

## General Characteristics of Biome| sample answer

**Q: 'Examine the characteristics of any one biome that you have studied under 3 of the following headings: Climate, soils, flora and fauna.' (2011 Q17)**

(3 aspects will be discussed)

Biome= Tropical Rainforest.

### 1) Climate: The influence of a low latitude location

A tropical rainforest is a forest of tall trees found in the hot, wet, tropical zone around the earth. it is also known as the jungle.

The tropical rainforest biome is found between latitude 23.5 degrees north and south of the equator. It is home to the greatest variety of living things (biodiversity) on the planet.

The tropical rainforest biome is an important part of the global climate system, It produces water vapour and absorbs carbon dioxide from the atmosphere. Tropical rainforests produces 30% of the world's fresh water through transpiration.

The main geographical areas around the world: Central America, Amazon basin, Africa- Congo basin, with a small area in West Africa and Indo-Malaysia off the west coast of India, Southeast Asia, New Guinea and Queensland Australia.

The climate of the biome is tropical/equatorial and heavily influenced by its location. Because it is located in the tropics , sunlight strikes the earth at roughly a 90 degree angle and therefore the region receives almost 12 hours of sunlight every day.

The average temperature is about 27oC . There is small temperature range. Day length hardly changes between summer and winter and intense heating occurs as a result.

Due to the intense heating large amounts of moisture evaporates from the ground and vegetation. Water vapour rises, cools and condenses to form heavy convectional rainfall. Annual rainfall is 1250mm to 6600 mm

Because of the amount of water and heat, humidity levels reach between 77% and 88%. This encourages growth. Though rainforests only cover about 6% of the earth's surface they contain over 50% of all plant and animal species.

### 2) Soils: The latosol is the zonal soil associated with the tropical rainforest biome

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Latosols are red/yellow coloured zonal soils associated with equatorial climate. Rapid, deep chemical weathering and leaching play an important role in the formation of it. The latosol is very poor in nutrients.

Thousands of years of heavy rainfall have washed the nutrients away in the process of leaching. Nutrients, instead, are found in living plants and in the layer of decomposing plant matter on the ground (O-Horizon) 99% of the nutrients are held in root mats on the forest floor.

Leaching is so intense that only alluvium and iron compounds are left which give the soil its characteristic red and yellow colour. These soils lack silica and have low humus content due to rapid breakdown of organic material.

Various species of decomposers such as insects, bacteria and fungi quickly turn all dead plant matter into humus (humification). Plants quickly take up nutrients from the O-Horizon the moment they are released. This is so heavy rain does not wash away nutrients before they absorb them.

Therefore, rainforests have a very short nutrient cycle, it takes a few days for dead organic matter to be converted into humus and absorbed by plants. All life in rainforest is based on decay.

When a rainforest is cut down, the nutrients are removed from the ecosystem and the remaining soil can only be used for a short time before becoming infertile.

Poor soil management such as deforestation, intense heating and heavy rainfall can lead to laterite soils developing.

Laterite is a hard brick-like soil impossible to cultivate, even when wet. It occurs when the iron and aluminium forms a hard pan and when topsoil is removed by erosion the hardpan is exposed and baked.

### 3) Vegetation (Flora): Huge variety due to climate and soils.

There is great variety of vegetation in the rainforest. Each of the 3 largest rainforests have a different plant group- they can only be identified by their flowers because they look so alike.

Typical rainforest trees include teak, mahogany, palm oil and Brazil nut trees. It can take up to 60 years for a tree to grow large enough to be cut down.

To avoid competition with each other for light and moisture, the plants have evolved a unique four layered structure consisting of an emergent layer, the canopy, the understory and the forest floor.

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The emergent layer consists of the tops of the tallest trees, which range in height from 30m to 60m. Emergent trees are exposed to chilling winds and therefore have small pointed leaves.

The tall straight trees have smooth trunks with few branches and have thin bark because they have no need to protect themselves from ice or freezing temperatures.

The canopy is the name given to the upper parts of the trees which grow below the emergent layer. The canopy is found between 20-35m above ground.

Plants in the canopy consist of thick, snake like vines and epiphytes (air plants) like mosses, lichen and orchids which grow on trees.

The understory is a dark environment under the canopy from 2-20m . With little light plant growth is limited because they cannot photosynthesise.

There are short, leafy, mostly non-flowering shrubs, small trees, ferns and vines (lianas) that have adapted to filtered light and poor soils. Over 2500 species of vine grow in the rainforest.

Plants have adapted by growing leaves with large surface areas in an effort to absorb as much light as possible, for example the elephant ear plant has a leaf blade 3 meters long and 2 meters wide.

The forest floor- up to 2 metres, receives less than 3% of the light that strikes the top of the forest. The forest floor receives so little light that few plants grow here. Therefore it is easy to walk through.

The main plant growth here are parasitic plants that live off others plants nutrients such as trees that receive sunlight. Fungus such as mushrooms and bacteria are mostly present here due to their role in decomposition.