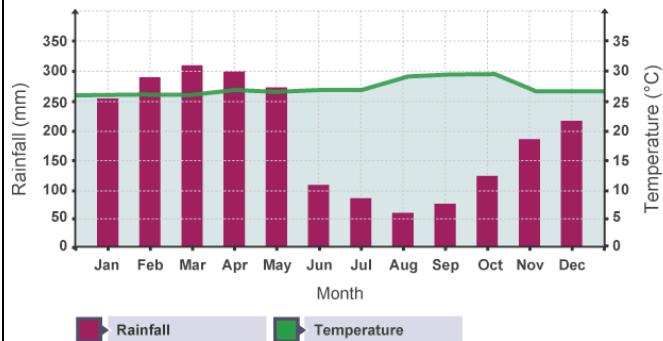


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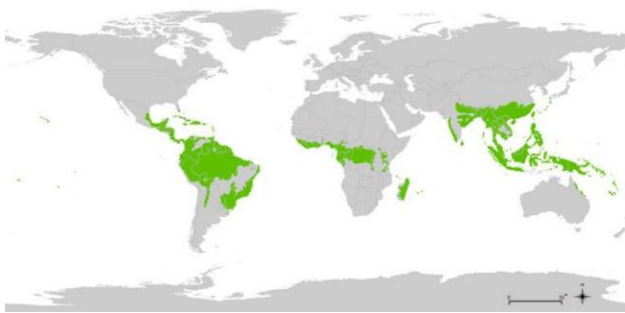
What is a rainforest?

Tropical rainforests are one type of **biome**. Biomes are geographical regions characterised by their climate and by the plants and animals that live there. Rainforests have a climate that is hot and wet all year round, receiving 2000mm of rain per year and temperate range of 27 to 32°C. The graph below shows the average climate of Manaus, Brazil. This climate promotes so much growth, rainforests are home to more plant and animal species than any other biome.



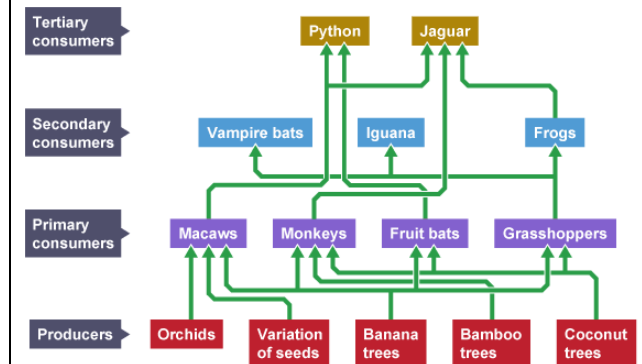
Where are rainforests found?

Rainforests are located around the Equator between the Tropics of Cancer and Capricorn. They are found in Central and South America, Central and West Africa, Southeast Asia, and the Pacific Islands. The countries with the largest areas of rainforest are Brazil, Democratic Republic of Congo, and Indonesia. Some other countries with large areas of rainforest are Peru, Colombia, Central African Republic, Cameroon, Laos, and Malaysia.



Rainforest food webs

Rainforests are home to high **biodiversity**. This means there is a large variety of different species of plants and animals living in the same space. These species are divided into five categories based on their role in the food web: **producers** like trees and shrubs, **primary**, **secondary**, and **tertiary consumers** (plants and animals that get protein from consuming the producers or other consumers), and **decomposers** like fungi.



Plant Adaptations

Only 2% of sunlight reaches the forest floor & rainforest soils are generally poor because heavy rainfall means nutrients are quickly leached from the soil.

Lianas - these are woody vines that have roots in the ground but climb up the trees to reach the sunlight. Their leaves and flowers grow in the canopy

Drip tips - plants have leaves with pointy tips. This allows water to run off the leaves quickly without damaging or breaking them.

Buttress roots - large roots have ridges which create a large surface area that help to support large trees.

Epiphytes - these are plants which live on the branches of trees high up in the canopy. They get their nutrients from the air and water, not from the soil.

Carnivorous plants are meat-eating plants that attract insects using smelly nectar and then trap them.

Fan palms have large, fan-shaped leaves that are good for catching sunshine and water. The leaves are segmented, so excess water can drain away.

Animal adaptations

Only a small percentage of species live on the forest floor, the majority live in the canopy. This may be to avoid predators or to be closer to their prey/food group. Some common adaptations are below:

Camouflage – animals use colour and shape to hide among their surroundings

Mimicry – animals appear and behave like another animal to fool predators

Reduced choice of food – to avoid competition for resources, some animals have developed an adaptation wherein they reduce the choice of food they consume

Bright colours and patterns – colours and patterns signal to predators to beware of poisoning etc; some harmless animals use the same colours and patterns as protection by tricking their predators

Reduced body size – the tropical rainforest favours smaller animals because it's so dense that it makes large movements hard to execute

Nocturnality – animals sleep during the day and hunt at night when it may be safer

Changing habitats – many animals take advantage of the huge trees in a rainforest and make habitats where they may not normally, like in the trees of the canopy

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Rainforest layers

Rainforests have four main layers – the emergent layer, the canopy, the under canopy, and the forest floor or shrub layer.

Emergent layer – contains a few trees that reach above the main canopy to heights of 40-50m and species like eagles, butterflies, bats, and some small monkeys

Canopy – most plant species exist in the canopy, where they form a dense cover of leaves, soaking up as much sunlight as they can; the canopy houses the most animal species

Under canopy – mostly open layer below the canopy where plants that have adapted to low light grow; the under canopy only receives 2-15% of the sunlight that the canopy gets

Shrub layer – only receives 2% of the light the canopy gets, so plants grow slowly and when trees or other organic materials fall they are decomposed quickly and plants race to grow and fill any gaps left in the light

People in the rainforest

The Amazon Rainforest is home to most the world's current uncontacted peoples, often living in tribes like the Awa. These tribes hunt, gather, and farm to feed themselves. They have been broken up and pushed further into the rainforest by different groups of settlers in their history, including European explorers in the 16th-17th centuries; the rubber industry in the early 20th century; and illegal loggers, drug traffickers, and cocoa farmers more recently. Some Awa people have moved into villages, but some still live in nomadic tribes the jungle. The current policy in Brazil and Peru is to let uncontacted peoples choose if, when, and how they would like to make contact and join the outside world. These encounters can be dangerous but could also be beneficial to Indigenous peoples.



Possible risks	Possible benefits
- Violent conflict	- Providing medical aid
- Spreading disease	- Providing tools and clothing to help people thrive
- Forcing assimilation and wiping out Indigenous ways of life	- Learning about sustainability and biodiversity from Indigenous peoples

Why are rainforests important?

There are many reasons why rainforests are a hugely important biome for our planet, including:

- **Providing habitats** for plants and animals (rainforests support 30 million plant and animal species)
- **Ancestral lands of Indigenous peoples**
- **Climate regulation** due to recycling of water
- **Preventing soil erosion** as trees bind the soil together and provide other plants with nutrients when they decompose
- **Providing many natural medicines** (25% of current medicines originated in rainforest plants!)
- **Providing an abundance of food**, including many that we see every day like coffee, chocolate, rice, and spices

Threats to rainforests

- **Cattle ranching** – every year more rainforests around the world are cut down to make room for pastures; pastures take up 80% of deforested land in the Amazon
- **Logging** – much of the logging that happens in the Amazon is illegal, since it is so hard to police remote areas of the jungle
- **Agriculture** – cash crops such as soya and palm oil are grown in deforested areas
- **Mining** – mining for gold and other metals can result in soil and water contamination with dangerous chemicals like mercury getting into the ecosystem
- **Hydroelectric power** – building dams often results in major flooding which damages the ecosystem and people's communities, and people are often not compensated
- **Road building** – road building destroys habitats and increases access to the forest for loggers and hunters
- **Poaching** – 9.6 to 23.5 million animals are hunted every year in the Brazilian Amazon alone, endangering the species and changing the area's food webs

How can we protect rainforests?

- **Logging and replanting** – selective logging of mature trees ensures that the rainforest canopy is preserved. This method allows the forest to recover because the younger trees gain more space and sunlight to grow. Planned and controlled logging ensures that for every tree logged another is planted.
- **Education** – it is important that local people, businesses and politicians understand the true value of the tropical rainforest. Once they understand the value of biodiversity, particularly in terms of tourism, they will be more likely to want to protect it from deforestation.
- **Ecotourism** – this encourages sustainable tourism that creates jobs for local people whilst ensuring that the money generated is used to protect and conserve the tropical rainforest for future generations to enjoy.
- **International agreements** – agreements to protect tropical rainforests have been made between different countries through debt-for-nature swaps. This is when a country which is owed money by another country cancels part of the debt if an agreement is made by the debtor country to ensure the conservation of its tropical rainforests.

