Food Chains and Food Webs

Food chains and food webs are diagrams that represent feeding relationships. They show who eats whom. In this way, they model how energy and matter move through ecosystems.

1. Food Chains

A food chain represents **a single pathway** through which energy and matter flow through an ecosystem. An example is shown in Figure 1.

Food chains are generally simpler than what really happens in nature. Most organisms consume—and are consumed by—more than one species.

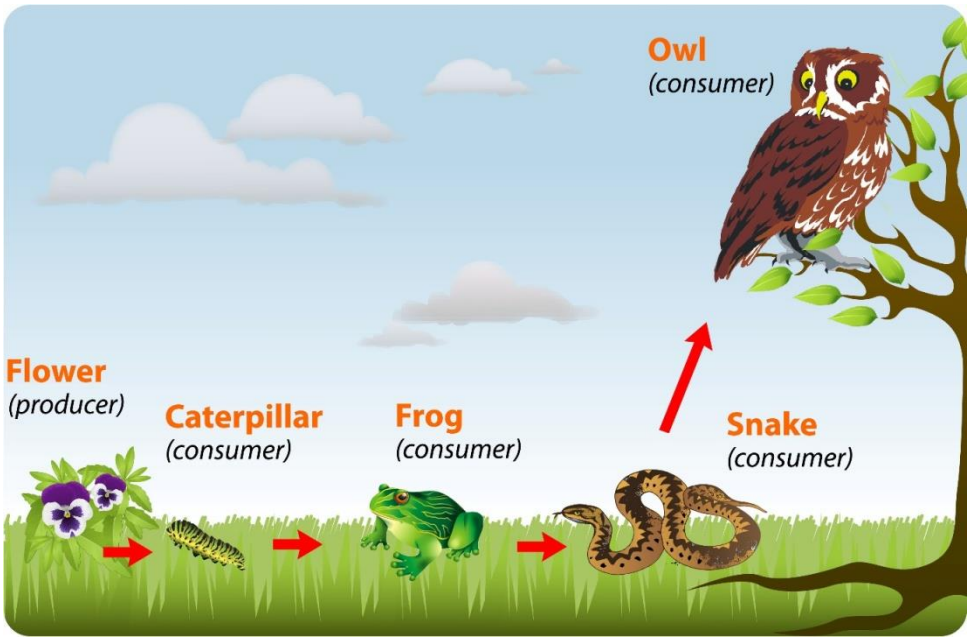

Figure 1: This food chain includes producers and consumers.

2.Food Webs

A food web represents **multiple pathways** through which energy and matter flow through an ecosystem. It includes many intersecting food chains. It demonstrates that most organisms eat, and are eaten, by more than one species. An example is shown in Figure 2.

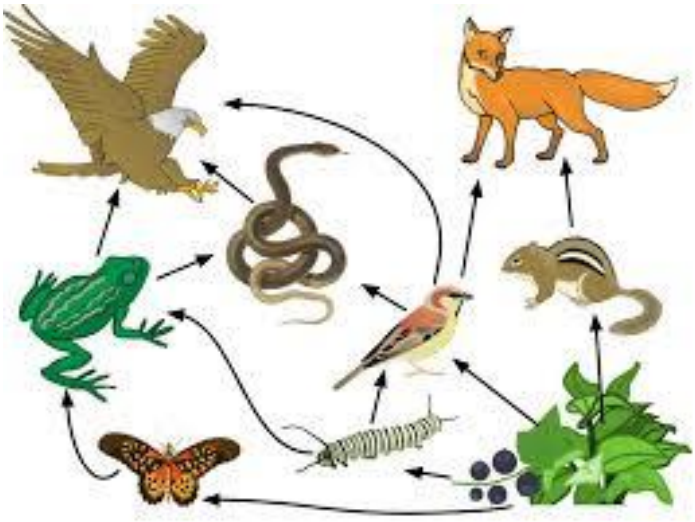

Figure 2.: Food Web. This food web consists of several different food chains.

3. Trophic Levels

The feeding positions in a food chain or web are called trophic levels. The different trophic levels are defined in Table .1. Examples are also given in the table. All food chains and webs have at least two or three trophic levels. Generally, there are a maximum of four trophic levels.

Table 2.1: Trophic Levels

Trophic Level	**organisms**	**Where It Gets Food**	**Example**
1st Trophic Level:	Producer	Makes its own food	Plants
2nd Trophic Level:	Firstly Consumes	From producers	Mice eat plant seeds
3rd Trophic Level:	Secondary Consumer	Consumes Primary Consumer	Snake eat mice
4thTrophicLevel:	Tertiary Consumer	Consumes Secondary Consumer	Hawks eat snakes

Many consumers feed at more than one trophic level. Humans, for example, are primary consumers when they eat plants such as vegetables. They are secondary consumers when they eat cows. They are tertiary consumers when they eat salmon.

Biosphere

A thin layer on and around the earth which sustains life is called biosphere. Life exists in the diverse forms of living organisms. All these living organisms of the biosphere are directly or indirectly dependent on one another as well as on the physical components of the earth. The three physical components of the earth are(air, land and water).

The atmosphere is a gass envelope surrounding the earth's surface, It is made up of nitrogen, oxygen, carbon dioxide and many other gases in very small amounts.

Component of Ecosystem

- In nature two major categories of ecosystems exist: **terrestrial** and **aquatic**.
- Forests, deserts and grasslands are examples of terrestrial ecosystem.
- Ponds, lakes, wet lands and salt water are some example of aquatic ecosystem.
- Crop lands and aquarium are the example of man-made ecosystems.

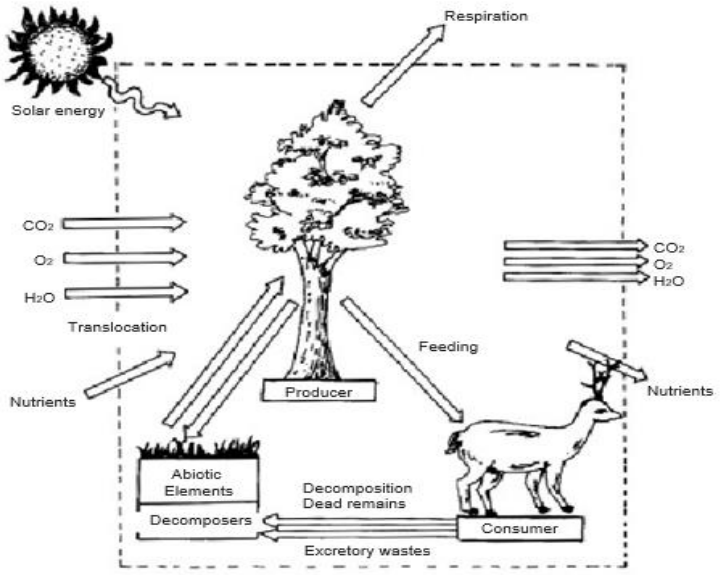

Fig. 4: Components of an ecosystem.

- **Biome**

When you travel long distances in a car from one part of the country to the other,you enjoy watching outside. Your car passes through the thick forests, grasslandsdeserts, croplands and sometimes mountains. If you look at the earth from a distance it shows beautiful colourful patterns. All these patterns are because of thedifferent types of plants that grow in these regions. The plant growth is determinedby physical, edaphic and geographical characteristics of a place. **These are the natural broad biotic zones of the biosphere called, Biomes**. Each biome is characterized by uniform life form of vegetation such as grass, desert plants, deciduous trees or coniferous trees. **A Biome is a large ecosystem which is embracing the large landscape, characterised by specific flora and fauna**.

If you look at the two pictures in Figure 3.1 you will see very few similarities. The picture on the left shows a desert in Africa. The picture on the right shows a rainforest in Australia. The desert doesn't have any visible plants, whereas the rainforest is densely packed with trees. What explains these differences?

Figure 3.1: Sahara Desert in Africa (left). Rainforest in Australia (right). Two very different biomes are pictured here.

The two pictures represent two different biomes.

So, a biome is a group of similar ecosystems with the same general abiotic factors and primary producers..

Biomes can be classified as :

1- Terrestrial Biomes:

Terrestrial biomes include all the land areas on Earth where organisms live. The distinguishing features of terrestrial biomes are determined mainly by climate. Terrestrial biomes include tundras, temperate, forests and grasslands, temperate and tropical deserts, and tropical forests and grasslands.

2- **Aquatic biomes**. These are the biomes found in water. These can be :

(i) Fresh waters, such as pond, lake and river

(ii) Marine as oceans, shallow sea

Forests are one of the largest plant formations, densely packed with tall and big trees. Forests are of many different types, depending on the climatic regime in which they are found. Two main forest types are:

1. Tropical rain forests
2. Temperate deciduous forests

1. Tropical Rain (Evergreen) Forest: These are in the tropical region of very high rain fall. Such forests are well developed over the western coast of India and North eastern Himalayas and scattered in south East Asia, West Africa and north coast of South America.

Main characteristics

1. Temperature and light intensity are very high
2. Rain fall is greater than 200 cm. per year.
3. Soil of these regions is rich in humus,
4. The rate the nutrients is very high leading to high productivity and have highest standing crop and biomass.

2. Temperate Deciduous Forests: Trees of deciduous forests shed their leaves in autumn and a new foliage grows in spring. They occur mostly in north west,central and eastern Europe, eastern North America, north China, Korea, Japan,far eastern Russia and Australia.

Climate at These forests occur in the areas of moderate climatic conditions such as:

1. Annual rainfall is 75 to 150 cm
2. Winter lasts for four to six months.
3. Temperature ranges between 10 to 20°C.
4. Soil is brown and rich in nutrients.