

SCIENCE

CHAPTER-17: FORESTS OUR LIFELINE



Forests: Our Lifeline

- A forest is an area with a high density of trees. Today, forests occupy approximately one-third of the Earth's land area. Forests are home to many animals and plant species.

There are three major types of forests- tropical, temperate and boreal forests.

Forest profile

There are different kinds of plants of varied height and size in the forests. Parts of a tree above the stem, including the branches and leaves are collectively known as the Crown. Trees belonging to the genus Pinus have tapered crowns, while a neem tree has a Crown that looks like a globe.

Components of a Forest

- Living components: Plants, animals and microbes.
- Non-living components: Soil, air and water.

Plants	• They produce food by photosynthesis and are called autotrophs or producers.
Animals	• They are heterotrophs or consumers because they cannot prepare their own food.
Decomposers	• They are also called saprotrophs because they live and feed on dead plants and animals. Bacteria and fungi are examples of decomposers.
Scavengers	• They feed on dead bodies of animals. Vultures, crows, hyenas, termites and millipedes are examples of scavengers.

Structure of Forest

Canopy	<ul style="list-style-type: none"> The uppermost branches and leaves of tall trees which act like a roof over the forest ground are called canopies. The canopy comprises of large and mature leaves.
Understorey	<ul style="list-style-type: none"> The layer of vegetation in a forest which is just below the canopy is called the understorey. This layer consists of small trees and tree saplings.
Shrub Layer	<ul style="list-style-type: none"> This layer of vegetation is just below the understorey. It mainly consists of mature shrubs and bushes.
Herb Layer	<ul style="list-style-type: none"> The layer of vegetation which is below the shrub layer is called the herb layer which mainly consists of herbs, ferns and grass.
Forest Floor	<ul style="list-style-type: none"> The ground surface of the forest is called the forest floor. It has many kinds of small, leafless plants such as moss, liverwort, lichen etc. and animals such as tigers, lions etc. and insects and decomposers.



- The branchy part of a tree above the stem is known as the crown of the tree.
- Crowns are mainly responsible for the absorption of Sun's light energy, performing photosynthesis, releasing oxygen and carrying out processes such as respiration and transpiration.

Forest Floor

- This is the ground layer of a forest.
- The soil is moist and water containing decaying leaves, fruits and animal matter.
- This layer of forests is home to rabbits, snakes, frigs, earthworms, fungi termite and insects.
- The decomposers (microorganisms) present on the forest floor decompose the dead plant and animal matter to form fertile soil known as humus.



Canopy and under storeys in a forest

Interdependence of plants and animals in a forest

- The plants and animals in a forest depend on each other for their survival. Plants are autotrophs, so also called **producers**.
- Living things that eat other organisms as food are called heterotrophs. All animals are heterotrophs, so also called **consumers**.
- Some animals eat only plants, such animals are called **herbivores**.
- **Carnivore's** animals eat only other animals, whereas omnivorous animals eat both plants and animals.
- When animals die, their bodies are eaten by crows, vultures and hyenas. This group of animals is called **scavengers**.
- The bodies of dead plants and animals get broken down into simpler substances or are decomposed by decomposers like fungi and bacteria present in the soil. The fertility of soil is increased by these decomposers.
- The energy from the plants enters the consumers in the form of food. This eventually ends up at the decomposers and is released into the soil. This is again used by the plants forming a cycle known as the cycle of nutrients.

Dependence of plants on animals:

Not only do animals depend on plants, but plants also depend on animals in many ways.

Insects and birds feed on the nectar found in the flowers of plants. This helps in the process of pollination of flowers, which leads to the reproduction of plants.

Fruits and seeds, which are produced after pollination, are dispersed by the animals in different places.

Forest- An Ecosystem

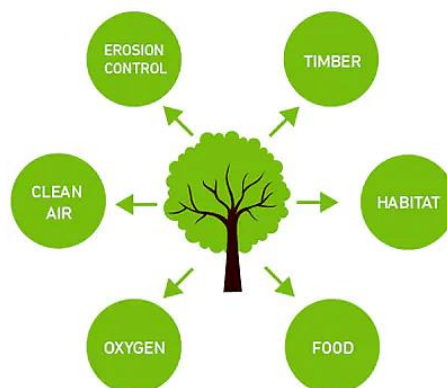


- An ecosystem is a self-sufficient unit of the living and non-living environment only requiring energy from the sunlight for its functioning.
- Living beings not only interact with each other but also with the non-living components of the forest.
- Plants interact with soil to obtain nutrients, with water to prepare food during photosynthesis and with
- air to obtain carbon dioxide for photosynthesis.
- Living beings interact with one another through the food chain. Example: Grass is eaten by a grasshopper; the grasshopper is eaten by a frog; the frog is eaten by a snake; and the snake may be eaten by a hawk.

Grass → Grasshopper → Snake → Hawk

- If any one of the components of a food chain is destroyed, it will disrupt the food chain causing imbalance in nature.
- All the food chains interlink to form a food web.
- When plants and animals die, decomposers decompose their bodies into nutrients, water and carbon dioxide.
- In this way, water and nutrients are returned to the soil and carbon dioxide is returned to the air. These are reused and the process goes on like a never-ending chain.

Importance of Forests



Forests help to keep the environment cool, to receive a good amount of rainfall and to reduce noise pollution by absorbing the noise of nearby highways.

We obtain several products from forests such as wood, honey, gum, sealing wax, fruits, rubber and medicinal plants.

Forests absorb carbon dioxide from the atmosphere and release oxygen during photosynthesis.

Trees in the forest release water vapour into the air by transpiration which helps in the formation of clouds and brings rain on the earth.

Forest cover helps to hold the soil particles together and prevents soil erosion.

The forest floor absorbs most of the rainwater during heavy rains. This water seeps into the forest ground and raises the water table. The forests release this absorbed water slowly into the rivers through the soil. This prevents the occurrence of floods in rivers.

Regeneration of Forests

- The trees and plants in a forest can grow and regenerate on their own.
- The organisms decompose the wastes and the dead bodies of plants and animals and convert them into humus which mixes with the soil making it fertile and appropriate for plant growth.
- In addition, animals and birds help in seed dispersal which helps in the growth of plants in different areas of the forest.

Conservation of Forests

Excessive cutting down of forest trees should not be allowed by the government.

Instead of taking resources from existing natural forests, afforestation is a process used to plant trees and use them as resources instead of using naturally existing forests.

Paper products such as old newspapers, notebooks etc. must be recycled.

Reforestation is a method of planting trees in an existing forested area.

Benefits of Forests

Purification of Air:

Photosynthesis takes place in all kinds of plants, trees and algae in a forest, which releases oxygen that is used by plants and animals for breathing. Animals breathe out carbon dioxide which is used by plants during photosynthesis. So, a balance is formed between the amount of oxygen and carbon dioxide in the air.

Plants and trees in a forest removed excess water through the stomata present on the underside of the leaves. This process is called transpiration, which helps in the water cycle and keeps the atmosphere cool.

Rainfall Due to Forest:

Rainfall is dependent on forests. Excess water from the trees is released in the form of water vapour by the process of transpiration and helps in the formation of Clouds by a process of condensation, which undergoes precipitation to form rain. The absence of forests and trees may lead to floods, soil erosion, depletion in the water table and poor rainfall.

Prevention of Soil Erosion:

Soil erosion is the removal of the top layer of soil. The roots of the trees hold the soil together and help the water to infiltrate into the soil. In this way, soil erosion due to the runoff water

and wind is prevented by the forests. Hence, trees act as windbreakers.

Forests- A Source of Wood:

A well-managed forest is a rich source of timber wood and bamboo, which is used for construction houses, making furniture, and building ships. Trees such as teak, shisham, rosewood, oak, willow, and sandalwood are sources of wood.

Forests- A Source of Medicinal Plants and Edible Fruits:

A forest is a storehouse of a variety of medicinal plants, some of which do not grow anywhere else. Quinine, a medicine used to treat Malaria is extracted from the bark of the cinchona tree. All parts of the 'trumpet tree' are used to treat respiratory illness while lemongrass is used to treat fever, colds and coughs.

Forests- A Storehouse of Biodiversity:

The variety of living organisms found in a region form the biodiversity of the region. A Forest is a huge storehouse of biodiversity. Some plants and animals are found only in certain forest regions of the world. For example, the golden lion tamarins are found only in some forests of Brazil etc.

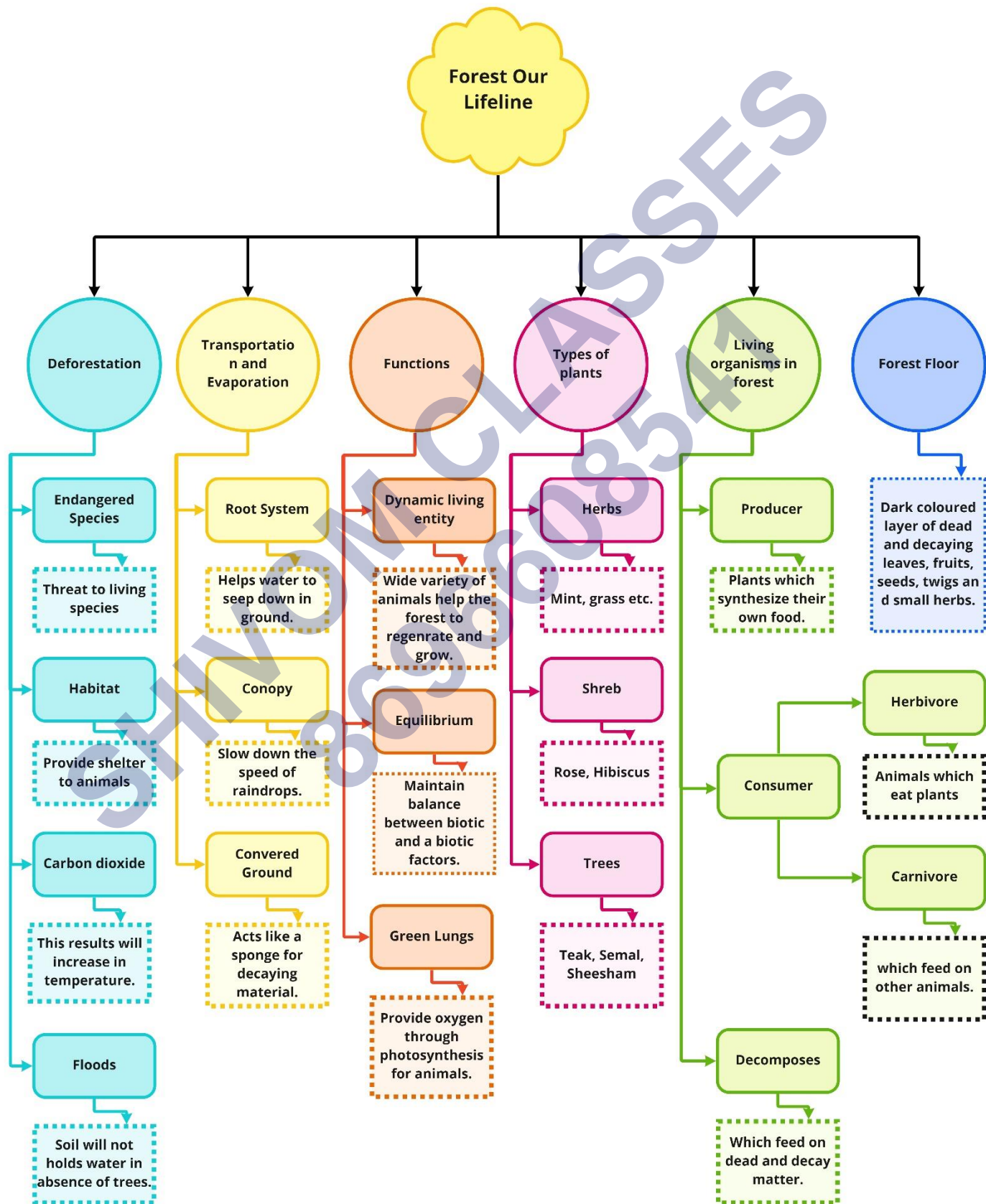
Destruction of Forests

Deforestation is the destruction of large number of trees in a forest and overuse of forest resources

The following are the reasons for deforestation:

- Construction of dams, highways and clearing of forest to convert them into cultivable land and other residential areas.
- The need for timber and medicinal plants, resulting in illegal logging and smuggling of the precious forest products.
- Construction of resorts in and around forests, leading to their destruction.
- Lack of awareness in people about the importance of forests.
- Overgrazing in forest by cattle from nearby villages.
- Poaching and hunting of animals for their meat, skin and bones causing a decrease in the number of animals and disturbance in the food chain.

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Important Questions

➤ Multiple Choice Questions:

Question 1. Which of the following is influenced by forests?

- (a) Temperature
- (b) Climate
- (c) Animals
- (d) All of these

Question 2. Which of the following is a forest plant?

- (a) Sheesham
- (b) Neem
- (c) Bamboo
- (d) All of these

Question 3. The branchy part of a tree above the stem is called

- (a) leaves
- (b) crown
- (c) saplings
- (d) canopy

Question 4. Which of the following is not the name of a tree?

- (a) Teak
- (b) Sal
- (c) Porcupine
- (d) Kachnar

Question 5. Which kind of plants generally constitute understory layer in the forest?

- (a) Grass
- (b) Shrubs
- (c) Tall trees
- (d) Herbs

Question 6. The smallest wild animal amongst the following is

- (a) fox
- (b) boar

- (c) bison
- (d) porcupine

Question 7. Name the organism on which all animals depend for food.

- (a) Humus
- (b) Plants
- (c) Insects
- (d) Crops

Question 8. Decomposers convert the dead plants and animals into

- (a) humus
- (b) oxygen
- (c) litter
- (d) fertilisers

Question 9. What are known as 'green lungs'?

- (a) Forests
- (b) Grasshoppers
- (c) Rivers
- (d) All of these

Question 10. Which of the following we can get from forests?

- (a) Food
- (b) Shelter
- (c) Fibre
- (d) All of these

Question 11. Which of the following is an animal product?

- (a) Rubber
- (b) Catechu
- (c) Gum
- (d) Honey

Question 12. Thing that is not obtained from the wood is

- (a) paper
- (b) thermocol

- (c) matchsticks
- (d) plywood

Question 13. Forests are not responsible for

- (a) providing medicinal plants
- (b) maintaining the flow of water into the streams
- (c) creating flood conditions
- (d) absorbing rainwater and maintaining water table

Question 14. Deforestation will lead to decrease in

- (a) soil erosion
- (b) rainfall
- (c) drought
- (d) global warming

Question 15. Greenhouse gases

- (a) trap heat of the sun
- (b) are green in colour
- (c) do not trap heat of the sun
- (d) smell foul

➤ **Fill In the Blanks:**

1. Forests are known as the of the earth.
2. The uppermost layer of the forest is known as layer.
3. The branches of the tall trees look like a roof over the other plants in the forest. This is called a
4. form the lowest layer of the forest.
5. Many food chains together constitute a
6. Some microorganisms feed on dead and decaying animal tissues and convert them into a dark coloured substance called

➤ **True or False:**

1. Forests are harmful for living beings.
2. Tiger is a wild animal.
3. Forests are a habitat for a large number of animals.

4. Sheesham is a forest plant.
5. Crown is the branchy part of a tree above the stem.
6. Only small trees form canopy.

➤ **Very Short Question:**

1. Name the resource that serves as green lungs and water purifying systems in nature.
2. What is crown of the tree?
3. Name the process by which plants release oxygen.
4. Name the living organism that helps in maintaining the supply of nutrients to the growing plants in the forest.
5. Name some factors responsible for clearing of forests.
6. Name the plant that forms the lowest layer in forest.
7. What is canopy?
8. Name any two forest products.
9. What is Endemic species?
10. What provides forest for many animals and plants

➤ **Short Questions:**

1. There is no waste in a forest. Explain
2. Explain how forests prevent floods.
3. What are decomposers? Explain with example.
4. What role does decomposer play in forest?
5. How water pollution will be affected with the depletion of forest?
6. Explain why there is a need of variety of animals and plants in a forest?
7. Why forest floor seemed to be dark coloured?
8. Define the following:
 - Crown
 - Understoreys

➤ **Long Questions:**

1. Discuss the role of forest in maintaining the balance between oxygen and carbon dioxide in the atmosphere.
2. Explain how animals dwelling in the forest help it grow and regenerate.

3. Explain the importance of forest.

✓ Answer Key-

➤ **Multiple Choice Answers:**

1. (d) All of these
2. (d) All of these
3. (b) crown
4. (c) Porcupine
5. (b) Shrubs
6. (d) porcupine
7. (b) Plants
8. (a) humus
9. (a) Forests
10. (d) All of these
11. (d) Honey
12. (b) thermocol
13. (c) creating flood conditions
14. (b) rainfall
15. (a) trap heat of the sun

➤ **Fill In the Blanks:**

1. Lungs
2. emergent
3. canopy
4. Herbs
5. food web
6. humus

➤ **True or False:**

1. False
2. True
3. True
4. True

5. True
6. False

➤ Very Short Answers:

1. Answer: Forest
2. Answer: The branchy part of the tree above the stem is known as crown of the tree.
3. Answer: Photosynthesis
4. Answer: Decomposers
5. Answer: Construction of roads and buildings, industrial development, increasing demand of wood etc.
6. Answer: Herbs form the lowest layer in the forest.
7. Answer: Tall trees which look like roof over other plants in the forest is called canopy.
8. Answer: Wax and paper
9. Answer: When an animal or a plant is found in a specific area, it is known as an endemic species.a
10. Answer: Home

➤ Short Answers:

1. Answer: There are several organisms and micro-organisms that live in the soil convert waste into useful nutrients called humus. This is why there is no waste in forest.
2. Answer: Forest absorbs rainwater and allows it to seep naturally; its leaves and branches prevent rain to hit the ground directly.
3. Answer: The micro-organisms which convert the dead plants and animals to humus are known as decomposers like Fungi and bacteria. They convert dead leaves and dead animals into humus.
4. Answer: Decomposers convert dead leaves and dead animals into humus.
5. Answer: Without tree roots holding the soil in a forest, soil will run into the river and will cause water pollution.
6. Answer: Animals and plants in a forest are dependent on the other for food. So there is a need of variety of animals and plants in a forest. Many food chains can be found in the forest like
Grass → insects → frog → snake → eagle.
7. Answer: The forest floor seemed dark coloured as it is covered with a layer of dead and decaying matters like leaves, fruits, seeds, twigs and small herbs.
8. Answer:

- Crown: The branchy part of tree above the stem is called crown.
- Understoreys: Trees have crowns of different type and sizes, these creates different horizontal layers in the forest, these are known as understoreys.

➤ Long Answers:

1. Answer: The forest plays an important role in maintaining the balance between oxygen and carbon dioxide in the atmosphere. As we know plants for their food nutrition requirement make use of process of photosynthesis, in which they consume Carbon Dioxide, released by the living organism from the environment. As a result of photosynthesis, plants release oxygen which is again consumed by living beings for respiration and this cycle goes on.
2. Answer: The wide variety of animals helps the forest to regenerate and grow. In forest, plants produce food. All animals, whether herbivores or carnivores, depend ultimately on plants for food. Organisms which feed on plants often get eaten by other organisms, and so on. For example, grass is eaten by insects, which in turn, is taken by the frog. The frog is consumed by snakes. This is said to form a food chain:

Grass → insects → frog → snake → eagle.

Many food chains can be found in the forest. All food chains are linked. If anyone food chain is disturbed, it affects other food chains. These food chains produce a lot of supplementary products which are vital for the plants growth. The micro-organisms which convert the dead plants and animals to humus are known as decomposers. Decomposers help in maintaining the supply of nutrients to the growing plants in the forest. Decaying heap of animal dropping is good source of nutrition for plants in the forest. The decaying animal dung also provides nutrients to the seedlings to grow. The animals also disperse the seeds of certain plants and help the forest to grow.

3. Answer: Forests provide us with oxygen. They protect soil and provide habitat to a large number of animals. Forests help in bringing good rainfall in neighbouring areas. They are a source of medicinal plants, timber and many other useful products. By the process of transpiration and photosynthesis, forests maintain the temperature. Forests provide shelter for the animals and act as a protective camouflage. Forests provide shelter and food to the tribes living in the jungle. Forest trees such as the bamboo are used in making furniture, baskets, ladders, etc. The teak tree is used to make furniture. The Neem tree is used for medicinal purposes. Forests also provide wood to make paper and other products such as gum, wax, rubber, and honey. Forest influence climate, water cycle and air quality. Forests play a very important role in the food chain. When forests are affected, they affect living beings such as animals and plants.