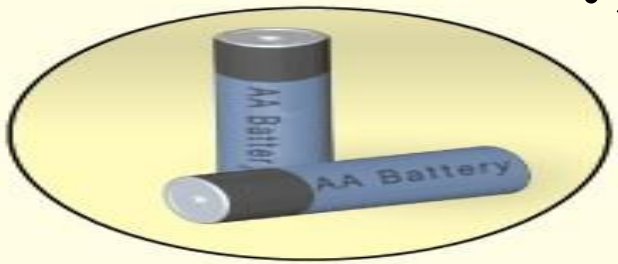
- Disinfectants
- Drain, toilet, and window cleaners
- Spot removers
- Septic tank, cleaners

Paint

- Latex and oil-based paints
- Paint thinners, solvents, and strippers
- Stains, varnishes, and lacquers
- Wood preservatives
- Artist paints and inks

General

- Dry cell batteries (mercury and cadmium)



Gardening

- Pesticides
- Weed killers
- Ant and rodent killers
- Flea powders

Automotive

- Gasoline
- Used motor oil
- Antifreeze
- Battery acid
- Solvents
- Brake and transmission fluid