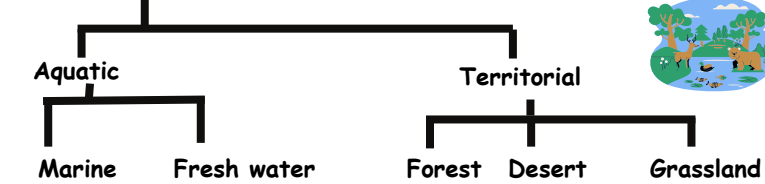


OUR ENVIROMENT

Environment: everything that is around us, which includes both living and nonliving things such as soil, water, animals and plants, which adapt themselves to their surroundings.

Ecosystem: a community of living organisms and their physical environment that interact together in a specific area

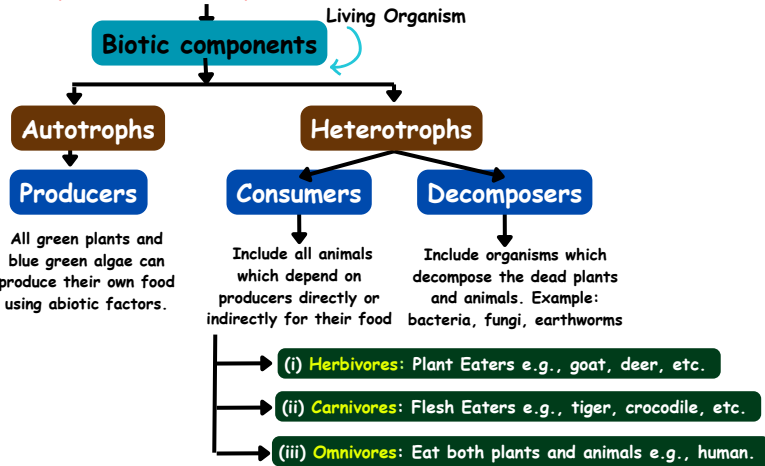
Natural ecosystem The ecosystem which exist in nature on its own.
Example: forest, lake, ocean.



Artificial ecosystem

Man-made ecosystem. (Aquarium, Garden, Crop field etc)

Components of Ecosystem

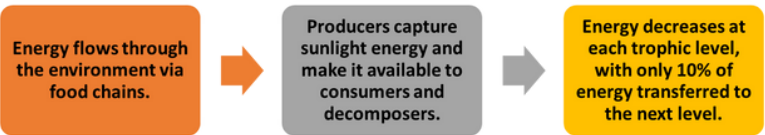


Food web: is a network of interconnected food chains showing complex feeding relationships in an ecosystem. It demonstrates how each organism can be consumed by multiple organisms and vice versa.

Trophic level

It is the position an organism occupies in a food chain, based on its role in the flow of energy

- First Level: Autotrophs/Producers (e.g., green plants) Fix solar energy and convert it into chemical energy.
- Second Level: Herbivores/Primary Consumers
- Third Level: Small carnivores/Secondary Consumers
- Fourth Level: Larger carnivores/Tertiary Consumers

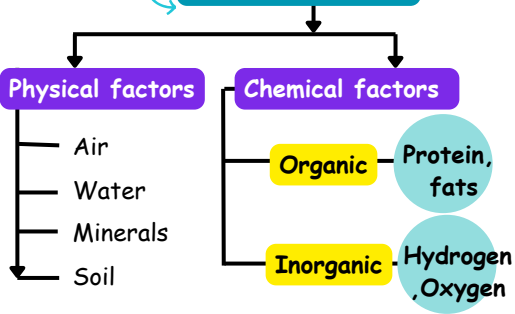


The **10% law of energy transfer**, proposed by Raymond Lindeman, states that only 10% of the energy from one trophic level is passed on to the next level in a food chain. The remaining 90% is lost as heat, during movement, growth, and other life processes.

- Green plants capture 1% of solar energy falling on their leaves.
- At each trophic level: Heat loss: A large part of energy is lost as heat to the environment. **10% Rule:** Only 10% of the consumed energy is converted into biomass and made available to the next level.
- Due to energy loss, food chains are usually limited to 3-4 levels.
- Producers are the most numerous, with numbers decreasing progressively at higher trophic levels.

Bio magnification: Progressive accumulation of harmful chemicals (e.g., pesticides) in organisms at higher trophic levels.

Non living organisms Aboitic Components

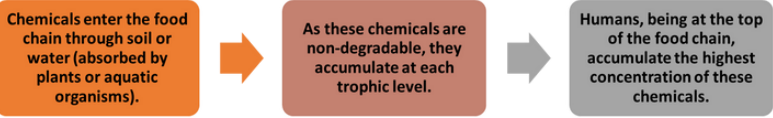


Fundamental energy driving our climate system **Sunlight**

| Environment | Ecosystem |
|---|--|
| The physical and biological surroundings where organisms live. | A system where living (biotic) and non-living (abiotic) components interact. |
| Includes all the external conditions affecting an organism's life. | Includes interactions like food chains, food webs, and nutrient cycles. |
| Environment changes as an organism moves from one place to another. | Ecosystems remain stable regardless of an organism's movement. |

How Ecosystem Works?

1. Sunlight - Primary energy source.
 2. Producers - Plants make food via photosynthesis.
 3. Herbivores - Eat plants (Primary consumers).
 4. Carnivores - Eat animals (Secondary/Tertiary consumers).
 5. Decomposers - Break down dead organisms.
 6. Nutrient Recycling - Nutrients return to soil for reuse.
- Food Chain:** A series of organisms feeding on one another.



| Food Chain | Food Web |
|---|---|
| A linear sequence of organisms where each is eaten by the next organism. | A complex network of interconnected food chains in an ecosystem. |
| Simple and straightforward, showing one pathway of energy flow. | Complex and branched, showing multiple pathways of energy flow. |
| Each organism is linked to only one other organism at the next trophic level. | Each organism is connected to multiple organisms at different trophic levels. |
| Less stable; affected if one organism is removed from the chain. | More stable; removal of one organism has less impact due to multiple connections. |
| Energy flows in a single direction (unidirectional). | Energy flows through multiple interconnected pathways. |
| Example: Grass → Grasshopper → Frog → Snake → Hawk | Example: Grass is eaten by grasshoppers, rabbits, or deer, which are eaten by frogs, hawks, or lions. |

OZONE: Molecule made of three oxygen atoms. Protects Earth from harmful UV radiation, which can cause skin cancer in humans. Ozone is formed when UV rays split oxygen molecules (O_2), and free oxygen atoms combine with O_2 to form ozone (O_3): $O_2 \rightarrow O + O$ (by UV rays) $O + O_2 \rightarrow O_3$ (ozone formation)

Depletion of Ozone Layer: Stratosphere

Sharp decline observed since the 1980s due to chemicals like Chlorofluorocarbons (CFCs) used in refrigerants and fire extinguishers.

The UNEP (1987) introduced an agreement to limit CFC production at 1986 levels.

Garbage disposal : Improvements in lifestyle have resulted in accumulation of large amounts of waste material.

Types of waste

Biodegradable Waste materials that can be broken down into simpler substances by natural processes such as the action of microorganisms (bacteria and fungi).

Examples: Food waste, paper, cotton,

Non biodegradable Waste materials that cannot be broken down by natural processes and remain in the environment for a long time.

Examples: Plastic, glass, and metals.

Harmful effects of waste

- Ozone depletion
- Air, soil and water pollution
- Bioaccumulation
- Bio magnification

Some Methods of Waste Disposal

- Biogas Plant - Converts biodegradable waste into biogas and manure.
- Sewage Treatment - Cleans drain water before releasing it into rivers.
- Landfilling - Buries and compacts waste in low-lying areas.
- Composting - Converts organic waste into manure.
- Recycling - Processes non-biodegradable waste into new products.
- Reuse - Uses old items again, like making envelopes from newspapers.
- Incineration - Burns waste at high temperatures to form ash.

Challenges: Improper disposal of plastics and e-waste harms the environment. Recycling may also have environmental impacts.

Chapter ka KAZAANA:

- 10% Law (Numerical)
- Ozone (formation)
- Biomagnification

