

D1: 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.

D4: Tropical Rainforest - Vegetation

The Emergent Layer

- Competition for light causes trees to grow fast. They are tall and straight. Buttress roots support these tall trees.

The Canopy

- 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.

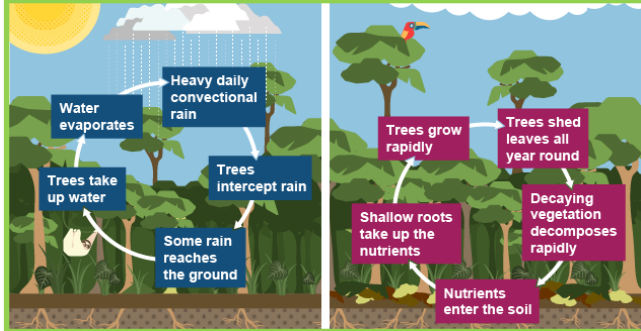
The Understory

- Lianas wrap themselves around other trees to gain access to light.

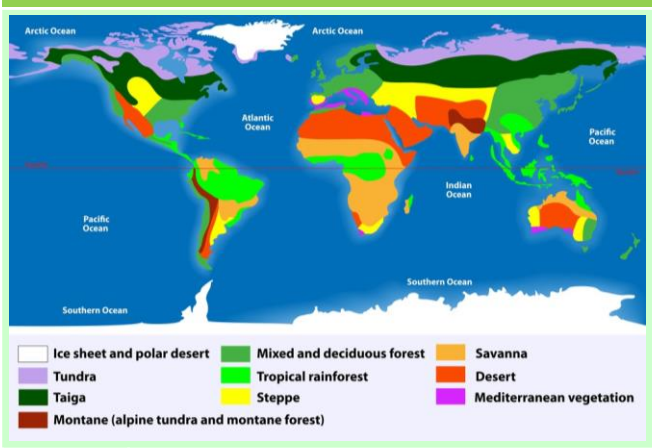
The Forest Floor

- Plants have drip tips.

D3: Water and Nutrient Cycle



D2: 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 mm 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.

D8: Effects of deforestation in the Amazon

<p>Economic development</p> <ul style="list-style-type: none"> •Brings in jobs and income. •Destroys resources in the long term. •Livelihoods of locals destroyed. •2008 \$6.9 billion from cattle. •Rubber tappers lost jobs. •Mercury from gold mining poisons fish. 	<p>Soil erosion</p> <ul style="list-style-type: none"> •Land left unprotected from heavy rain leads to landslides and flooding. •Nutrients are washed away decreasing nutrients in the soil. •Rivers silt up.
<p>Contribution to climate change</p> <ul style="list-style-type: none"> •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). 	<p>Others</p> <ul style="list-style-type: none"> •Loss of biodiversity - 137 species a day. •Loss of indigenous tribes (90 since 1990). •Tribal people moving to towns and cities and have drugs and alcohol issues. •Loss of indigenous knowledge. •Conflicts between developers and indigenous people.

D7: Causes of deforestation in the Amazon

Commercial farming	Farming to sell produce for a profit. Cattle and crops. Responsible for 80% of Amazon deforestation. Ruins soil and nutrients
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.
Resettling	Since 1970 1 million people have been encouraged to move away from shanty towns and into the rainforest. They have been given land which has been cleared to allow farming.
Roads	The 4000km long Trans Amazonia Highway built 1970s. Opened up rainforest, but allowed loggers in.

D9: Protecting the Amazon

- 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

The Living World

D5: 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.

D6: Rainforest Climate

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

Climate Graph for Manaus, Brazil

Month	Rainfall (mm)	Temperature (°C)
Jan	250	28
Feb	280	28
Mar	320	28
Apr	300	28
May	120	28
Jun	80	28
Jul	50	28
Aug	70	28
Sep	100	28
Oct	150	28
Nov	200	28
Dec	250	28

D10: Trophic levels

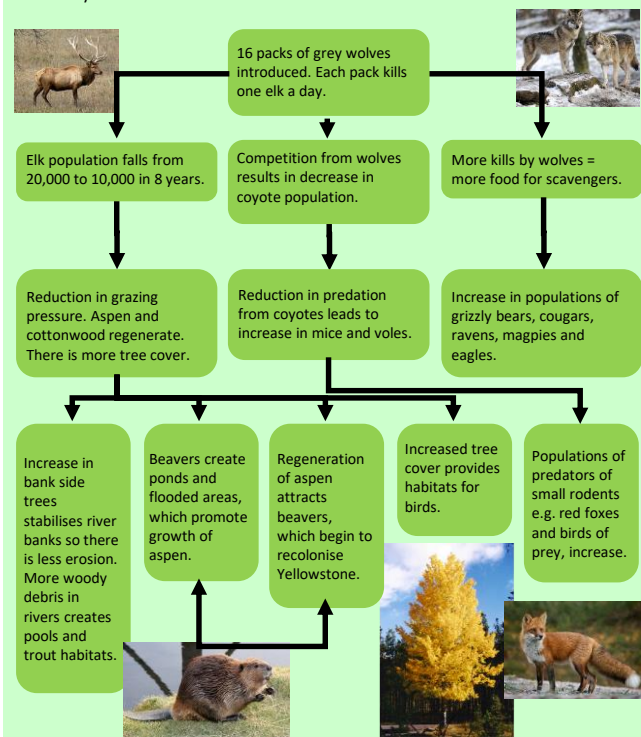
Trophic Level	Source of Energy	Examples
Producers	Solar energy	Green plants, photosynthetic protists and bacteria
Herbivores	Producers	Grasshoppers, water fleas, antelope, termites
Primary Carnivores	Herbivores	Wolves, spiders, some snakes, warblers
Secondary Carnivores	Primary carnivores	Killer whales, 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.

D11: 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.



D12: 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.

D13: A small scale ecosystem – Sutton Park

Sutton Park is an urban park in NE Birmingham. It covers 2400 acres and has a wide range of flora (plants) and fauna (animals).

The park attracts almost 1 million visitors each year.



Sutton Park is a 2,400 acre National Nature Reserve located 6 miles north of the city centre. It's one of the largest urban parks in Europe and is designated as a Site of Special Scientific Interest.

The park has open heathland, woodlands, seven lakes, wetlands, and marshes - each with its own rich variety of plants and wildlife, some rarely seen in the region. Cattle and wild ponies graze on the land.

Sutton Park has been designated as a National Nature Reserve, a Scheduled Ancient Monument and a Site of Special Scientific Interest.

The park is managed by coppicing where unnatural trees have been cut down to be replaced by natural species.

E2: 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.

E1: 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.

E4: 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.

E6: 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.

E8: INDIA, Thar Desert – 200km² in North West India

Opportunities •Farming using water from the Ghandi Canal. •Mineral extraction e.g. limestone, gypsum. •Energy. There are extensive coal deposits in the Thar. The Jaisalmer Wind Park also opening in 2001 for wind energy. •Tourism includes desert safaris and an annual desert festival.

E5:

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 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

E7: 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.



E3: 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.

Can drink up to 50 litres of water in just a few minutes.

Two rows of long eyelashes keep out the sand.

