

OUR ENVIRONMENT

Environment

- The **environment** is the sum total of all living and non-living components, events, and influences that surround and affect an organism. It includes everything that directly or indirectly affects the survival, growth, and development of living organisms.
- All organisms depend on the environment for their **basic needs**, such as:
 - ❖ Food
 - ❖ Water
 - ❖ Oxygen
 - ❖ Energy
 - ❖ Shelter
- There is a **close and continuous interaction** between organisms and their environment. Any change in the environment can directly affect the life processes of organisms.

Biodegradable and Non-biodegradable Substances

Biodegradable Substances	Non-biodegradable Substances
➤ Biodegradable substances are those materials that can be broken down into simpler substances by biological processes , mainly by microorganisms such as bacteria and fungi.	➤ Non-biodegradable substances are those that cannot be decomposed by biological processes .
➤ These substances do not persist in the environment for long.	➤ They remain in the environment for a long time.
➤ However, if their decomposition is slow, they may accumulate and cause pollution.	➤ They may be inert or harmful and lead to environmental pollution.
➤ Examples: plant waste, fruits, animal excreta, dung, paper, cloth	➤ Examples: plastics, DDT, aluminium cans, metal oxides

Ecosystem

- An **ecosystem** is a functional unit of nature where **living organisms (biotic components)** interact with **non-living components (abiotic components)**.
- It is a **self-sustaining system** where energy flows and nutrients are recycled.

Components of Ecosystem

(a) Biotic Components

- These include all **living organisms** present in an ecosystem:
 - ❖ Plants
 - ❖ Animals
 - ❖ Microorganisms

(b) Abiotic Components

- These include all **non-living physical factors**, such as:
 - ❖ Soil
 - ❖ Water
 - ❖ Air
 - ❖ Light
 - ❖ Temperature
 - ❖ Rainfall
 - ❖ Minerals
- These factors influence the survival and distribution of organisms.

Types of Ecosystem

(a) Natural Ecosystem

- These ecosystems occur naturally without human interference.
- **Examples:** forests, ponds, lakes
 - ❖ Green plants and algae act as **producers**.

- ❖ Herbivorous organisms (like insects, fishes) act as **primary consumers**.
- ❖ Carnivorous animals (like frogs, large fishes) act as **secondary consumers**.

(b) Artificial Ecosystem

- These ecosystems are **man-made** and maintained by humans.
- **Examples:** gardens, agricultural fields, aquariums
 - ❖ An aquarium is considered a **balanced artificial ecosystem**.

Types of Organisms in an Ecosystem

(a) Producers (Autotrophs)

- Producers are organisms that **prepare their own food** using sunlight through the process of photosynthesis.
 - ❖ They contain chlorophyll.
 - ❖ They convert solar energy into chemical energy.
- **Examples:** green plants, algae
- They form the **base of the food chain** and provide energy to all other organisms.

(b) Consumers (Heterotrophs)

- Consumers are organisms that **cannot make their own food** and depend on other organisms.

Types of Consumers:

- ❖ **Herbivores:** eat plants (grasshopper, goat, rabbit)
- ❖ **Carnivores:** eat other animals (lion, cat)
- ❖ They may act as **predators or parasites**

(c) Decomposers

- Decomposers are microorganisms that **break down dead plants and animals** into simpler inorganic substances.
- They recycle nutrients back into the soil.
- These nutrients are reused by plants.
- **Examples:** bacteria, fungi

Food Chain and Food Web

Food Chain

- A **food chain** is a sequence in which organisms eat and are eaten by others.
- Example:
Plants → Herbivore → Carnivore

Food Web

- A **food web** is a network of interconnected food chains.
- It shows multiple feeding relationships.
- It provides stability to the ecosystem.

Pyramid of Numbers

- In a food chain, the number of organisms decreases at higher trophic levels.
- The top level has the **least number of organisms**.

Energy Flow in Ecosystem

- Energy flows from:
Sun → Producers → Consumers
- Energy flow is **unidirectional** (one-way).
- Only **10% of energy** is transferred from one trophic level to the next. This is called the **10% Law**.
- Due to loss of energy at each level:
- Food chains are usually **short (3–5 levels)**.

Biological Magnification

- Biological magnification is the process in which **non-biodegradable harmful substances** accumulate in increasing concentration at higher trophic levels.
- These substances are not broken down.
- They enter the food chain and become more concentrated at each level.

Ozone Layer

- Ozone (O₃) is a molecule made of **three oxygen atoms**.
- It forms a protective layer in the atmosphere.

Importance:

- Protects Earth from **harmful ultraviolet (UV) radiation** from the Sun.
- UV rays can damage living organisms.

Threat:

- Chemicals like **CFCs (Chlorofluorocarbons)** damage the ozone layer.

Environmental Problems

- Increased use of **non-biodegradable materials** like plastics
- Excessive waste generation
- Improper waste disposal

These problems lead to:

- ❖ Pollution
- ❖ Harm to ecosystems
- ❖ Long-term environmental damage