

Unit 4

FORESTS OF THE WORLD

Student's learning outcomes:

After completing this lesson, the students will be able to:

- ◆ Differentiate between natural vegetation and agriculture.
- ◆ Explain the link between climate and natural vegetation.
- ◆ Compare and contrast rainforests with other types of forests.
- ◆ Explore different shapes and functions of the three layers of the rainforests.
- ◆ Describe the importance of the Amazon rainforest.
- ◆ Evaluate how forests play an important role in the economy of the region.
- ◆ Identify the four major types of forests in Pakistan.
- ◆ Discover different types of trees in the northern areas of Pakistan.
- ◆ Explore why the forests of the various regions across Pakistan differ.
- ◆ Describe ways in which forests are helping the environment of a place.
- ◆ Suggest ways to minimize deforestation.

Natural vegetation is a type of vegetation in which plants grow without the interference of humans. It does not need watering from humans as they obtain water from rainfall. It does not need to add any fertilisers, pesticides etc. to the soil since it is already fertile. The natural vegetation



Natural vegetation



Agriculture

consists of forests, grasslands, mosses, lichens, algae and shrubs, etc. Agriculture is defined as the growing and harvesting of crops in particular natural and human environment. Plants in agriculture do not grow automatically but are controlled by humans. **“Agriculture is an activity done by farmers to yield crops”.**

Types of vegetation

Natural vegetation may be classified into three main types.

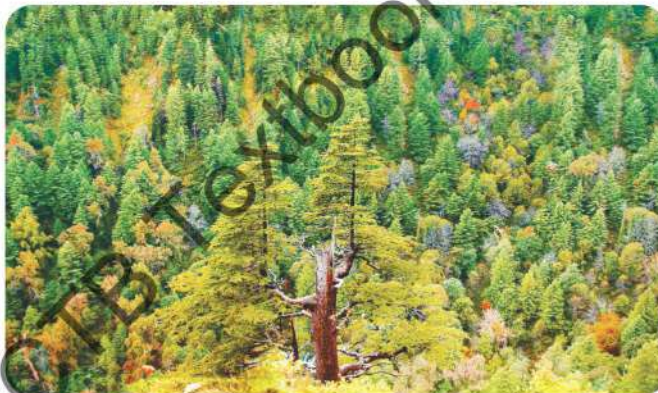
- **Forest**

- **Grassland**

- **Desert Vegetation**



Grassland



Forest



Desert vegetation



Do You Know?

Some vegetations are grown by human beings as well which are known as cultivated vegetation.

CLIMATE AND NATURAL VEGETATION

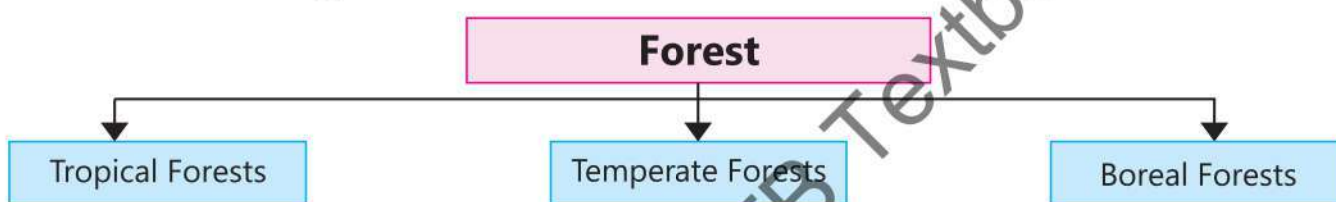
Natural vegetation in any area is greatly influenced by climate (precipitation and temperature). Three main types of vegetation exist actually due to unequal distribution of precipitation. Areas with more than 100 cm (1000 mm) rainfall generally support forests, places

with 25-100 cm (250-1000 mm) rainfall have grasslands whereas desert vegetation is found in the areas with less than 25 cm (250 mm) rainfall.

Temperature is another element which is responsible for classification of forests into various subtypes. Distribution of vegetation changes due to change in temperature. Hotter areas generally have more lush vegetation as compared to the colder areas as very few plants grow in areas with less than 40° C.

TYPES OF FORESTS

There are three main types of forests that are as follows:



i. Tropical Forests

Forests situated in equatorial and sub-equatorial areas between 30° N to 30° S are known as tropical forests. These areas are hot while winters are short and cool. Season remains same throughout the year so daily and annual range of temperature is ignorable. This condition is suitable for dense growth of vegetation. The most common type of tropical forests is evergreen rainforest.

Rainforests

These forests are situated in equatorial belt which include some parts of Africa, Southeast Asia and South and Central America. Amazon Basin (South America) and Zaire Basin (Africa) are two largest regions all over the world having rainforests. Trees in rainforests are taller and highly dense.

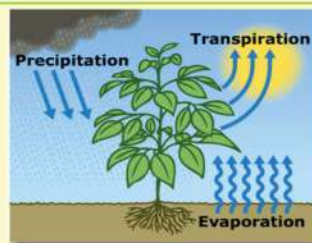


Rainforests



Do You Know?

Evapotranspiration means evaporation of water into the atmosphere from the soil surface, It also includes transpiration, which is the water movement from the soil to the atmosphere via plants.



LAYERS OF RAINFORESTS

Rainforests have the following different layers.

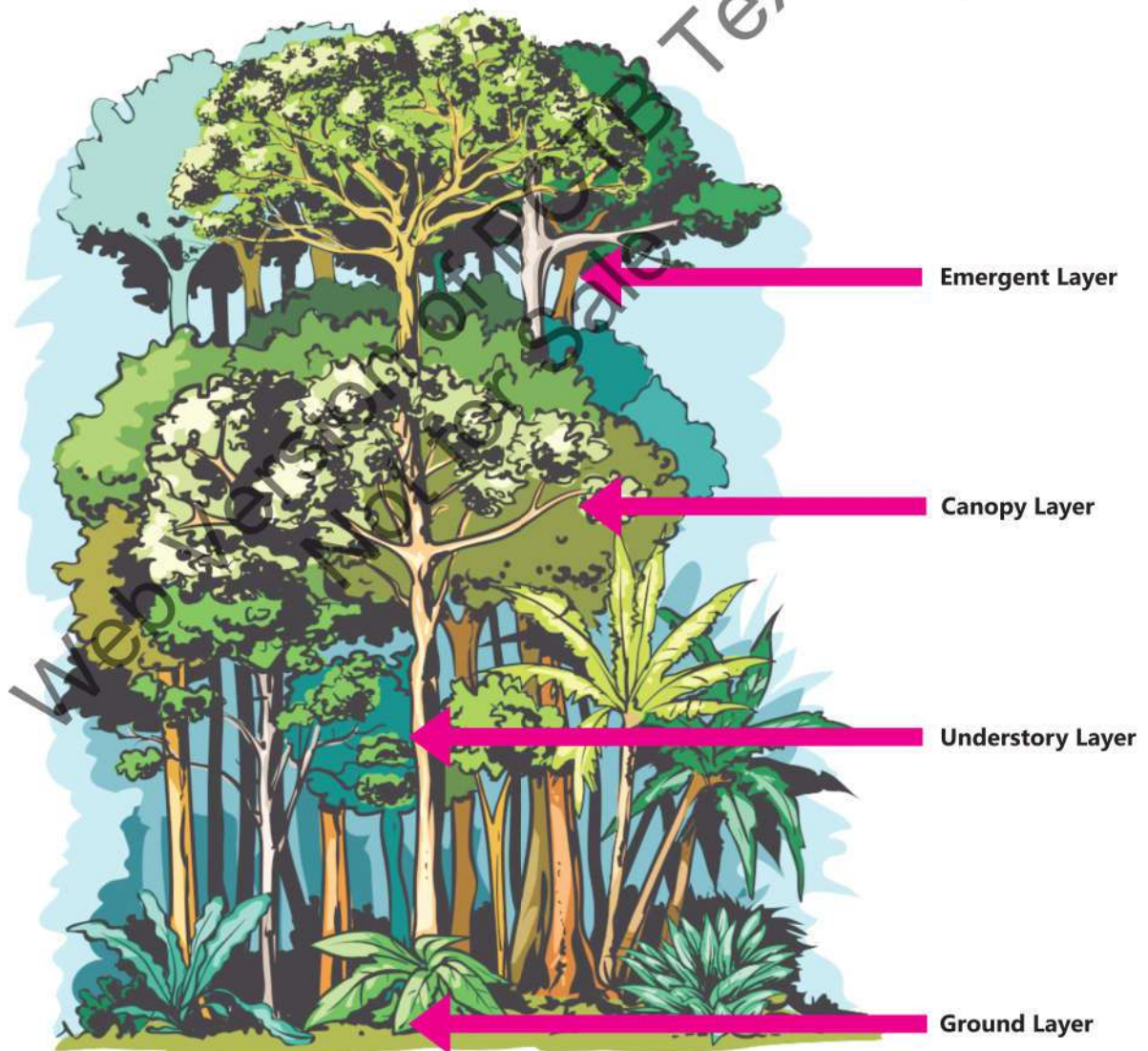
Emergent Layer

Upper most layer of the forest where the tallest trees rise above the surroundings are known as emergent trees which are found in limited number. Their average height is 40-55 meter. Species like bats, certain types of monkeys and butterfly live here.

Canopy Layer

Tall trees with average height of 30-40 metres are known as canopy trees. They are extremely close to each other so that their crowns are mixed up with each other to form a continuous canopy. This layer doesn't let the sunlight to penetrate.

Non-parasitic plants i.e. lianas and epiphytes etc. may also be found in this layer.



Layers of Rainforests

Understory Layer

This layer lies between ground layer and canopy layer. Number of insects, birds, lizards, snakes and leopards live in this layer as short-heighted trees are found here.

Ground Layer

Smaller plants like algae, mosses, ferns and fungi etc. are found here as they do not require more sunlight to grow up. Canopy layer resists sunlight to reach the ground therefore, ground layer has sparse vegetation.

Trees and their Characteristics

Most of the trees in rainforests are hardwoods. Seraya, ebony and ironwood are some examples of such trees.

Characteristics of these trees are as below:

- Trees in rainforests have broad leaves.
- Loss of moisture from soil through transpiration is minimum.
- Many plants have sweet smelling fruits and colourful flowers.

ii. Temperate Forests

Temperate forests are situated in temperate areas with annual precipitation ranging from 750 mm to 1750 mm. Unlike tropical forests, these forests are not as much dense and contain three to four species of plants per hectare.

There are two main types of temperate forests.

- Deciduous Forests
- Coniferous Forests

Deciduous Forests

Location of these forests is between 25° to 40° latitudes in both hemispheres. Regions having deciduous forests include various parts of China, Korea, Europe, eastern U.S.A. and southeastern Australia.



Deciduous Forests



Coniferous Forests

Trees and their Characteristics

Famous trees in deciduous forests are hardwoods which include the species of Oak, Elm, Maple, Pine, Fir and Walnut. Characteristics of their trees may be described as below:

- Trees have broad leaves.
- Trees in deciduous forests shed their leaves in autumn.
- Shedding of leaves reduce transpiration.
- Deep roots hold and support the tree and allow them to suck the groundwater.

Coniferous Forests

Another type of forests in temperate region is coniferous forests which are mostly situated in northern hemisphere between the latitudes of 45° and 60° . Main areas having coniferous forests are northern parts of Asia, North America and Europe.

They have straight-trunked and cone-shaped trees with uniform height.

Trees and their Characteristics

These forests have evergreen softwoods which include the trees of Redwood, Pine, Cedar, Spruce and Fir. Deer, Black bear and Spotted Owl are notable animal species found in coniferous forests. Prominent characteristics of these forests are:

- Trees are conical in shape.
- Their conical shape allows the snow to slide down.
- Leaves are narrow and small.
- Roots are shallow so they can take nutrients from top soil easily.

iii. Boreal Forests

These are also known as taiga forests which are located in colder areas like Northern Canada, Siberia and Scandinavia. These forests observe short summers and long winters. Rainfall remain 40-100 cm annually. Trees are mostly evergreen.



Do You Know?

Denmark, Sweden, Norway, Finland and Iceland are known as Scandinavian countries. They contain almost 65% of total boreal forest in the world.

IMPORTANCE OF AMAZON RAINFOREST

Amazon rainforests are the largest one not only in South America but in the world, which are almost 60% of total world's rainforests.

Precipitation

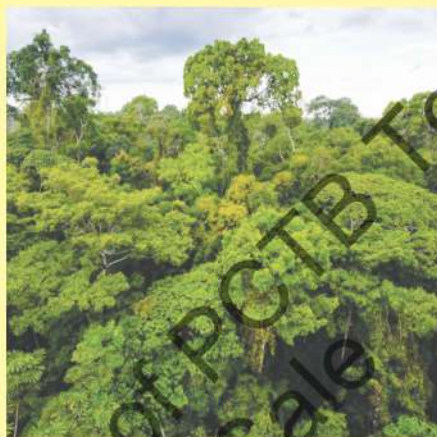
Transpiration of the forest is the main reason of precipitation. Influences of this transpiration and resulting rainfall extends over Central America and western parts of USA as well.

Regional Benefits

Millions of people living in Amazon depend on services afforded by the forest. Rivers are the main source of transportation whereas timbering and related industries are important in the region. Fishing is another important economic activity.

Carbon Storage

Amazon region has about 390 billion trees which lock up huge amount of carbon in their trunks, branches and leaves. Almost 86 billion tons carbon is stored by these forests as per estimates.



Amazon Biodiversity

Biodiversity

No other ecosystem on the earth has as much diversified species of plants and animals as Amazon has. Estimates reveal that around 30% of the total world's species are found here.

ROLE OF FORESTS IN ECONOMY

Forests play significant role in the development of any country. Forests are an important natural resource on which economy of the region depends.

Economic Activities: Forests provide places for hunting, recreational activities and tourism. Adventurers from foreign countries visit Central Africa, Amazon and other forests which boosts the economy. Forests provide fruits to human beings and fodder to animals as well.

Water Flow: The rivers and streams receive the rainwater and flow along mountains slopes. The forests on these slopes restrict the speed of flow and help in maintaining a regular and constant flow of water to the plains.

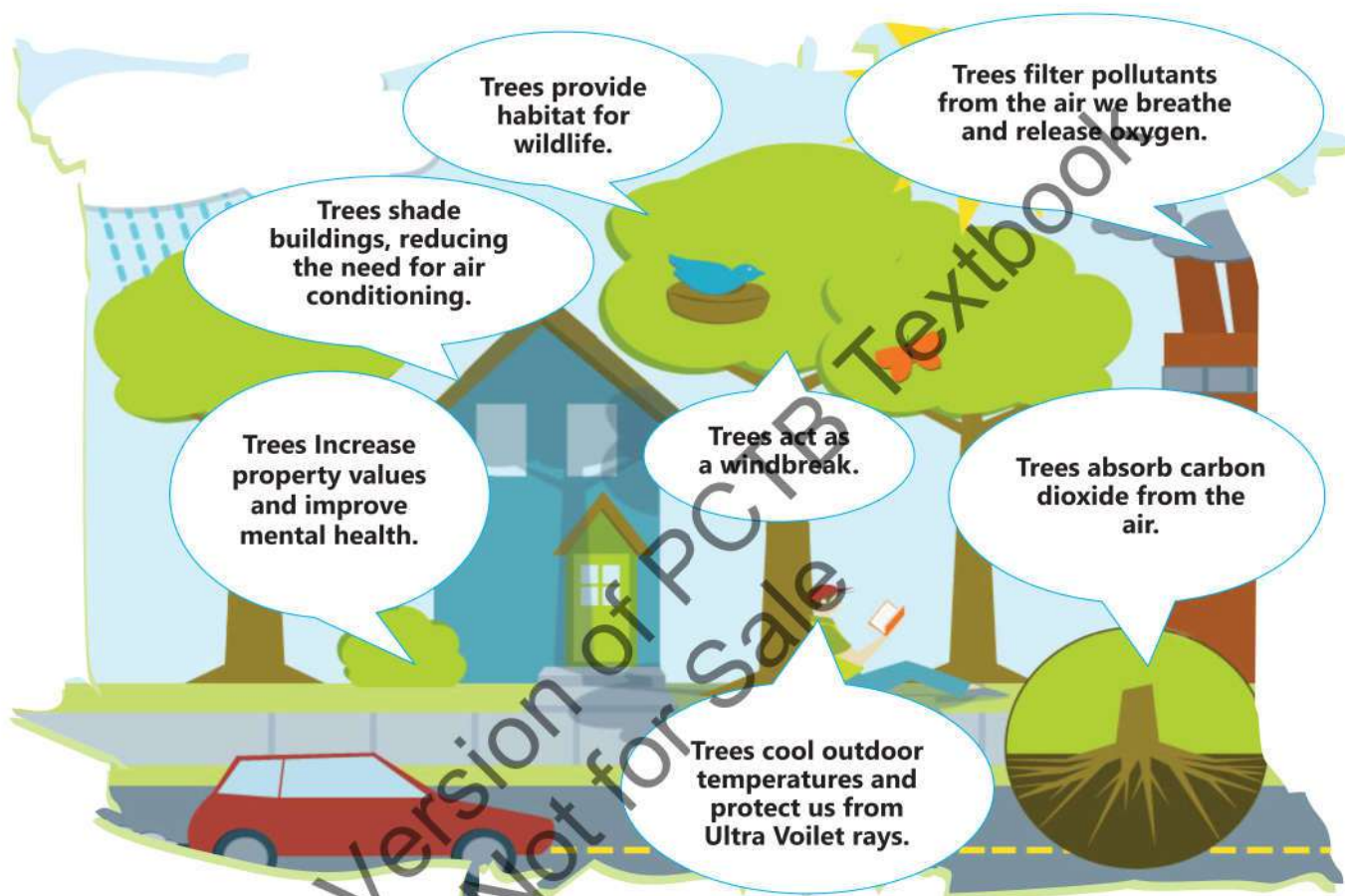
Energy Resource: Energy resources are limited in various parts of the world. Forests make up the deficiency of coal by fuelwood.

Agriculture: Forests trees help in maintaining the fertility of the soil which could otherwise be washed away by the running water on the slopes. The roots of trees keep the soil intact. They are also helpful against water logging and salinity.

Storage of Water Reservoirs: Forests prevent the soil erosion. The broken material may collect in the bases of water reservoirs. Therefore, storage capacity of dams retains.

Medicines: Valuable medicinal herbs are obtained from forests.

FORESTS HELPING ENVIRONMENT



TYPES OF FORESTS IN PAKISTAN

Following types of forests are found in Pakistan.

1. Coniferous Forests

The Northern and northwestern mountainous areas of Pakistan have suitable weather conditions for growth of vegetation. Alpine and evergreen coniferous forest are two main types. Forest found between 1000-4000 metres elevation are known as coniferous forests whereas the forests above 4000 metres elevation are known as alpine forests.



Activity Corner!

Use available source such as maps, google maps or GIS to identify different forests of the world.

2. Piedmont Forests

Such forests are located in the foothills. In Pakistan, they are found in Gilgit, Jhelum, Rawalpindi and Kohat districts. Species like Acacia, Wild olive, Phulai, Kahu, Jand and Black berry are found here.

3. Tropical Thorn Forests

They are found in dry tropical and semi-arid regions. The main dry hill-forests are in Quetta, Kalat, Zhob and Sibbi divisions where some Chilghoza Pines and Pencil Junipers manage to grow, here.

4. Riverine Forests

Riverine forests are located along the rivers. Alluvial soil supports rich crop of acacia, poplar and tamarind. Shisham and babul are another two important trees.

5. Irrigated Plantations

There are man made forests grown after clearing the warm tropical thorny forests in the areas where canal water is available. A typical example of irrigated plantation is Changa Manga. The other important plantations are there in Chichawatni, Khanewal, etc.

6. Coastal Forests

These forests are located in coastal areas and support a unique coastal mangrove type. Main species found here are *Avicennia officinalis*.



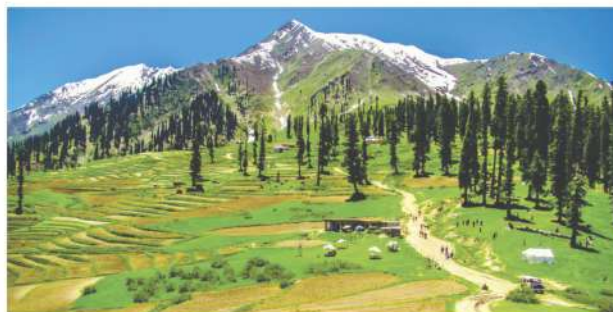
Riverine Forests



Irrigated Plantations

TREES IN NORTHERN AREAS

These are the main forests of Pakistan and lie in Dir, Swat, Chitral and the districts of Rawalpindi and Abbotabad. Rainfall in this region is plentiful. In these forests, evergreen coniferous trees such as Deodar, Firs Blue Pine, Spruce, Chalghoza, Juniper and Chirpine flourish. Their



wood is soft and valuable for building and construction work. Deciduous and broad-leaved trees such as Oak, Chestnut and Walnut are also found on warmer sunnier slopes. Large quantities of fuel wood and resin are obtained from these forests.

Why the forests of the various regions across Pakistan differ?

- Vegetation pattern changes with change in altitude.
- Different parts of Pakistan have different soil types.
- Rainfall distribution is uneven in the country. Northern and northwestern mountains receive abundant rainfall. Eastern and western parts of Pakistan are arid or semiarid.
- Temperature is another weather element affecting the type of vegetation and forests. Some trees are resistant to temperature while some are not.
- Slope of the region, quantity of pollens, duration of day for sunlight and pollution are some other factors that have more or less influence on vegetation type.

DEFORESTATION

Ideally, forests must cover 25% area for development of the country. Unfortunately, Pakistan is far below the standard with 5% forest cover. This trend is threatening not only the environment but our economy also.

Strong Administration and Legislation

Illegal wood cutting is banned but even then, this practice is going on.

Energy Resources

Firewood must not be burnt excessively. For this purpose, alternate energy resources may be used to get energy.

Reduction in Use of Wood-Related Products

Different commodities like papers, tissues etc. are used domestically and industrially that encourage deforestation.

Controlled Urbanization

Forests are eliminated to get agricultural and residential land. Increase in population is boosting this trend.

Awareness Campaign

People must realize importance of trees. Awareness campaign may be run to develop awareness among the people about the importance of trees and forests.

Key Points

- Agriculture is about growing and harvesting of crops in particular natural and human environment.
- Natural vegetation in any area is greatly influenced by climate.
- Vegetation varies as per climatic conditions.
- Forests situated in equatorial and subequatorial areas between 30° N to 30° S are known as tropical forests.
- Most of the trees in rainforests are hardwoods.
- Temperate forests are situated in temperate areas with annual precipitation ranging from 750 mm to 1750 mm.
- Forests are essential part of the ecosystem.
- Ideally, forests must cover 25% area for development of the country.
- Forests are eliminated to get agricultural or residential land.

Exercise

1

Circle the correct option:

- i. Forests situated in equatorial and subequatorial areas between 30° N to 30° S are known as:
- | | |
|----------------------|-------------------|
| a. Tropical Forests | b. Boreal Forests |
| c. Temperate Forests | d. Taiga |
- ii. Ideally, forests must cover area of:
- | | | | |
|--------|--------|--------|--------|
| a. 50% | b. 40% | c. 25% | d. 10% |
|--------|--------|--------|--------|
- iii. There are main types of forests:
- | | | | |
|------|------|------|------|
| a. 3 | b. 5 | c. 7 | d. 9 |
|------|------|------|------|
- iv. Forests above the height of 4000 meters are:
- | | | | |
|---------------|-----------|-------------|----------|
| a. Coniferous | b. Alpine | c. Riverine | d. Rakhs |
|---------------|-----------|-------------|----------|
- v. The largest rainforest in the world is:
- | | | | |
|-----------------|-----------------|-------------------|-------------------|
| a. Indus Forest | b. Changa Manga | c. Amazon Forests | d. Alpine Forests |
|-----------------|-----------------|-------------------|-------------------|

- vi. Area of Pakistan is covered by forests:
- a. 5% b. 10% c. 25% d. 50%
- vii. Zaire Basin is located in:
- a. Pakistan b. Europe c. South America d. Africa
- viii. Chiltan National Park is located in:
- a. Peshawar b. Chitral c. Gwadar d. Quetta
- ix. An example of irrigated plantation is:
- a. Alpine b. Riverine c. Rakhs d. Changa Manga
- x. The tallest trees are found in:
- a. Emergent Layer b. Canopy Layer c. Ground Layer d. Understory

2

Answer the following short questions:

- i. Name any two forests found in the world.
- ii. Where temperate forests are located?
- iii. How do the forests prevent soil erosion?
- iv. Name any three forests in Pakistan.
- v. Define deforestation.
- vi. Evaluate how do the forests boost economic activities?
- vii. Write the difference between agriculture and vegetation.
- viii. What do you know about canopy layer of rainforests?

3

Answer the following questions in detail:

- i. Elaborate different layers of rainforests and discuss the features of each layer.
- ii. Name different types of forests in the world. Briefly describe the tropical forests along with characteristics of trees.

- iii. What are the importance of Amazon rainforest?
- iv. Discuss role of forests in economy of any country in detail.
- v. How are the forests distributed all over Pakistan? Write a comprehensive note.

Critical Thinking Questions:

- How forest are important for our environment?
- Explore the impacts of northern (Pakistan) forest on the climate of those areas.
- Why forests are different in different areas of Pakistan?
- How we can reduce deforestation in Pakistan?

Learning Activities:

The Teacher will:

- i. Visit any forest around you. Observe the trees planted there. Note them in the note book.
- ii. Enlist the reason why forests are disappearing.
- iii. Explore Changa Manga contribution to the environment of the region.