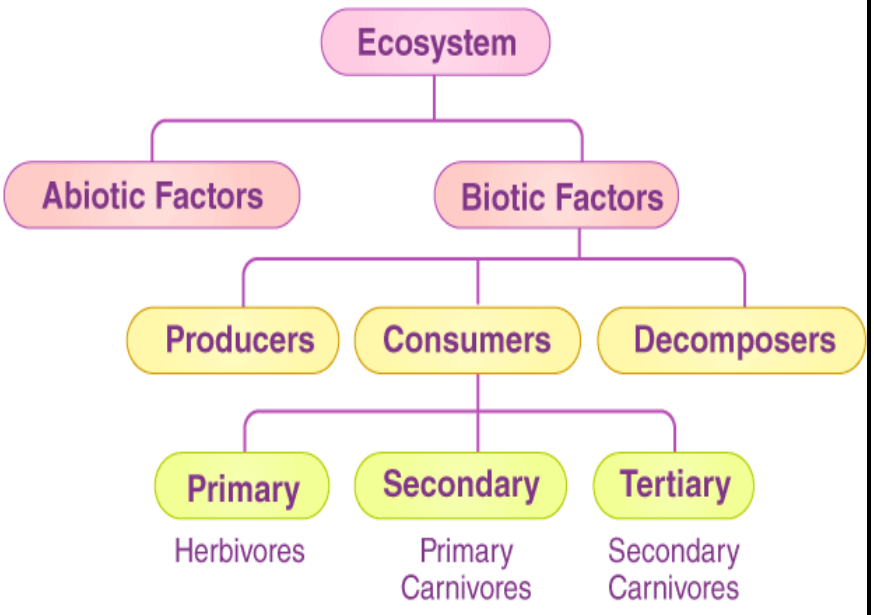
OUR ENVIRONMENT

- Everything that surrounds us is environment. It includes both living (biotic) and non-living (abiotic) components.
- The ecosystem comprises all the biotic and abiotic factors interacting with one another in a given area. Biotic components include all living organisms such as plants, animals, microorganisms and humans, etc., and abiotic components include sunlight, temperature, air, wind, rainfall, soil and minerals, etc. E.g. pond ecosystem, grassland ecosystem, etc.
- All the interacting organisms in an area together with the non-living constituents of the environment form an ecosystem. E.g., forest, pond etc.
- **Types of ecosystem**
- It is of two types

1. **Natural ecosystem:** The ecosystem which exist in nature on its own. Example: forest, lake, ocean.
2. **Artifical ecosystem:** Man-made ecosystems are called artificial ecosystem. Example: crop field, aquarium, garden.



⇨ Components of Ecosystem

1. **Abiotic Components: -** All the non-living components such as air, water, land, light, temperature etc. form the abiotic components.

⇨ Edaphic factors like soil texture, topography, water, and air.

⇨ Inorganic substances like carbon dioxide, nitrogen, oxygen, water, phosphorus, sodium, potassium, and calcium. These are involved in the cyclic of materials in the ecosystem.

⇨ Organic compounds like proteins, carbohydrates, and lipids. These largely form the living body and link the abiotic and biotic components.

⇨ **Climatic factors:** These are sunlight temperature, pressure humidity, moisture, rainfall, etc. these factors affect the distribution of the organisms.

2. **Biotic Components: -** All the living components such as plants, animals, bacteria, fungi etc. form the biotic components.

⇨ On the basis of nutrition biotic components are further divided into:

(i) **Producers:** All green plants and blue-green algae can produce their own food using abiotic components (photosynthesis), hence called producers.

(ii) **Consumers:** Include all animals which depend on producers directly or indirectly for their food.

⇨ **Division of Consumers**

(a) Herbivores: Plant eaters. Example: goat, deer.

(b) Carnivores: Flash eaters. Example: tiger, crocodile.

(c) Omnivores: Eats both plants and animals. Example: human.

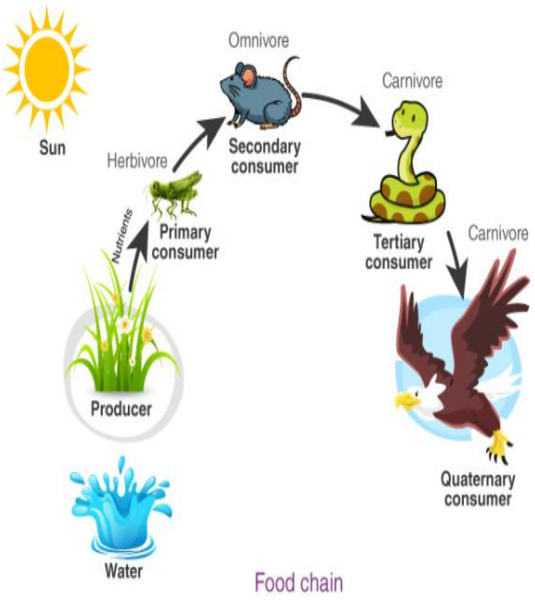
(d) Parasites: Live on the body of host and take food from it. Example: lice, cascuta.

⇨ **Decomposers:** Include organisms which decompose the dead plants and animals. Example: bacteria, fungi. These help in the replenishment of natural resources.

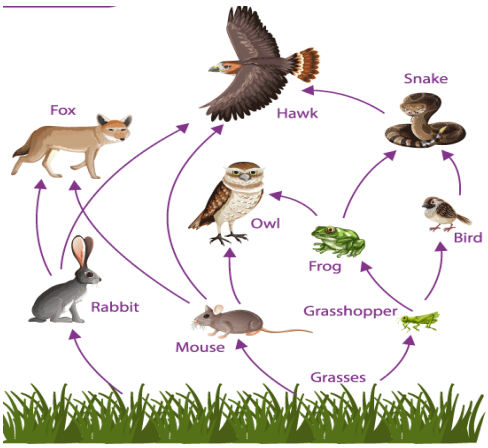
⇨ **Importance of Decomposers**

1. Decomposers help in disposing of the wastes and dead bodies of plants and animals. Therefore, they clean the environment and create space for a living of newer generations of organisms.
2. The decomposers release minerals and other raw materials trapped in organic matter. These are picked up by plants. This also helps to maintain the fertility of soil.
3. The decomposers produce some acids which are useful in solubilization of some minerals.
4. Decomposers help in recycling the materials in the biosphere so that, the process of life may go on and on like an unending chain.

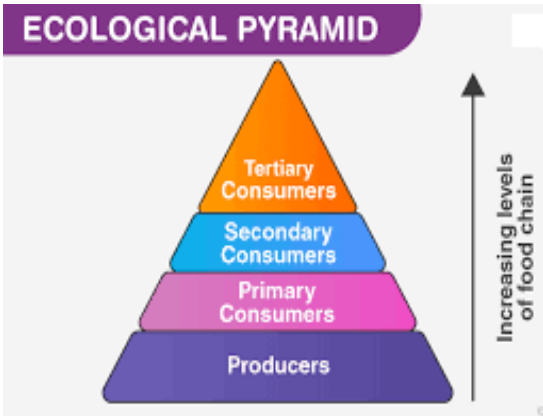
- **Food Chain:** The sequence of living organisms in a community in which one organism consumes another organism to transfer food energy, is called a food chain.
- A food chain is unidirection where transfer of energy takes place in only one direction.
- Food chain is sequential process which represents “who eats whom”.
- Food chain refers to an arrangement of different biotic groups in a sequence of energy transfer. These biotic groups are producer herbivores, carnivores.



- The study of food chains helps in understanding food relationships and interactions among the various organisms in an ecosystem. The food chains, transfer energy and materials between various living components of an ecosystem.
- The food chains transfer energy and materials between various living components in an ecosystem or biosphere.
- The food chains give dynamicity to an ecosystem or biosphere.
- The movement of toxic substances like pesticides, weedicides, etc., through food chains, can prove very harmful.
- **Food Web:** The inter-connected food chains operating in an ecosystem which establish a network of relationship between various species, are called a food web.
  In a food web, one organism may occupy a position in more than one food chain. An organism can obtain its food from different sources and in turn, may be eaten up by different types of organisms.



- **Trophic Levels:** The various steps in the food chain at which the transfer of food (or energy) takes place are called trophic levels.
  There is a gradual decrease in the amount of energy transfer from one trophic level to the next trophic level in a food chain.



- ⇨ Green plants capture 1% of sunlight and convert it into food energy.
- ⇨ **10 percent law:** Only 10% of energy is transferred to the next trophic level. The remaining 90% energy is used in life processes (digestion, growth, reproduction etc.) by present trophic level.
- ⇨ **Environmental Problems:** Changes in the environment affect us and our activities change the environment around us. This led to the slow degradation of the environment that arose many environmental problems. For Example; depletion of the Ozone Layer and waste disposal.
- ⇨ **Ozone layer**
- ⇨ Ozone layer is a protective blanket around the earth which absorbs most of the harmful UV (ultraviolet) radiations of the sunlight, thus protecting living beings from many health hazards such as skin cancer, cataract, destruction of plants etc.
- ⇨ Ozone (O_3) layer is present at higher levels of atmosphere (i.e. stratosphere). It is a deadly poison at ground level.
- ⇨ **Depletion of ozone layer.**
- ⇨ The decrease in the thickness of ozone layer over Antarctica was first observed in 1985 and was termed as ozone hole.
- ⇨ This decrease was linked to excessive use of synthetic chemicals like chlorofluorocarbons (CFCs) which are used in refrigerators, ACs, fire-extinguishers, aerosols sprays etc.
- ⇨ United Nations Environment Programme (UNEP) succeeded in forging an agreement to stop CFC production at 1986 levels (KYOTO PROTOCOL) by all countries.
- ⇨ **Garbage disposal**
- ⇨ Improvements in lifestyle have resulted in accumulation of large amounts of waste materials.
- ⇨ **Types of materials in Garbage**
  1. **Biodegradable:** Substances which can be decomposed by the action of micro-organisms are called biodegradable wastes.
     Example: fruit and vegetable peels, cotton, jute, dung, paper, etc.
  2. **Non-biodegradable wastes:** Substances which cannot be decomposed by the action of micro-organisms are called non-biodegradable wastes.
     Example: plastic, polythenes, metals, synthetic fibres, radioactive wastes, pesticides etc.
- ⇨ Micro-organisms release enzymes which decompose the materials but these enzymes are specific in their action that's why enzymes cannot decompose all the materials.
- ⇨ **Methods of waste disposal**

1. **Biogas plant:** Biodegradable waste can be used in biogas plant to produce biogas and manure.
2. **Sewage treatment plant:** The drain water can be cleaned in sewage treatment plant before adding it to rivers.
3. **Land fillings:** The wastes are buried in low lying areas and are compacted by rolling with bulldozers.
4. **Composting:** Organic wastes are filled in a compost pit and covered with a layer of soil, after about three months garbage changes to manure.
5. **Recycling:** Non-biodegradable wastes are recycled to make new items.
6. **Reuse:** It is a conventional technique to use an item again. Example: newspaper for making envelops.

⇨ **Biological magnification**

⇨ Biological magnification, also known as biomagnification, is the process by which toxic substances increase in concentration as they move up the food chain

⇨ Biological magnification occurs when toxic substances, like pesticides or heavy metals, enter the environment and are absorbed by organisms.

⇨ These substances can't be broken down by the environment or excreted by the organism.

⇨ As a result, the concentration of the substance increases as it moves up the food chain.

⇨ Higher-level predators, like fish, birds, and marine mammals, have higher concentrations of toxic substances than lower-level organisms.

⇨ **Causes of Biomagnification**

1. **Toxic substances: -** Toxic substances like pesticides, heavy metals, and organic contaminants can be released into the environment by industries, agriculture, and mining
2. **Agricultural chemicals: -** Pesticides, herbicides, fungicides, and fertilizers used in agriculture can accumulate in the soil and water.
3. **Mining: -** The mining process can release selenium and sulfide into the water, which can destroy coastal regions and oceans.
4. **Organic contaminants: -** Manures and biosolids used in personal care products and pharmaceuticals can contain contaminants that contribute to biomagnifications.
5. **Plastics: -** Microplastics can add another layer of exposure to the biomagnification process.