

10th Standard Science

Our Environment

- **Biodegradable wastes-**

- Wastes that can be broken down by biological processes are called Biodegradable.
- They are mainly produced mainly from plant and animal sources.

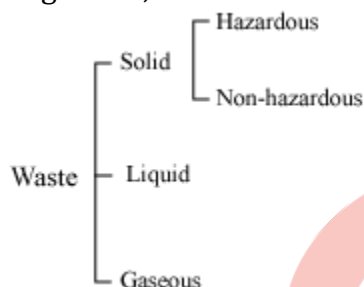
Decomposition of waste is accomplished by enzymes released by microbes in order digest this organic waste and consume it.

- **Non-biodegradable wastes**

- Wastes that cannot be broken by biological processes.
- They are usually man-made like plastic, metal etc.

Waste, is any unwanted, unused, and rejected material. Waste can be categorized according to its source – municipal, agricultural, industrial etc.

In general, wastes are of three types – **liquid, gaseous, and solid.**



Management of solid wastes

Waste management includes collection, transport, processing, and disposal of waste materials.

Measures for waste management

- Separate bins (blue and green) can be used for disposing non-biodegradable and biodegradable wastes respectively.
- Reduction in the use of non-biodegradable products like plastic.
- Separation of material, which can be reused or recycled.

The 7 principles of solid waste management i.e. Reuse, Refuse, Recycle, Rethink Reduce, Research, Regulation and public awareness should be followed.

How can we reduce waste production?

Use of recyclable material reduces the generation of wastes to a large extent. Reduced usage of materials, reusing of materials, and using recycled material will reduce the generation of wastes.

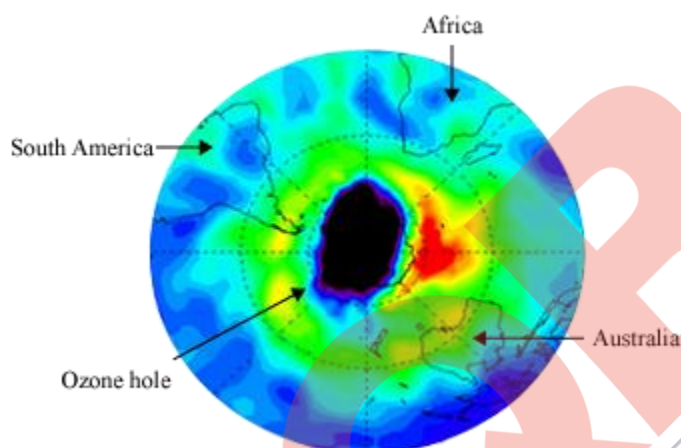
Ozone

- Ozone is a protective layer of gas in the stratosphere. Sunlight that reaches the Earth consists of ultraviolet radiations, visible radiations and infrared radiations.

- In recent years, the ozone layer has depleted rapidly. This is mainly due to an increased concentration of chlorine in the stratosphere. One atom of chlorine can destroy around 100,000 molecules of ozone, which results in its depletion.
- This chlorine is mainly produced by chlorofluorocarbons, commonly called freons, which are widely used as refrigerants.
- $\text{CFd}_3 + h\nu \rightarrow \text{CFd}_2 + \text{d}$
- Ultraviolet light acts on CFCs in the stratosphere and releases chlorine atoms.
- These chlorine atoms destroy the ozone molecules.
- $\text{Cl} + \text{O}_3 \rightarrow \text{ClO} + \text{O}_2$

Consequences of Ozone depletion

- Ozone depletion has occurred widely in the stratosphere, but is more prominent over the Antarctic region. The depletion of ozone in this region has created an **ozone hole**.



- It causes skin darkening, skin cancer, aging, and corneal cataracts in human beings. It can even result in the death of many phytoplanktons.

Environment

- **Environment**-natural surroundings and external conditions of an organism, which include all living and non-living factors that affect the organism
- **Organism**- is the basic unit of an ecological hierarchy, can be unicellular such as *Amoeba* and *paramecium* or multicellular such as humans
- **Population**- a group of individuals of the same species inhabiting a given geographical area at a particular time and functioning as a unit
- **Community**- includes all individuals of different species living within a certain geographical area
- **Ecosystem**- includes both living and non-living components of an area
- **Biosphere**- The sum total of all ecosystems and their interactions

Components of an ecosystem

- **Abiotic factors**- non living components like light, temperature, water, air etc.
- **Biotic factors**-living organisms
- **Autotrophs or producers**- organisms that can manufacture their own food from inorganic raw materials, also known as producers
- **Heterotrophs**-cannot synthesize their own food; dependent on other organisms for their food requirements.
- **Herbivores or primary consumers** - feed only on plants e.g., deer, horse, sheep etc.
- **Carnivores or secondary consumers** - eat other animals e.g., frog, cat, spider etc.
- **Omnivores**- feed on both plants and animals e.g. bear, man etc.
- **Decomposers**-obtain nutrients by breaking down remains of dead plants and animals, includes some bacteria and fungi.

Functions of an ecosystem

- **Productivity**- rate of production of organic matter (food) by producers
- **Decomposition or recycling of nutrients** - breakdown of organic matter or biomass with the help of decomposers

Energy flow through an ecosystem

- **Trophic level** - level of species in an ecosystem on the basis of the source of nutrition
- **Producers**- form the first trophic level, they manufacture food trophic levels are connected through food chains
- **Food chain**- a linear sequence of organisms in which each organism is eaten by the next member in the sequence e.g., plants → grasshopper → frog → eagle
- **Generalised Food chain**

Producers → Herbivores or primary consumers → Carnivores or secondary consumers → Omnivores or tertiary consumers → Decomposers

- **Food web**-interconnected network of food chains
- **10% law of energy transfer**- only 10% energy is transferred from a lower trophic level to a higher trophic level, which means that energy keeps on decreasing as one moves up different trophic levels
- The graphical representation of energy exchange in the ecosystem is known as "**Pyramid of energy**".
- Since so little energy is available for the next trophic levels of consumers, food chains generally consists of three or four trophic level.
- **Biomagnification**-increase in the concentration of pollutants or harmful chemicals with each step up in the food chain