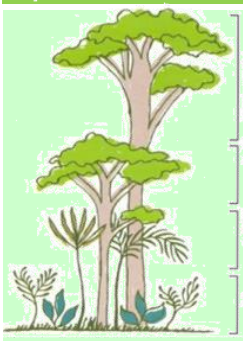
Ecosystem - Key terms

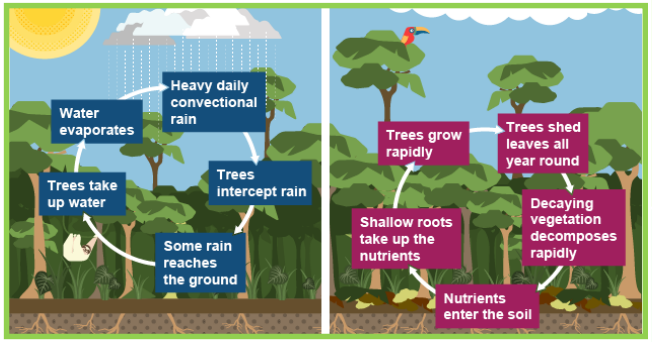
Key term	Definition
Ecosystem	A community of plants and animals that interact with one another and their physical environment.
Abiotic	Relating to non living things.
Biotic	Relating to living things.
Producer	An organism or plant that is able to absorb energy from the sun through photosynthesis.
Primary 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

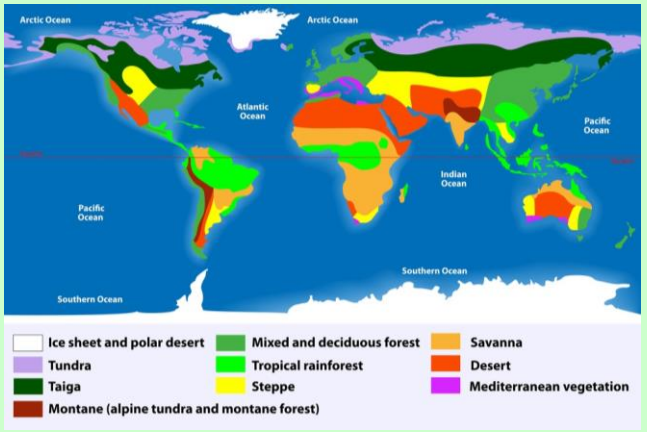


- Competition for light causes trees to grow fast. They are tall and straight. Buttress roots support these tall trees.
- Plants on the forest floor are shade tolerant and able to cope in the darker conditions.
- Epiphytes grow high up on the branches of trees to gain access to the light.
- Lianas wrap 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
• **Gains** - Brings in income. Development of land for farming and enegy will lead to jobs. Companies will pay taxes. Improved infrastructure. Oil palm and rubber provides raw materials. HEP means cheap electricity. Minerals such as gold are valuable.
• **Losses –** Pollution of water. Fires cause pollution. Rising temps kills crops eg tea. Plants can bring medicines. Climate change. Tourism decrease in rainforest.

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. •Evaporation speeded up.

Loss of Biodiversity
Over 600 species on Main Range Penninsular. 25% of all plant species in Malaysia. Loss of life to Orangutans

Causes of deforestation in the Malaysia

Commercial farming	Farming to sell produce for a profit. Cattle and crops. Responsible for 80% of Amazon deforestation. Ruins soil and nutrients. Palm Oil
Logging	The business of cutting down trees and transporting the logs to sawmills. Selective logging and clear felling. Teak and Mahogany worth the most.
Mineral extraction	The removal of mineral resources from the earth. Gold, Bauxite, Oil and gas. Pollutes rivers and air. Trees above the mines and quarries are removed.
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.
Hydro - electricity	Dams have been built and large areas of rainforest destroyed by flooding.
Population Pressure	Urban people encouraged to move to the rainforest. Called **Transmigration.** Between 1956 – 1980**'s** about 15000 ha forest was felled.
Energy Development	Bakun Dam – HEP. Asia's highest dam.

Protecting the 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

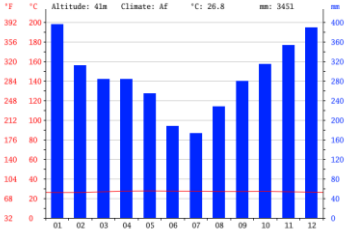
Tropical Rainforest - Animals

- 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. Sarawak Climate graph



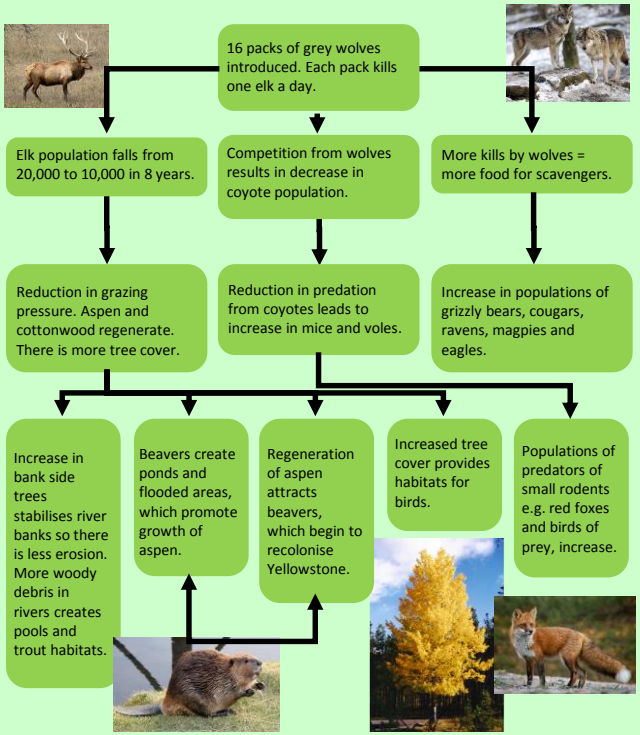
Trophic levels

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.



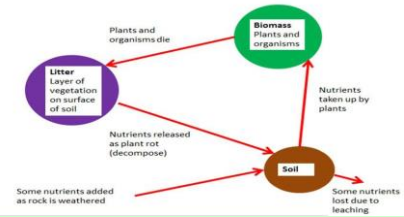
Ecosystem - A question of scale

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 – Freshwater Pond- Avington Lake

Freshwater ponds provide habitat for plants and animals. Plants like weeds grow in the water. On the banks there are bushes and trees. At the edges of the pond the water is shallow.In the centre the water is deep. Above the pond animals and birds breathe oxygen. Pond surface plenty of oxygen. Animals breathe through gills, lungs or skin. Mid water animals breathe through skin or gills. Fish are main predators

Ecosystems are changed due to natural and human influences. Agricultural fertilisers, drainage from farmland, woods cut down destroying habitats.



Hot deserts

To be defined as a Hot Desert, there must be:
-Less than 250mm of rain a year.
- Diurnal temperatures ranging from 50°C during the day to 0°C at night.

NOT hot desserts

Desert - Challenges

Extreme Temperatures Temperatures are over 40 degrees during the day and drop below freezing at night.

Inaccessibility – The Sahara is huge making travel difficult and expensive.

Water Supply - low rainfall makes water for drinking, washing and agriculture difficult to supply.

Desertification - Causes

Desertification is where land is gradually turned into desert, usually on the edge of a desert. It is caused by overgrazing by cattle or trees being cut down for firewood. Population growth is a key factor. Climate change will lead to more droughts that kill vegetation and cause the problem to spread. In the area to the south of the **Sahara**, known as the **Sahel** heavy rainstorms can wash away the exposed soil in a couple of hours.

Desert - Opportunities

Mineral resources - mineral resources from the earth can be used by industry or sold for export.

Oil and gas - oil is trapped in huge aquifers deep underground. It is an extremely valuable resource.

Solar energy - with 12 hours of cloudless sunshine every day, deserts are ideal locations for this form of electricity generation.

Tourism – deserts are remote, romantic and exotic locations for tourists.

Farming - only possible where there is access to water through irrigation.

Specific Detail

Morocco is the world's largest exporter of phosphate which is used in fertilisers and batteries. The money gained can be used to develop the country.

Algeria is a leading exporter of oil and gets 60% of its income from the oil and gas industry. It has many huge oilfields e.g. Hassi Messaoud. The industry provides jobs for 40,000 people.

Tunisia is planning a huge development that will supply enough electricity to meet the needs of 2 million homes in Western Europe. Solar power does not contribute to global warming.

You can go camel trekking in Morocco. Cities like Marrakech are popular with many tourists visiting the famous souk (market). Increasing opportunities for sand-boarding and dune buggies exist.

Egypt doubled the amount of land where crops were grown by building the Aswan Dam to control the flow of the Nile and irrigate the surrounding desert.

Desertification - Solutions

Irrigation - Water from aquifers used to grow crops / vegetation.

National Parks - Conserve areas at risk, protect wildlife.

Afforestation - Green wall being planted across the Sahel.

Crop rotation - Keeps nutrients in the soil by avoiding monoculture.

Appropriate Technology - Use of suitable crops, magic stones, terraces.

Sahara Desert - Morocco

Opportunities • Solar Energy. Tourism, Argon Oil, Mineral Extraction, Farming.

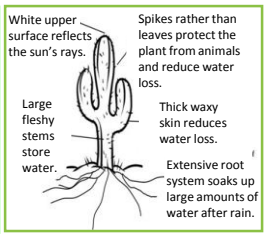
Solutions to Desertification – Tree planting
Water management, Soli Management, Appropriate Technology

Challenges •Water scarcity, Accessbility, Climate Challenges

Desert plants

High temperatures should lead to rapid growth but this is not possible due to the lack of moisture. Vegetation is sparse and usually confined to water holes.

Lack of rainfall is the main limit on plant growth. Plants have thin leaves or spines to reduce water loss and long roots to reach deep underground water. The Cactus is a common desert plant.



Desert Animals

The limited number of producers means the number of consumers is also low.

Animals need to be able to tolerate the range of temperatures in the desert. Many do this by staying underground during the day. They also need to find ways to cope with the limited availability of water. Some gain enough water from their food. Others extract water from air.