17

Our Environment

The word *environment* means to encircle or surround. Any thing that surrounds us forms our environment. The plants, animals, air, water and land all form our environment. All our activities are influenced by the environment in which we live. These activities include the functioning of our body and our interaction with other parts of our environment. Therefore, the environment is important for our survival. We should take care of it.

OBJECTIVES

After completing this lesson, you will be able to:

- define environment and list the biotic and abiotic components of the environment;
- discuss the different types of habitats and the adaptation of animals and plants in these habitats;
- explain the causes and consequences of alterations in habitats and the need to conserve habitats;
- define biosphere and ecosystem, and discuss the ecological significance of these levels of organization;
- explain food chain, food web and trophic levels in a biological community and discuss how these are constituted as the pyramids of energy;
- compare the carbon and nitrogen cycles within the ecosystem.

17.1 COMPONENTS OF THE ENVIRONMENT

The environment has two types of components.

- **Biotic components**, which include living beings including humans.
- **Abiotic components**, which include all non-living things around the organism.

These two components have an effect on each other. For example, if it does not rain for some days and the temperature is very high, the plants will dry up and animals, including human beings, will find it difficult to live in such an environment.

The desert area is covered with sand all around. It rains very little in such areas hence water is scarce. The days are very hot while the nights are cool in deserts. It is because of such adverse conditions of the abiotic components that

there is very little vegetation and only a few species of animals can live in deserts. Animals, such as camels, and plants like cactus that can survive without water for many days are found in such places.

We know that a fish swims with ease in water. However, as soon as it is taken out of water, it dies. Do you know the reason? This is because the changed environmental condition is not suitable for the survival of the fish.

Thus, we find that biotic components depend upon the abiotic components for their survival. On the other hand, the abiotic components are also affected by biotic components. For example, if there are more trees at a place the air will contain more moisture at the place. Also, the temperature of the place will be relatively low. The amount of dust particles in the air shall be less. Have you ever felt such difference between a place with more trees and the one with fewer trees?

The amount of fertility of the soil at a place gets affected by the water, temperature and air.

CHECK YOUR PROGRESS 17.1

1. Classify the following into biotic and abiotic components of the environment: neem, soil, buffalo, air, rose, butterfly, light, heat, man, cow, humidity
2. Give an example to show that abiotic components of environment depend upon the biotic components.
3. Name one desert animal and one desert plant.

17.2 HABITAT AND ADAPTATION

Every living organism lives in a specific environment. A place or a set of environmental conditions in which a particular organism lives is called its **habitat**. The habitats of different plants and animals are different, but at the same time many plants and animals share the same habitat.

All forests are not habitats of tigers or lions. Jim Corbett National Park in Uttaranchal has thick forests. It provides optimum conditions for the tigers to live. There are streams and rivers flowing in the area that provide water. The presence of deer and *sambhar* in large number in the same habitat provide food for the tigers.Thus, a habitat must provide the organisms suitable climatic conditions, shelter and food.

17.2.1 Modes of life

The following modes of life have been identified for different organisms:

- **Aquatic :** For organisms living in water
- **Terrestrial :** For organisms living on land
- **Aerial :** For organisms that use air as a medium for their activities such as locomotion
- **Amphibious :** For organisms, such as a moss plant and a frog that complete their life cycles by living one part of their life in water and another part on land.

Fig. 17.1 Different organisms live in different habitats

Organisms that live in a specific habitat have some important characteristics that help them to adjust and to live successfully. This adjustment is called **adaptation**.

The organisms adapt so that they can:

i. successfully compete for food,
ii. defend themselves from attack by other organisms (enemies),
iii. find a mate to reproduce/find favourable conditions to reproduce, and
iv. respond efficiently to the change in environment.

17.2.2 Aquatic adaptations in organisms

a) **In plants**

Plants that live in water are called **hydrophytes** (*hydro*: water, *phyte*: plant).

Look at the picture above and relate. Plants that live in water have the following characteristics:

i. **Poorly developed root system**: As they can easily absorb water and minerals from the plentifully available water.
ii. **Thin and narrow leaves** (*Hydrilla*) or long, flat and ribbon-shaped leaves (*Vallisneria*): As this helps to withstand water currents.

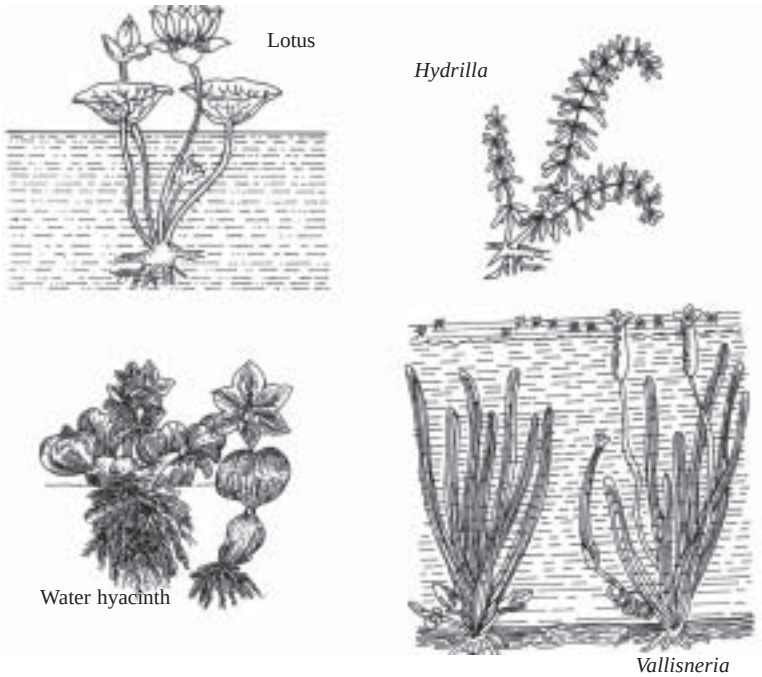

Fig. 17.2 Some plants that live in water

In a lotus plant, the leaves float on water with their broad upper surface coated with wax. This wax acts as water repellant.

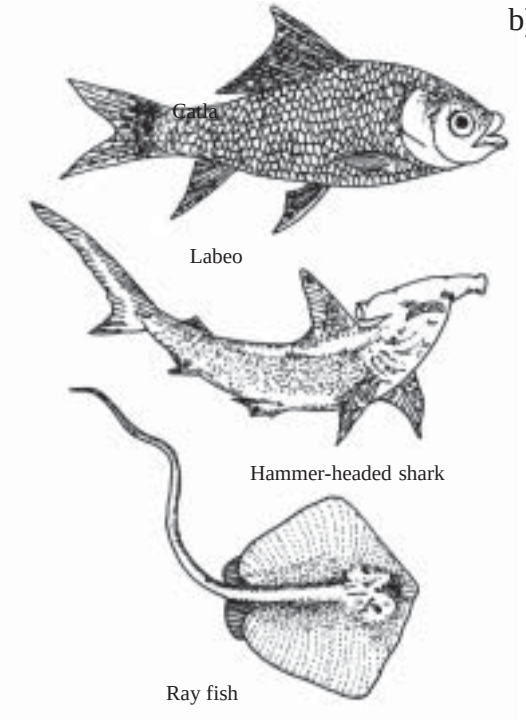

Fig. 17.3 Some fishes that live in water

b) **In animals**

Observe the animals shown in the figure 17.3. Vertebrates that live in water have the following characteristics:

i. The body is **streamlined** (pointed at both ends) that helps in reducing friction and allows swift movement in water.

ii. Gills help the animal to breathe in water.

iii. Fins help to swim, steer and maintain balance. A whale (a mammal) has flippers to swim.

iv. Pupil of the eyes is large as compared to other vertebrates. It allows more light to enter for clear vision in water.

v. Some fish have swim bladders that act as floats and allow the organisms to float in water.

vi. The body surface gives out some secretions, which lubricate the scales and help the animal slip away and escape from enemies.

There are numerous other kinds of aquatic animals with varying adaptations, such as *Hydra*, water flea and some worms.

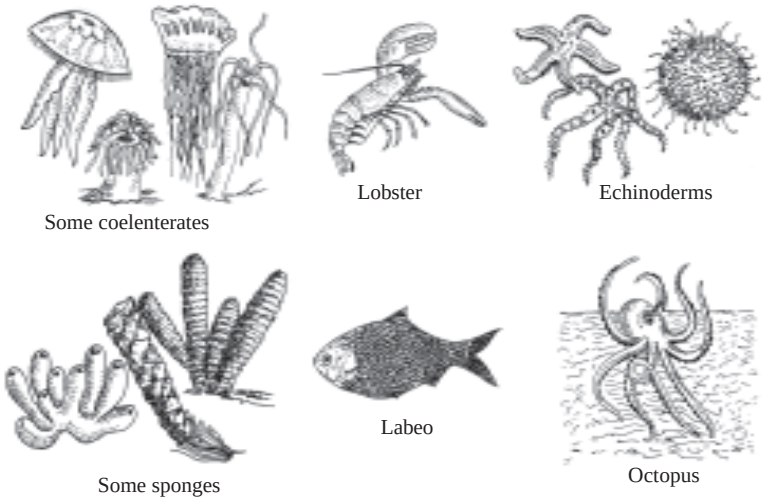

Fig. 17.4 Diversity of animal life in water

17.2.3 Terrestrial (land) adaptations in organisms

a) **In plants**

Some plants live on land and require moderate (neither low nor high) supply of water and temperature. These plants are called **mesophytes** (*meso*: moderate). Examples: neem, papaya, banyan, mango, wheat, tomato, etc.

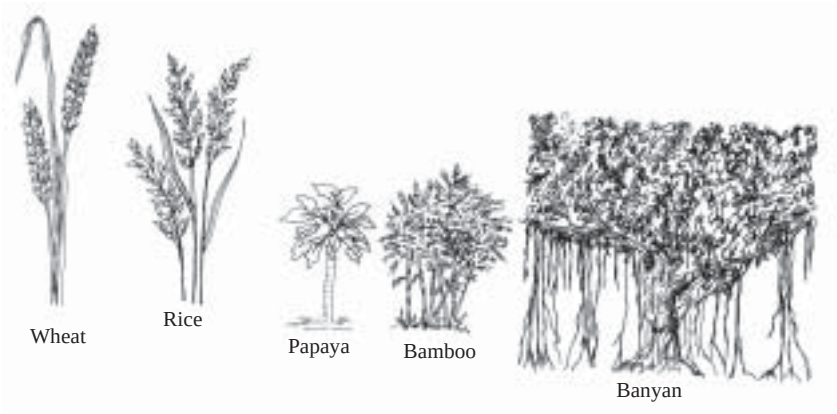

Fig. 17.5 Mesophytic plants

Some plants live on land under extreme water scarcity and high temperature conditions. These are called **xerophytes** (*xeros*: scarce water). Examples: cactus (*Opuntia*), Babool (*Acacia*).

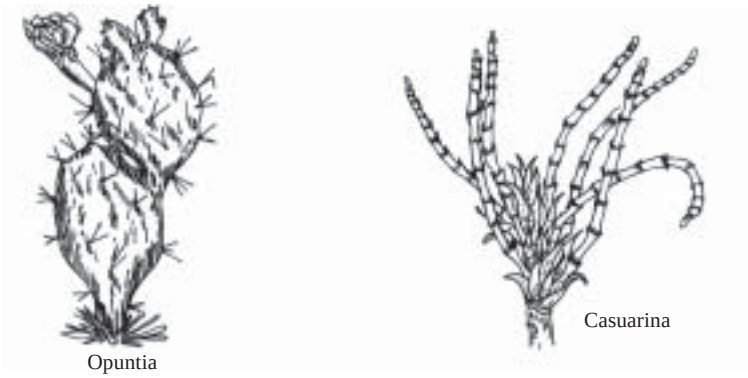

Fig. 17.6 Xerophytic plants

Table 17.1 Adaptations in land plants

Part of the plant	Mesophytes	Xerophytes
Roots	Well-developed draw as much water as	Extensively developed to possible from the ground
Stem	Well-developed, solid and branched	Flattened, fleshy and green to store water and function as leaves
Leaves	Well-developed, numerous, of various shapes and sizes and with large number of stomata	Reduced (modified) into spines, stoma if present reduced in number to prevent loss of water

b) **In animals**

Most animals you see around are those living in a moderate type of a habitat. These are different types of animals. Examples of some terrestrial mammals and reptiles are given below :

- **Mammals:** tiger, lion, deer, bear, squirrels and many others
- **Reptiles:** lizards and snakes

Terrestrial animals may be of different types according to their mode of locomotion. Such animals have well-adapted toes. These are:

- **Runners:** deer and antelopes
- **Climbers:** monkeys and squirrels
- **Burrowers:** rats, moles and snakes
- **Fliers:** bats and birds

All vertebrate terrestrial animals breathe through lungs.

17.2.4 Xerophytic adaptations in organisms

Animals found in the xeric (dry) conditions show certain special types of adaptations.

- **Extreme heat and scarcity of water:** These animals have very scaly skin, resistant to drying and show many adaptations to conserve water. Examples: camel, snakes, spiders and scorpions.
- **Extreme cold and scarcity of water:** These animals have oily hairs that provide thick winter coat. Examples: polar bear, reindeer.

Fig.17.7 Aerial adaptations in a bird

17.2.5 Aerial adaptations in organisms

Besides insects, organisms, such as birds, mainly use air as a medium to fly. Birds show the following adaptive features that help them to fly:

i. **streamlined body** to steer through the air,

ii. **wings** that help to fly are modified forelimbs,

iii. **strong flight muscles**,

iv. body covered with **feathers**, which trap air to keep the body warm and help the bird to fly, and

v. light weight because of **hollow bones** along with reduction in the number of bones.

CHECK YOUR PROGRESS 17.2

1. Name the type of habitat in which the following organisms are found.
   i) *Acacia*
   ii) Snake
   iii) Bat
   iv) Frog
   v) Lotus
   vi) Mango tree

2. Give the adaptive features of the following:
   i) Birds with respect to bones ( )
   ii) Snakes with respect to high temperature ( )
   iii) Neem tree with respect to the number of stomata ( )
   iv) Xerophytes with respect to the root system ( )
   v) Fish with respect to shape of the body ( )

17.3 EFFECT OF ALTERATION OF HABITAT

The survival of an organism in a habitat depends upon the way an organism is conditioned to the abiotic and the biotic components of the environment in the habitat. Any change or alteration in the habitat can disrupt the balance in nature.

Bhopal gas tragedy

Do you know what happened on 3rd Dec 1984 in Bhopal? Leakage of methyl isocyanate (MIC) gas from Union Carbide factory totally disturbed human and animal life there. The adverse effects of that gas are seen till today.

Gujarat earthquake

What happened in Gujarat on 26th January 2001? The earthquake damaged human, animal and plant life.

In a similar way other natural calamities, like floods, volcanic eruptions and tornadoes cause so much of damage to life all around. *Much more than this, a kind of change in the habitat is brought about by human beings for their selfish gains.* Some such activities are, deforestation, indiscriminate use of poisonous materials in form of pesticides and chemical repellants, industrialization and mismanagement of industrial waste, automobiles, hunting and fishing, and use of nuclear weapons.

Natural calamities or adverse human activities have a destructive effect on the natural habitat. As a result, the organisms may die an unnatural death, or lose their place of shelter. Many of the species in turn many get completely wiped out from the world, i.e. they may become extinct.

To save the living treasure (flora and fauna) and to protect the natural habitat many laws have come into force. These are being operated by many organizations. It is compulsory to implement the plan related to **Human Resource Development (HRD)** and **Natural Resource Development (NRD)**. To conserve the natural habitat, many national parks and sanctuaries are being maintained by the government.

CHECK YOUR PROGRESS 17.3

1. Name any one recent natural calamity that occurred in India and any one calamity caused due to human activities.
2. List any four human activities that affect the natural habitat adversely.

17.4 BIOSPHERE

The land, water and air on the earth support living organisms. The region comprising water forms the **hydrosphere**. The soil and rocks on the earth's surface

as well as below the oceans make up the **lithosphere**. The air above the earth's surface forms the **atmosphere**. These three parts act together to provide surroundings called the **biosphere** in which life exits. *Biosphere is considered as the largest organisational unit of the biological system.*

17.4.1 Environmental levels of organization

Let us start at the level of the whole organism, such as a plant or an animal. This is called **organismal level**. Take an example of a human being as an organism. All human beings of your family, locality, city, state, country and the world form one kind of individuals, they can potentially interbreed and produce fertile young ones, thus they are one **species**. Individuals of a species occupying a definite space or area at a given time constitute **population**. Thus there can be a population of frogs in a pond, population of squirrels in a garden, or population of peepal trees in a forest, etc.

Any population of individuals cannot live independently. Can we live without domestic animals, crops or plants?

When you look in a pond, you may see plants like lotus, hydrilla and algae. You may also see frogs, fish, water fleas and some other insects.

There are different kinds of organisms (populations) in that area. All these organisms are interdependent and live together forming a **community**. *A community of living organisms is called biotic community.*

We have learnt earlier that no biotic community can exist in the absence of abiotic factors (water, air and light). The interdependence of the two types of factors occurs in an **ecosystem**.

A pond and a lake are examples of aquatic ecosystems. Examples of some terrestrial ecosystems are natural forests, crop fields, etc.

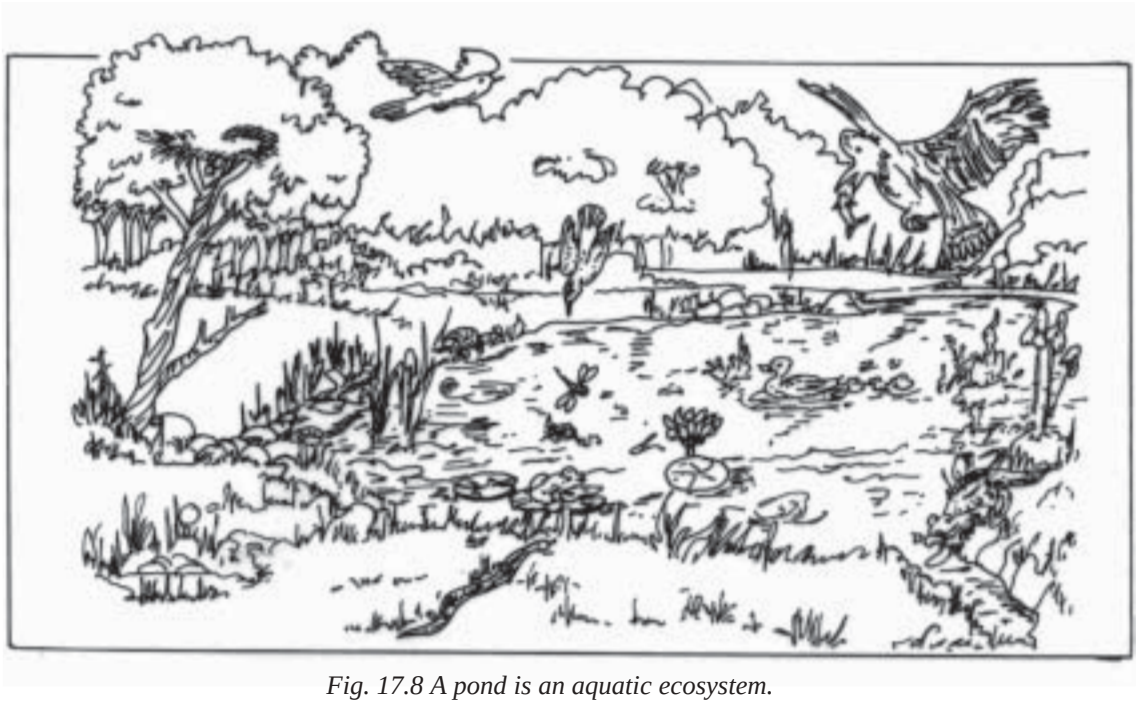

Fig. 17.8 A pond is an aquatic ecosystem.

Fig. 17.9 A forest is a terrestrial ecosystem

In simple language we can say that, the living organisms which are found in a definite geographical region together with the physical environment of that region form an ecosystem.

All the ecosystems taken together in a geographical area form a bigger unit called **biome**. For example, in forest biomes one may find ponds, lakes, grasslands and forests.

Organisms exist up to 8 km in the air above sea level and up to 5 km below sea level. These life supporting regions of the earth comprise the biosphere. Various levels of organization and their sequence is given below.

The biosphere includes the total world of life. The living world which is made up of millions of organisms, depends upon the earth for the necessary materials that enter into its composition and upon the sun for its constant need of energy to perform its vital activities.

17.5 FLOW OF ENERGY

The sun gives out a large amount of radiation that consists of many different kinds of rays. Only some of these rays reach the earth's surface. Others are either reflected by the earth's atmosphere or turned away by the earth's magnetic field.

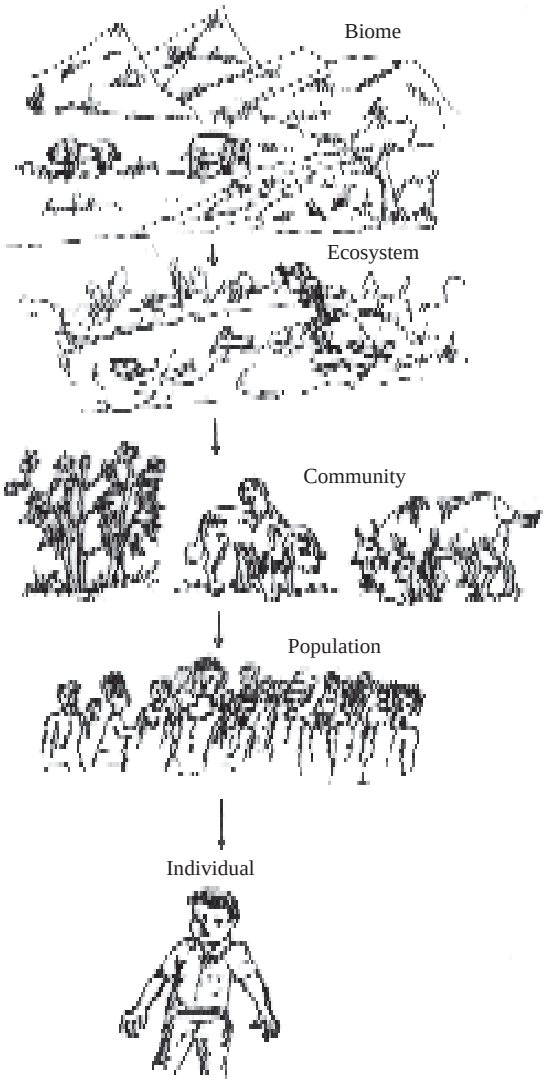

Fig. 17.10 Various levels of organisations

The amount of sunlight, which the earth receives in the form of energy, is very little. A portion of it is also reflected back to the earth's surface. No animal can use sunlight directly for its living activities.

Green plants possess chlorophyll. This chlorophyll is capable of trapping a fraction of the incoming sun's energy to make food for the plants by a process called **photosynthesis**. During photosynthesis, water and carbon dioxide are used to build up complex carbohydrates. The absorbed light energy is thus trapped as chemical energy. Thus, solar energy enters into the biosphere through photosynthesis.

Only a negligible amount of solar radiation striking the plants is fixed through photosynthesis. The pathway along which the energy flows through the organisms can be studied in the following two ways:

- We can study the food relationship between the species and the community by way of food chains and food webs.
- We can also find out the energy flow in terms of number of organisms and their biomass (i.e. weight of all organisms and calorie content.)

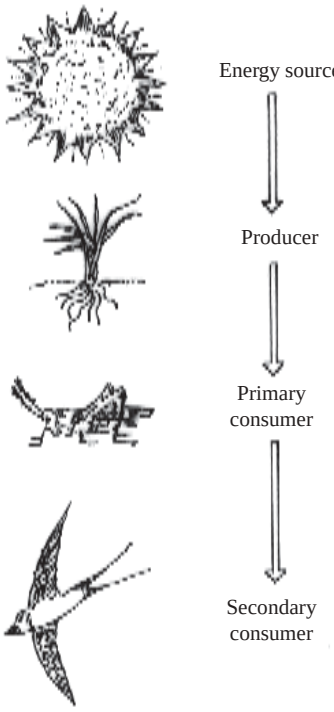

Fig. 17.11 Energy flow in a food chain

17.5.1 Food chain

We know that green plants make food during photosynthesis, taking raw material from the earth and energy from the sun. Thus, the green plants are **producers** in the living world.

It is seen that the animals eat green plants, which in turn are the food for other animals. Hence, the food produced by green plants is consumed directly or indirectly by all kinds of animals, which are called **consumers**.

The *relationship of eating and being eaten up* at different levels in an ecosystem is represented in the form of a chain called **food chain**.

A food chain is the representation of a single energy pathway from the producer to the consumer.

The study of food chains in an area or habitat helps us to know about interactions among the different organisms and also their interdependence.

Let us take the example of a simple food chain in grassland in which the grass is eaten by the grasshopper that in turn is eaten by a bird Fig.17.11. In this process of eating and being eaten, energy is passed on from one step to next in a food chain.

This energy flow can be represented in a food chain as shown in figure 17.11.

In this chain, the grass is the producer, the grasshopper, which consumes grass, is a **herbivore** and the bird, which consumes the grasshopper, is called the **carnivore**. Animals that consume both plants and animals are called **omnivores**. Herbivores, carnivores and omnivores are consumers. The best example of omnivores is man.

17.5.2 Food web

In a community, a large number of food chains exist. Many of these chains are interconnected by a species, which occurs in more than one chain. Grassland can have many food chains operating in it as shown in fig. 17.12. These interconnected food chains establish a network of species' relationships called food web.

A food web is a network of species relationship formed by interconnected food chains.

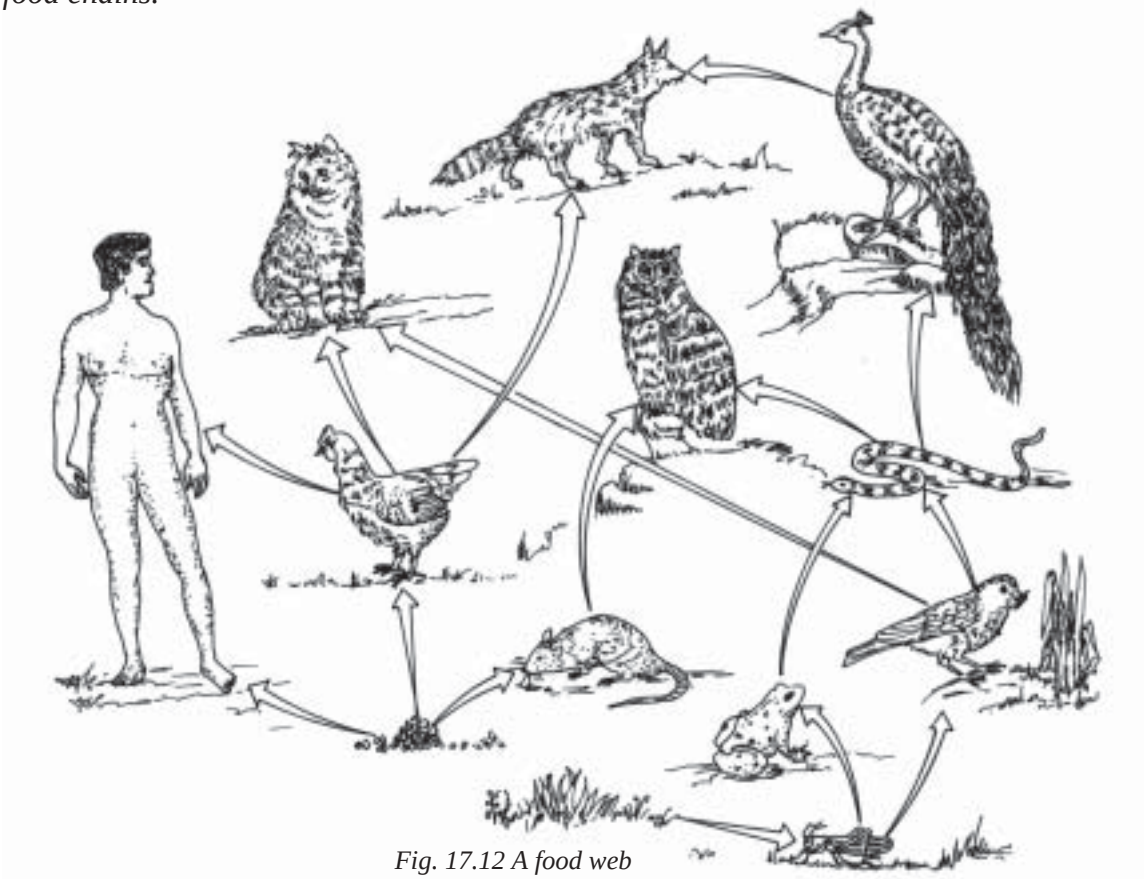

Fig. 17.12 A food web

A food web indicates that one organism may occupy position in more than one food chain. For example, a snake and also a hawk may consume a rat. The organisms representing producers and consumers in the food chain give a definite structure of the ecosystem.

We have seen that in a food chain there are different steps and energy is passed on from one step to the next step. Each of these steps in a food chain is called **trophic level**.

In other words, *the various steps in a food chain at which energy transfer takes place are denoted as trophic levels.*

Plants are producers and form the first trophic level. Herbivores, i.e. plant eaters, are the first order consumers and form the second trophic level. Carnivores, i.e. animal eaters, which feed upon the herbivores, form the third trophic level. Large carnivores that feed upon small carnivores form the fourth trophic level, and so on.

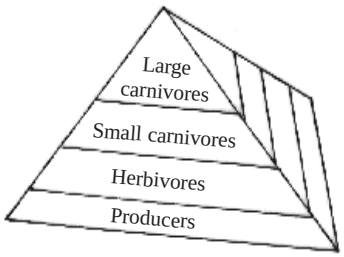

Fig. 17.13 Pyramid of numbers

If you compare the number of organisms living at each trophic level in a food chain, then you can represent the chain by a **pyramid of numbers**. Producers form the base of the pyramid and the apex by the last order consumers. The pyramidal shape shows that the large carnivores at the top are fewer in numbers (Fig. 17.13)

One can also construct a pyramid of energy if it is measured in term of joules for each trophic level.

CHECK YOUR PROGRESS 17.4

1. Complete the following sentences :
   i) Plants trap solar energy and pass it to the next trophic level in the form of_____ energy.
   ii) The third trophic level in a food chain is formed by the _____
   iii) A food chain is the representation of single energy pathway from_____ to_____
2. Which of the following statements are TRUE?
   i) One organism cannot occupy position in more than one food chain.
   ii) The number of organisms living at different trophic levels in a food chain is the least for large carnivores.
   iii) Plants are called producers because they can produce a new plant.
   iv) The solar energy enters the biosphere through the process of photosynthesis going on in the plants.
3. What is the difference between a biome and an ecosystem?

17.6 AMOUNT OF ENERGY FIXATION

Energy after being trapped by plants (producers) is passed to the animals (consumers) of the next trophic level in the form of food. Some amount of energy is lost during these transfers. Energy is also used up by the organisms at each trophic level to carry out various activities. Thus, the amount of energy available goes on decreasing during its transfer from one trophic level to the other. And, the flow of energy through various trophic levels is one-way energy transfer.

An interesting point emerges from the study of food chains. Shorter the chain, more is the energy available at each level. Maximum energy is at the plant level (producers). Nearer the eater is to the plants, greater is the energy available to it.

17.7 CYCLING OF MATERIALS

Since materials flow from non-living to the living and back to the non-living in a more or less circular path, the cycle is also known as **biogeochemical cycle**.

One can study the cycling of each element and have a total picture of this property of the ecosystem.

17.7.1 Carbon cycle

Carbon is the main constituent of the living matter. It is found in carbohydrates,

fats, proteins and nucleic acids that make up the living cell. It is available from the following three main sources – **atmosphere, oceans (hydrosphere)**, and lime stone, coal and petroleum of the **lithosphere**.

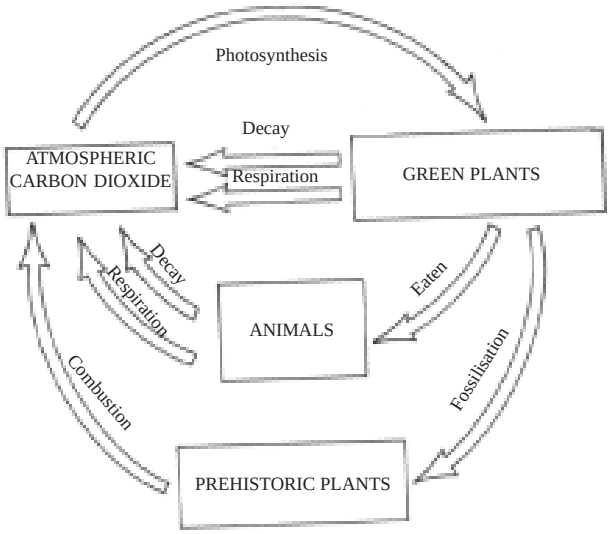

Fig. 17.14 Carbon cycle in nature

The atmosphere contains about 0.03 to 0.04% carbon dioxide in free state. Green plants use this carbon dioxide to synthesize food by the process of photosynthesis. The atmospheric carbon taken in by the plants is transferred to animals in the form of food. From both plants and animals, it is then passed on to the decomposers after their death. If such processes of taking in and passing on continued then there would have been no carbon dioxide left in the atmosphere. However, this does not happen in reality. There are processes by which carbon dioxide is returned to the atmosphere to maintain a balance. The processes by which carbon dioxide is returned to the atmosphere are as follows:

- By the process of **combustion**, i.e. burning of fuels like wood, coal, petroleum, etc. which takes place continuously.
- By the process of **respiration** in plants, animals and decomposers.

17.7.2 Nitrogen cycle

Nitrogen is an essential component of the proteins and nucleic acids in living beings. The atmosphere is the biggest source of nitrogen. Green plants absorb nitrogen in the form of nitrites and nitrates from the soil and water in organic or inorganic form. Nitrogen cycle can be studied in five steps as given below.

i. Nitrogen fixation: Free nitrogen from the atmosphere can be fixed in following two ways:

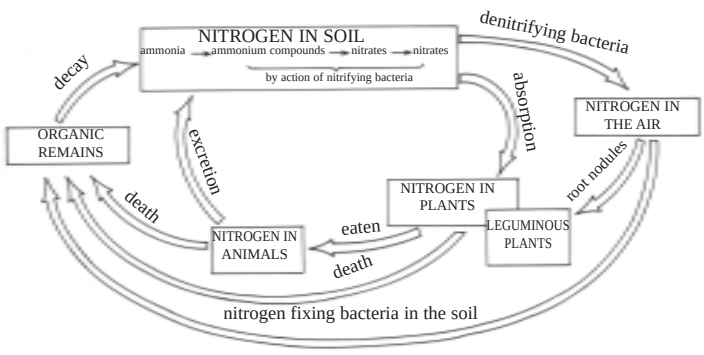

Fig. 17.15 Nitrogen cycle in nature

- Nitrogen and oxygen combine with each other to form oxides in the atmosphere by lightning during cloud formation. These oxides of nitrogen dissolve in rainy water and on reaching the earth's surface become a part of soil and water.
- Some microbes like blue green algae and bacteria fix the free nitrogen in the atmosphere into nitrites and nitrates. Nitrogen fixing bacteria are found in the soil and in root nodules of the roots of some leguminous plants like peas, gram, beans, etc. They fix the atmospheric nitrogen into nitrates. These nitrates are released into the plants or soil.

ii. **Nitrogen assimilation:** Plants absorb nitrogen in the form of nitrates to prepare amino acids. This nitrogen is then taken by animals from plants in the form of proteins (complex form of amino acids) through the food chain.

iii. **Ammonification:** Proteins in the body of animals are broken down in simpler form, such as urea and ammonia. These are removed from the body along with urine. Remains of the dead organisms are also converted into ammonia. This process is known as ammonification.

iv. **Nitrification:** Conversion of ammonia into nitrates is called nitrification. Some bacteria, found in the soil convert ammonia into nitrites. Some other bacteria convert these nitrites into nitrates.

v. **Denitrification:** Denitrifying bacteria living in some soils like the soil of ponds and marshes change the soil nitrates into nitrogen which goes back to the atmosphere.

CHECK YOUR PROGRESS 17.5

1. Choose the correct answer from the following :
   i. Which of the following gases is essential for burning?
      a) Oxygen
      b) Nitrogen
      c) Water vapour
      d) Carbon dioxide
   ii. The process of conversion of free atmospheric nitrogen into nitrites and nitrates is called
      a) nitrification
      b) denitrification
      c) nitrogen assimilation
      d) nitrogen fixation
   iii. The processes by which carbon dioxide is returned to the atmosphere are
      a) combustion and respiration
      b) photosynthesis and respiration
      c) decomposition and nutrition
      d) photosynthesis and digestion
2. Why do living organisms need nitrogen?

LET US REVISE

- The environment has both living and non-living parts, i.e. biotic and abiotic.
- The biotic and abiotic components depend on each other.
- A place or a set of environmental condition in which a particular organism lives is its habitat.
- A habitat provides shelter, food and climate to the organism.
- Aquatic, terrestrial, aerial and amphibious are different types of habitat.
- Different organisms are adapted to live successfully in different modes of life.
- Any alteration in the habitat because of natural or man-made calamity causes imbalance in nature.
- Efforts are being made at international and national level to maintain balance in nature.
- Living organisms have various levels of organization, which are divided into two main groups, i.e. lower level (up to individual) and higher level (up to biosphere).
- Each level of organization works like a system involving both matter and energy.
- Biosphere is the highest level of organization.
- It includes all the living (biotic) and non-living (abiotic) components of the world, i.e. all the ecosystems.
- It works like a system showing interactions and interdependence between different organisms and different physical environments.
- The living community in the biosphere has various trophic levels like green plants (producers), animals (consumers) and microorganisms (decomposers).
- The food inter-relationships between the organisms of various trophic levels are studied through food chains.
- In the process of eating and being eaten up, energy trapped by the green plants is passed on through various trophic levels.
- Ultimately, the energy is released and it does not re-enter the system. Thus, a cyclic flow of energy is seen in an ecosystem.
- Energy is lost at each transfer and maximum of it is available near the beginning of the food chain.
- The materials or nutrients which plants and animals require for their normal growth and development, cycle through the ecosystem.
- They are absorbed by plants, passed on to animals and returned to the environment by decomposers.
- Nature has a unique way to maintain balance in the atmospheric gases through various cycles, viz. carbon and nitrogen cycles.

TERMINAL EXERCISES

A. **Multiple choice type questions.**

1. Plants found in which of the following habitats have poorly developed root system?
   a) Aquatic b) Terrestrial
   c) Xerophytic d) Amphibious

2. As a special feature of birds, their bones are
   a) small-sized and jointed for flexibility.
   b) porous to allow circulation of materials.
   c) filled with a hard material to provide strength.
   d) hollow and few in number to make the body light in weight.

3. The government is maintaining national parks and sanctuaries in order to
   a) conserve natural habitat for animals.
   b) identify areas where hunting and fishing can be done without any restriction.
   c) protect small animals from other carnivores that feed on them.
   d) protect animals from accidents.

4. The largest unit of the biological system is
   a) population b) biome
   c) biosphere d) ecosystem

5. The apex position in the pyramid of numbers is occupied by:
   a) producers b) small carnivores
   c) large carnivores d) herbivores

B. **Descriptive type questions.**

1. Differentiate between the following :
   i) Ecosystem and biosphere
   ii) Food chain and food web
   iii) Carnivores and omnivores
   iv) Producers and consumers

2. Using a simple food chain, explain the pathway along which energy flows in an ecosystem.

3. Why do we say that energy flow in the biosphere is unidirectional, i.e. in one way? Explain with an example.

4. With the help of a diagram, explain the cycling of carbon in the biosphere.

ANSWERS TO CHECK YOUR PROGRESS

17.1

1. | | |
   |---|---|
   | Soil | Neem |
   | Air | Buffalo |
   | Light | Rose |
   | Heat | Butterfly |
   | Humidity | Man |
   | | Cow |
2. Presence of trees makes the air contain more moisture and keep the temperature low.
3. Camel, Cactus

17.2

1. | | | | |
   |---|---|---|---|
   | i) | Acacia | - | Terrestrial |
   | ii) | Snake | - | Terrestrial |
   | iii) | Bat | - | Aerial |
   | iv) | Frog | - | Amphibious |
   | v) | Lotus | - | Aquatic |
   | vi) | Mango tree | - | Terrestrial |
2. i) Light and hollow bones ii) scaly skin iii) large number of stomata iv) root system extensively developed v) streamlined body.

17.3

1. Natural calamity: Earthquake in Gujarat on 26th Jan. 2001
   Calamity due to human activities: Leakage of MIC from the Union Carbide factory in Bhopal on 3rd Dec.1984
2. Deforestation, use of pesticides and automobiles, hunting, and fishing

17.4

1. i) Chemical
   ii) Carnivores
   iii) Producer, consumer
2. (ii), (iv) True statements
3. All living organisms in a definite geographical region along with the physical environment form an ecosystem. While, all ecosystems in a geographical area together form a biome.

17.5

1. i. (a)
   ii. (d)
   iii. (a)
2. Nitrogen is an essential component of proteins and nucleic acids in living beings. Therefore, it is required for growth.

GLOSSARY

Habitat: A place or a set of environmental conditions in which a particular organism lives.

Adaptation: The adjustment made by an organism that lives in a specific habitat by acquiring certain important characteristics that helps it to adjust and live successfully.

Biotic community: A community of living organisms in an area.

Ecosystem: Living organisms found in a definite geographical region together with the physical environment of that region.

Biome: All the ecosystems taken together in a geographical area.

Food chain: The relationship of eating and being eaten up at different levels in an ecosystem represented in the form of a chain.

Food web: A network of species relationship formed by interconnected food chains.