EWCE-105

Environmental Chemistry

(Lecture-3)

Lecture Outline

- Integrated Waste Management
- Concept of 3R’s
- Examples related to 3 R’s

Integrated Waste Management

WASTE Generation:

- The volume and types of waste are in steep increase all over the world due to rapid economic growth, urbanization and industrialization.
- Managing waste in society has been a challenge.
- Improper management of waste is one of the main causes of environmental pollution and degradation of living conditions.

Integrated Waste Management

What is Waste?

- It is any unwanted or discarded material. It can be a solid, liquid or in gaseous form.
- Waste is any substance which is discarded after primary use, or is worthless, defective and of no use.it is not considered waste until someone throws it away.

Integrated Waste Management

What is Waste Management?

- It is defined as it includes all the activities that seek to minimize the health, environmental and aesthetics impacts of solid waste.
- The orderly execution of functional elements such as collecting, transporting, processing and disposing of waste.

Integrated Waste Management

Classification of Waste: (waste can be classified into different types depending on their source)

- Household waste or municipal waste: includes food, paper, cardboard, plastic, textiles, leather glass, metal, electronics and etc.
- Industrial waste: includes toxic chemicals, debris from construction site, packaging waste and etc.
- Biomedical waste or hospital waste: medicines bottles, expired medicines, syringes, medical instruments such as blades, cottons and etc.

Integrated Waste Management



Integrated Waste Management

Effects of waste if not managed properly

- Spreading of diseases by insects, flies and mosquito (as their number increases).
- Greatly affect the health of the population living nearby the polluted area or landfills.
- Environmental pollution (Air, Water and Soil).
- Disruption of Aesthetic value.
- Infection to animals (domestic)

Integrated Waste Management

Challenge of Managing Waste:

- Weak regulation/absence of legislation.
- Poor and unscientific waste handling/processing.
- Lack of technical skills/resources (financial).
- Socio-cultural problem (lack of community interest).

Integrated Waste Management

Integrated Waste Management (IWM) is a comprehensive **waste collection, treatment, recovery and disposal method** that aims to **provide environmental sustainability**, **economic affordability** and **social acceptance** for any specific region.

It brings us to :

The modern concepts based on the three ‘R’s.



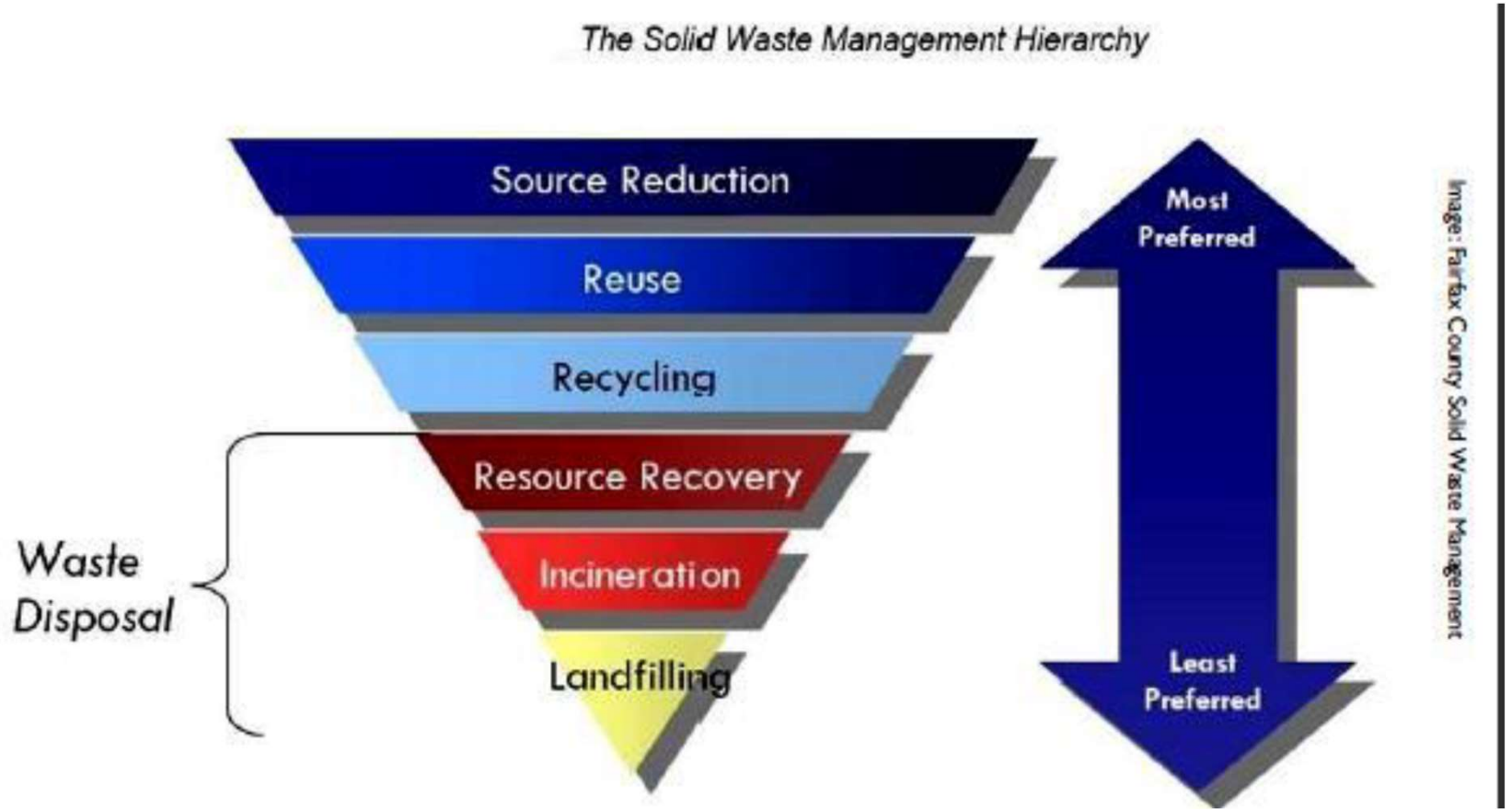
Integrated Solid Waste Management

Why Manage Waste?

- Protection of the environment and the health of the population
- Conserves resources & energy
- Saves landfill space



Integrated Solid Waste Management



Concept of 3R’s

What are the 3Rs?

3Rs refers to three terms often used when talking about waste: **Reduce**, **Reuse**, and **Recycle**.



Reducing is cutting back on the amount of trash we make.

Reusing is finding a new way to use trash so that we don't have to throw it out.

Recycling is using trash to remake new goods that can be sold again.

Concept of 3R’s

Why do we use the 3Rs?



Concept of 3R's

REDUCE :

- The best way to manage waste is to not produce it.
- This can be done by "Source Reduction".
- Preferred method: Preventing the generation of waste in the first place:

•Manufacturer: Decrease materials/energy used during Manufacturing /distribution.

•Consumer: Purchase items with minimal packaging, avoid disposable products



Concept of 3R's

REUSE:

It makes economic and environmental sense to reuse products. Sometimes it takes creativity.

- Prolonging a product's usable life.
- Repairing items, selling them or donating them to charity.
- Using durable rather than disposable items (i.e. reusable shopping bags, metal spoons).
- Preferable to recycling because item does not need to be collected/reprocessed.



Concept of 3R's

Metal vs. Plastic Spoon

- **Cost to Purchase:**

50 cents for metal vs. 1 cent for plastic

- **Cost to Produce & Maintain:**

Resources (metal, petroleum, water, chemicals, etc.) Energy used (extraction, manufacturing, shipping)

- **External Costs:**

Pollution (during extraction, built-up, shipping) Disposal (landfill, incineration, litter clean-up)

- **Savings from repetitive use of metal spoon:**

Priceless!

Concept of 3R's

RECYCLE:

It is a series of steps that takes a used material and processes, remanufactures, and sells it as a new product.

- Taking a product at the end of its useful life and using all or part of it to make another product.
- Benefits: Saves energy, natural resources, and landfill space, reduces pollution, creates jobs and useful products.
- Requires collection, processing, remanufacturing and purchase (Close the Loop!).
- It is estimated that about 75% of our waste is recyclable.

Examples related to 3 R's

The EPA (Environmental Protection Agency) tells us these recycling facts:

- 56% of all paper used by households in America in 2007 was recycled – a whopping 360 lbs per person!
- Recycling 1 ton of paper saves 17 mature trees, 7,000 gallons of water, 3 cubic yards of landfill space, 2 barrels of oil, and 4,100 kilowatt-hours of electricity.
- Recycling paper instead of making it from new material generates 74 % less air pollution and uses 50 % less water.
- Producing recycled paper requires about 60 percent of the energy used to make paper from virgin wood pulp.

Lecture Summary

- Integrated Waste Management
- Concept of 3R’s
- Examples related to 3R’s

The 3'R's – **Reduce, Reuse, Recycle** – are all about minimizing the amount of waste we produce, reusing products as much as we can, and remembering to recycle any materials that can be used for a new purpose.