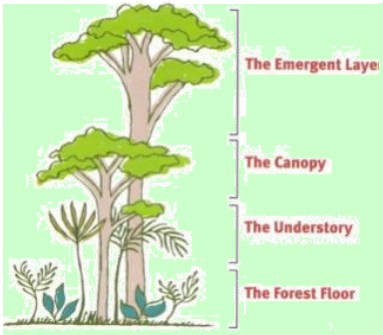
Ecosystem - Key terms

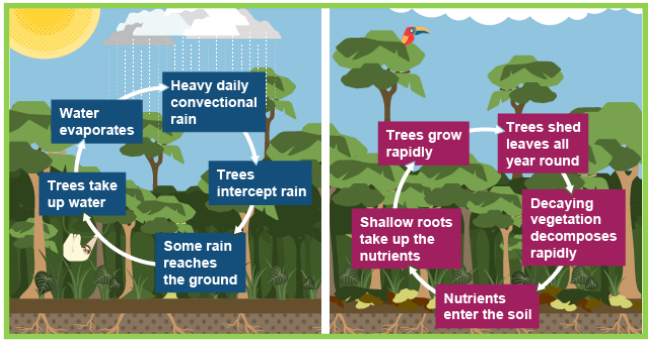
Key term	Definition
Ecosystem	A community of plants and animals that interact with one another and their physical environment.
Abiotic	Relating to non living things.
Biotic	Relating to living things.
Producer	An organism or plant that is able to absorb energy from the sun through photosynthesis.
Primary consumer	Creature that eats plant matter. Also known as a herbivore.
Secondary consumer	Creature that eats other animals. Also known as a carnivore.
Decomposer	An organism that breaks down dead plant and animal matter.
Food chain	The connections between different organisms that rely on one another as their food source.
Food web	A complex hierarchy of plants and animals relying on each other for food.
Biome	A large global ecosystem with flora and fauna adapting to their environment.

Tropical Rainforest - Vegetation

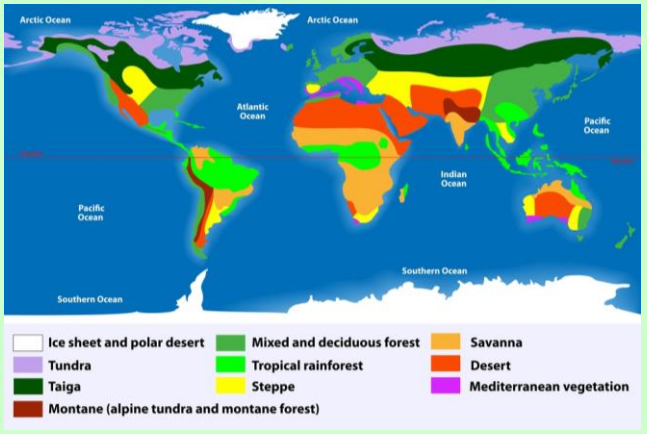


- Competition for light causes trees to grow fast. They are tall and straight. Buttress roots support these tall trees.
- Plants on the forest floor are shade tolerant and able to cope in the darker conditions.
- Epiphytes grow high up on the branches of trees to gain access to the light.
- Lianas wrap themselves around other trees to gain access to light.
- Plants have drip tips.

Water and Nutrient Cycle



Distribution of Biomes



Biome	Key Characteristics
Tropical Rainforests	•Along equator (Asia, Africa / South America). •6% of earth's surface. •25°C – 30°C and over 250mm rain per month.
Tropical Grasslands (Savanna)	•Between equator and tropics. •20 – 30°C and between 500 - 1500 mm of rain per year. •Wet and dry seasons.
Deserts	•Tropics (Sahara and Australia). •Over 30°C and less than 300 mmm per year rain. •20% of land's surface.
Deciduous forests	•Higher latitudes (W Europe, N America, New Zealand). •5 – 20°C and between 500 – 1500 mm rain per year. •4 distinct seasons. •Lose leaves in the winter to cope with the cold.
Coniferous forest (Taiga)	•60°N (Scandinavia / Canada). •Cone bearing evergreen trees. •No sunlight for part of the year.
Tundra	•Above 60°N (Arctic Circle). •Less than 10°C and less than 500mm per year rain. •Cold, icy and dry means 2 month growing season.

Effects of deforestation in Malaysia

Economic development

•Brings in jobs and income. • Companies pay taxes to the government which can be used to improve public services. •Pollution of water sources. •Fires can cause harmful pollution •Rising temperatures could devastate some forms of farming

Soil erosion

•Land left unprotected from heavy rain leads to landslides and flooding. •Nutrients are washed away decreasing nutrients in the soil. •Rivers silt up.

Contribution to climate change

•Trees cut down change the water cycle and make it drier. •Rainforests are the lungs of the earth and so when deforested there is more carbon dioxide in the air and less oxygen. •Burning also releases carbon dioxide into the air (Greenhouse effect).

Others

•Loss of biodiversity . •Loss of indigenous tribes •Loss of indigenous knowledge. •Conflicts between developers and indigenous people.

Causes of deforestation in Malaysia

Commercial farming	Farming to sell produce for a profit. Cattle and crops. Malaysia is the largest palm oil transporter in the world
Logging	Malaysia is the wold's largest exporter of tropical wood
Mineral extraction	The removal of mineral resources from the earth and drilling for oil and gas
Subsistence farming	A type of agriculture producing food and materials for the benefit only of the farmer and his family or community. Small scale, often slash and burn.
Population pressure	Urban poor were encouraged by the government to move to the countryside from rapidly growing cities. This is called transmigration. Between 1956 and the 1980's around 15,000 hectares of rainforest were felled for settlers. Many set up plantations.

Protecting Malaysia's rainforest

- Selective logging. Only fell fully grown trees. Mark sustainable trees for sale.
- Conservation & education. WWF (NGO) educate and train conservation workers. Buy threatened areas.
- Ecotourism. Minimises damage to the environment and benefits locals. This creates incentive to protect the forest.
- International agreements. International Tropical Trade Agreement restricts trade in hard woods.
- Debt reduction. In 2010 the USA converted $13.5 million from Brazil and used to protect forest.

Unit 1b

AQA

The Living World

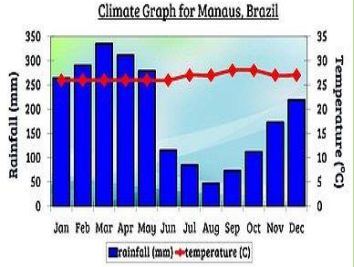
Tropical Rainforest - Animals

- Jaguars have spotted fur. This camouflages them in the dappled shade of the forest floor.
- Parrots have strong, sharp beaks to help them crack open nuts.

- Spider monkeys have a prehensile tail that allows them to cling to branches. Sharp nails allow them to peel bark.
- Poison dart frogs are a bright colour to warn predators away.

Rainforest Climate

Temperatures are high all year (around 28°C). Rainfall is around 250mm per month.



Trophic levels

Trophic Level	Source of Energy	Examples
Producers	Solar energy	Green plants, photosynthetic protists and bacteria
Herbivores	Producers	Grasshoppers, water fleas, antelope, termites
Primary Carnivores	Herbivores	Wolves, spiders, some snakes, warblers
Secondary Carnivores	Primary carnivores	Killer whales, tuna, falcons
Omnivores	Several trophic levels	Humans, rats, opossums, bears, racoons, crabs
Detritivores and Decomposers	Wastes and dead bodies of other organisms	Fungi, many bacteria, earthworms, vultures

At each (trophic) level of the food chain the number of individuals declines. This is because not all individuals in any trophic level are consumed (eaten). This means not all energy is passed up to the next trophic level.

Changes within ecosystems

If any component within an ecosystem is changed it will have a knock on effect on the rest of the ecosystem.
An example of where this happened was in Yellowstone National Park in the USA when they reintroduced wolves in 1995.

16 packs of grey wolves introduced. Each pack kills one elk a day.

Elk population falls from 20,000 to 10,000 in 8 years.

Competition from wolves results in decrease in coyote population.

More kills by wolves = more food for scavengers.

Reduction in grazing pressure. Aspen and cottonwood regenerate. There is more tree cover.

Reduction in predation from coyotes leads to increase in mice and voles.

Increase in populations of grizzly bears, cougars, ravens, magpies and eagles.

Increase in bank side trees stabilises river banks so there is less erosion. More woody debris in rivers creates pools and trout habitats.

Beavers create ponds and flooded areas, which promote growth of aspen.

Regeneration of aspen attracts beavers, which begin to recolonise Yellowstone.

Increased tree cover provides habitats for birds.

Populations of predators of small rodents e.g. red foxes and birds of prey, increase.

Ecosystem - A question of scale

Ecosystems can be any size.
- Local e.g a pond or under a dead log. Also called a habitat.
- Regional e.g. the upland moorland of the Pennines in the north of England.
- Global e.g. tropical rainforest. Also called biomes.

A small scale ecosystem – A freshwater pond

Freshwater ponds can provide a variety of habitats for plant and animals

Plants like reeds grow in the water and around the edge of the pond.

On the banks grow grasses, bushes and trees

At the edges of the pond the water is shallow and there will be plants like water lilies

At the centre the water will be deeper and there will be fish

On the surface ducks and shall insects such as water boatman

Cold environments

To be defined as a cold environment a place must experience temperatures that are below zero degrees Celsius for long periods of time.

NOT cold environments

Svalbard - Challenges

Extreme Temperatures Even in Longyearbyen winter temperatures can fall below -30. In the northern glacial regions it can be even colder

Inaccessibility – Svalbard in located in a remote part of Europe and can only be reached by plane or ship

Services- Pipes need to be kept off the ground to prevent them causing any possible thawing of the permafrost and allow easy maintenance.

Construction- Working outdoors in extreme temperatures and also limited light in winter is very demanding. As a result most construction work is carries out during the brief summer period.

Svalbard - Opportunities	Specific Detail
Mineral resources - mineral resources from the earth can be used by industry or sold for export.	Svalbard has rich reserves of coal, but mining on Svalbard is a controversial issue as environmentalists are against it. However coal mining is vital to the economy of Svalbard.
Energy developments-Coal mining provides income and power but can be a controversial issue.	The most likely future source of energy for Svalbard is geothermal energy, tapping into the heat of the earth and using it to generate electricity
Tourism – Cold environments offer an opportunity for tourists to explore the natural environment.	Tourism in Svalbard has grown in recent years. In 2011, 70,000 people visited Longyearbyen and 30,000 of these were cruise passengers.
Fishing – Cold waters provide a rich finishing ground	Barents Sea south of Svalbard is one of the richest fishing grounds in the world. There are an estimates 150 species of fish including herring and haddock.

Why are cold environments fragile?

Off road vehicles- leave deep tyre tracks. It takes many years for the land to recover

Oil pollution- kills trees and animal life

Gas and oil exploitation- roads constructed through forests

Managing cold environments

The Antarctic Treaty• In 1959 the Antarctic treaty was signed by countries with territorial claims to Antarctica. Its main aim was to protect the natural environment of the largest wilderness on earth. The treaty recognises the importance of the continent for scientific research and keeps tourism to a minimum.

Conservation groups. The WWF in Canada- The world wildlife fund (WWF) is a conservation group that helps to protect Arctic environments in Canada provides scientific information, expertise and resources. It works with local communities to manage critical ecosystems such as the Beaufort sea.

Cold plants

Few plants, if any ate found in polar regions, but a wide variety of plants live in Tundra areas. This is because they have evolved a number of special adaptations to cope with the low temperatures, strong winds and dry conditions.
E.g- Flowering and seed formation happens in a short time so that reproduction can take place during short summers. Plants are low growing and cushion like to protect and insulate them from strong dry winds.

Cold animals

Polar bears are well adapted to the environment. To retain heat they have thick fur, an insulating layer of fat, with a black nose and foot pads to absorb sunshine.

In the Antarctic penguins lay their eggs on land and bring up their young before returning to the ocean.