

SCIENCE

BIOTIC FACTORS & FOOD CHAIN, TROPHIC LEVELS

FOOD CHAIN

It is a sequence of organisms through which energy is transferred in the form of food by the process of one organism consuming the other.

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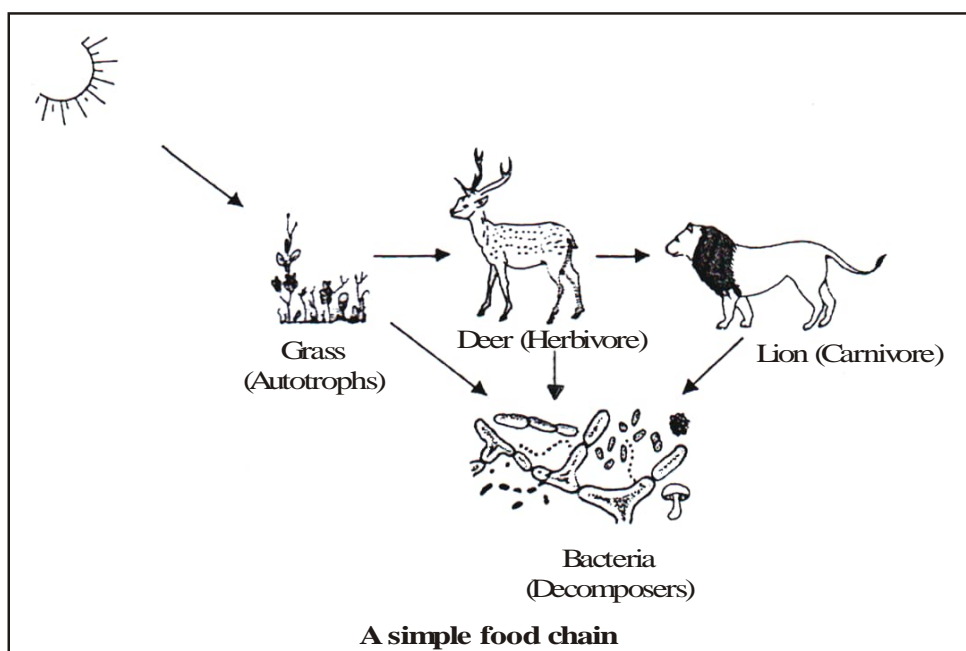
List of organisms [living beings] showing "who eats whom" is called a food chain.

→ A food chain represents unidirectional transfer of energy.

→ All the food chains begin with a green plants.

(i) Grass → Deer → Lion
(Producer) (Herbivore) (Carnivore)

(ii) Grass → Insects → Frog → Birds
(Producer) (Herbivore) (Carnivore) (Top carnivores)



Two types of food chains :

(A) Grazing food chains

Grazing type food chains					
Type of Ecosystem	Producers	Herbivores	Primary Carnivores	Secondary carnivores	Tertiary carnivores
(A) Grassland ecosystem	1. Grass	Insects (Grasshopper)	Frog	Snakes	Predatory birds
	2. Grass	Rats and mice	Snakes	Predatory birds	
	3. Grass	Rabbits	Foxes	Wolves	Lions
(B) Pond ecosystem	Phytoplanktons	Zooplanktons	Small fish	Large fish	Predatory birds

(b) Detritus food chain

Detritus food chain				
Detritus	Detritivores	Detritivore consumers	Small carnivores	Large carnivores
Mangrove fallen leaves and dead bodies of animals	Fungi, Bacteria and Protozoans	Insects larvae, certain crustaceans, molluscs and fish	Minnows, small game fish, etc.	Large fish, fish-eating birds

SIGNIFICANCE OF FOOD CHAINS

The significance of food chains can be seen with the help of following functions :-

- (i) It is a means of transfer of food from one trophic level to another.
 - (ii) It provides information about the living components of an ecosystem.
 - (iii) It helps us in understanding the interactions and interdependence amongst different organisms in an ecosystem.
 - (iv) It is a pathway for the flow of energy in any ecosystem.
- ❖ Plants ———→ Men (Two trophic levels)
 - ❖ Plants ———→ Goat ———→ Men (Three trophic levels)
 - ❖ Plants ———→ Mice ———→ Snakes ———→ Peacocks (Four trophic levels)
 - ❖ Plants ———→ Insects ———→ Frogs ———→ Snakes ———→ Eagles (Five trophic levels)

❖ Plants → Grasshoppers → Frogs → Snakes → Hawks (Five trophic levels)

Introduction of Ecosystem

An ecosystem is a structural and functional unit of ecology where the living organisms interact with each other and the surrounding environment. In other words, an ecosystem is a chain of interactions between organisms and their environment. The term “Ecosystem” was first coined by A.G.Tansley, an English botanist, in 1935.

Read on to explore the structure, components, types and functions of the ecosystem in the notes provided below.

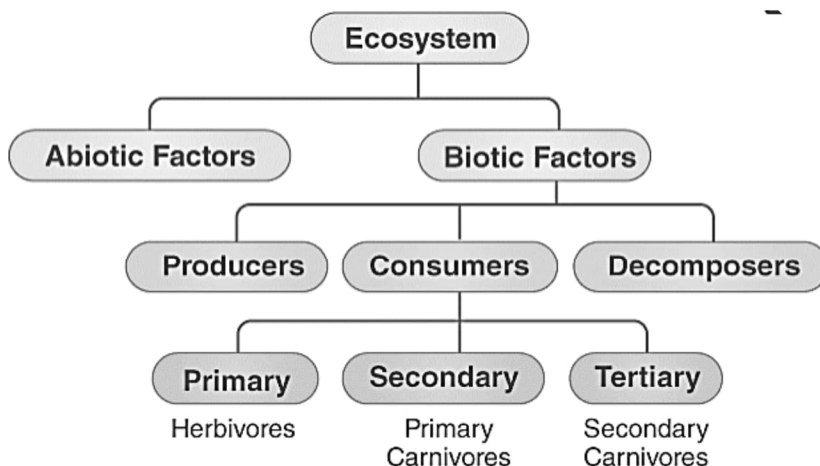
Ecosystem Structure

The structure of an ecosystem is characterised by the organisation of both biotic and abiotic components. This includes the distribution of energy in **our environment**. It also includes the climatic conditions prevailing in that particular environment.

The structure of an ecosystem can be split into two main components, namely:

- Biotic Components
- Abiotic Components

The biotic and abiotic components are interrelated in an ecosystem. It is an open system where the energy and components can flow throughout the boundaries.



CHARACTERISTICS OF FOOD CHAIN

1. A food chain involves a nutritive interaction between the living organisms (biotic components) of an ecosystem in a food chain, there occurs **repeated eating**, i.e., each group eats the other group and subsequently is taken by some other group organisms.
2. A food chain is always straight and proceeds in a progressive straight line.
3. In a food chain, there is unidirectional flow of energy from sun to producers and subsequently to series of different types of consumers.
4. Usually, there are 3 or 4 trophic levels in the food chain. In few chains, there may be maximum of 5 trophic levels.
5. Some organisms are omnivores. These occupy different trophic positions in different food chains.
6. At each transfer, generally 80-90% of energy is lost as heat in accordance with second law of thermodynamics.