

# Ecosystem

## 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
- **Ecology**: It is the field of science that deals with the interrelationship between biotic and abiotic factors.
  - It includes four levels of biological organisation: **organisms, populations, communities and biomes.**
  - **Major abiotic factors**: Light, temperature, water, air, soil, etc.
  - **Eurythermal**: Organisms that can tolerate wide range of temperature
  - **Stenothermal**: Organisms that live in a narrow range of temperature
  - **Euryhaline**: Organisms that can tolerate wide range of salinity
  - **Stenohaline**: Organisms that live in a narrow range of salinity

**Forest** is a large area of land where a large number of tall trees, herbs, and shrubs grow naturally.

Forest have four layers -

- emergent layer
- canopy layer
- understory
- forest layer

### **Features-**

- In a forest, different types of trees , grasses, herbs, shrubs, climbers are present
- The vegetation in a forest provides shelter to various animals, birds, and insects.
- It maintains the balance of nature. All the components of forests are interconnected with each other in the form of food chain.
- Decomposers increase the soil fertility. They convert dead plants and animals into humus. Humus is the topmost, dark brown, fertile layer of soil.
- Forests also maintain the balance of oxygen and carbon dioxide.
- They improve the quality of air as plants absorb CO<sub>2</sub> gas from atmosphere and give out oxygen. This oxygen is used by animals for respiration.