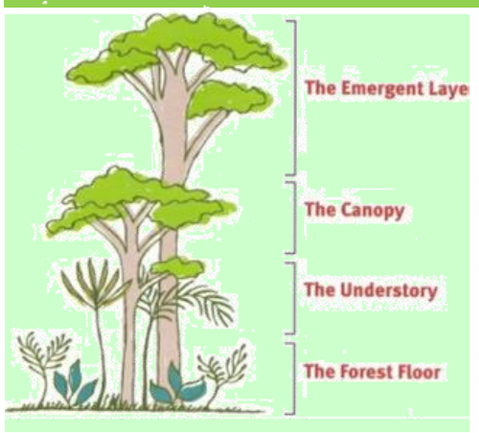
The Living World

Ecosystem - Key terms

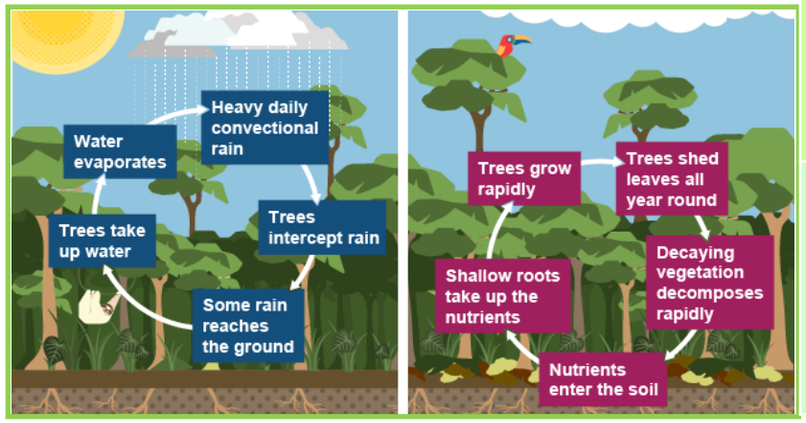
Key term	Definition
Ecosystem	A community of plants and animals that interact with one another and their physical environment.
Abiotic	Relating to non living things.
Biotic	Relating to living things.
Producer	An organism or plant that is able to absorb energy from the sun through photosynthesis.
Primary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

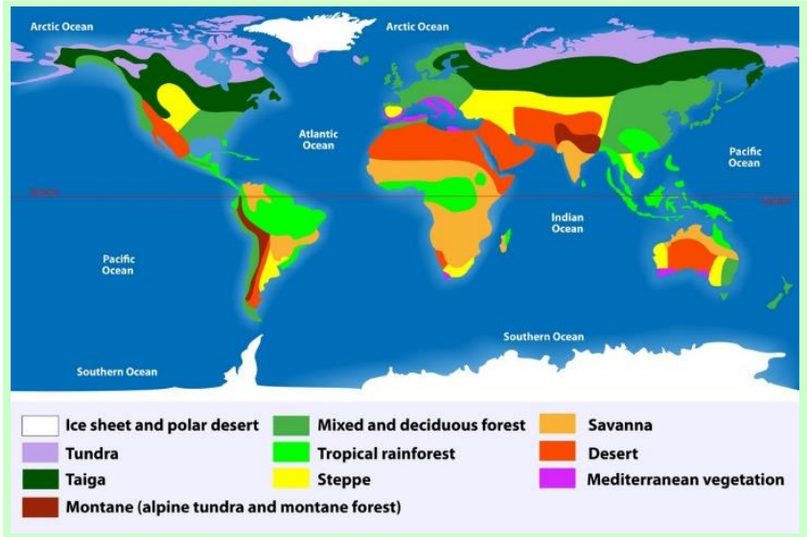


- Competition for light causes trees to grow fast. They are tall and straight. Buttress roots support these tall trees.
- Plants on the forest floor are shade tolerant and able to cope in the darker conditions.
- Epiphytes grow high up on the branches of trees to gain access to the light.
- Lianas wrap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

Water and Nutrient Cycle



Distribution of Biomes



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.

Effects of deforestation in the Amazon

Economic development
•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.

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 - 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.

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 Generated $6.7bn to the Brazilian Economy.
Logging	The business of cutting down trees and transporting the logs to sawmills. Selective logging and clear felling. Teak and Mahogany worth the most. Employs 204,000 people (that we know of)
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. 10,000 tonnes removed each year.
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. Has promoted global trade.

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.

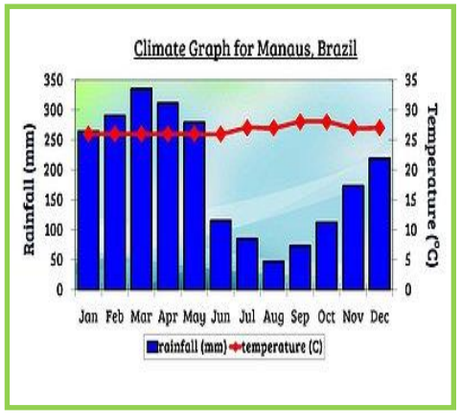
Tropical Rainforest – Animals and Plants

Animals – Toucan
Brightly coloured bill used to attract a mate and for camouflage.
Noisy calls to sound of potential threats.
Sharp bill to squash berries and plants, also to act as a defence and kill prey.

Vegetation
Drip tip leaves to allow for water to quickly leave the leaves without breaking/burning them.
Lianas are vines wrap around trees to allow them to reach the sunlight in order to grow.
Buttress Roots – able to secure large trees into the ground to prevent falling.
Epiphytes – Parasitic plants that grow on other trees.

Rainforest Climate

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



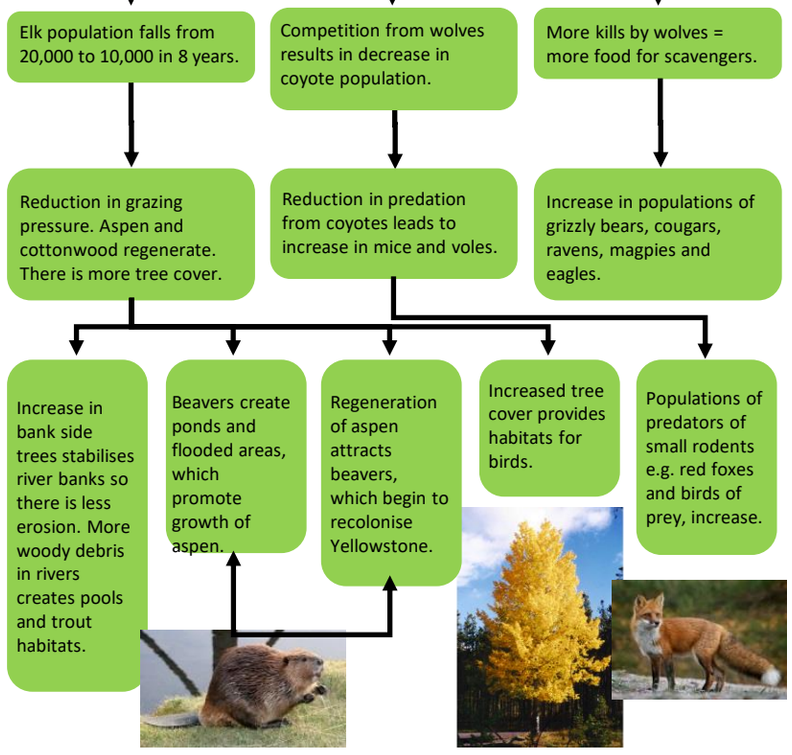
Trophic levels

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.



Cold Environments

Cold environments are usually found in the polar regions, either 90 degrees north or south of the equator. They have very cold climates because of the reduced **insolation**.

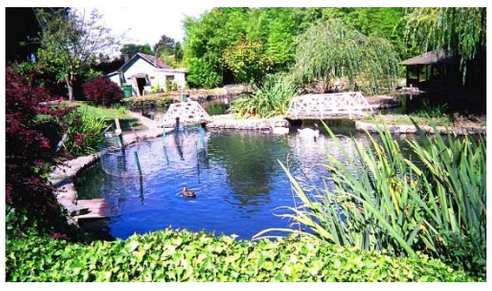
Ecosystem - A question of scale

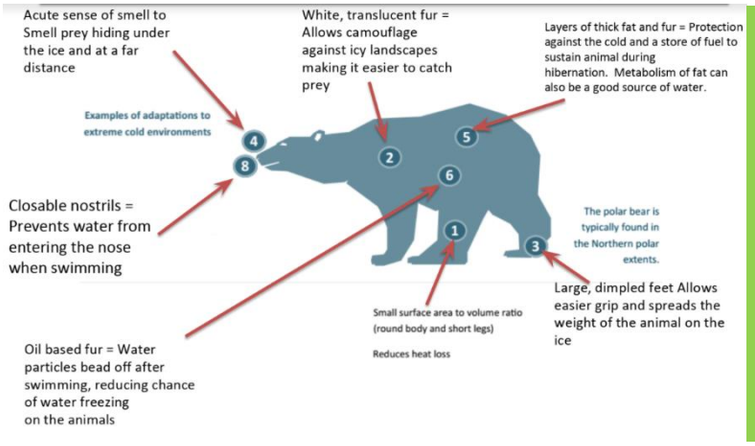
Ecosystems can be any size.
- Local e.g a pond or under a dead log. Also called a habitat.
- Regional e.g. the upland moorland of the Pennines in the north of England.
- Global e.g. tropical rainforest. Also called biomes.

A small scale ecosystem – Local Pond

You may have a freshwater pond in your back garden or in your school or the local park. They contain a VARIETY of habitats for plants and animals:

- Animals and plants living in deeper water at the bottom of the pond will have less light and Oxygen to cope with and ADAPT to.
- Living things at the edges of a pond (the margins) have more light and Oxygen, but also have to cope with more wind etc.





Cold Environment - Challenges

Extreme Temperatures Temperatures rarely get above 5˚ through the year and during the winter months the average temp is -25˚.

Inaccessibility – The roads are under constant threat of subsidence because of melting of the permafrost. Snow covered run-ways make it hard for supplies to get in and out.

Provision of Buildings- climate change is melting the permafrost, as a result buildings that sit on top are sinking. #climaterefugees

The Trans-Alaskan Pipeline

Advantages:
Can transport up to 1.4 million barrels of oil a day / Revenue collected from oil means citizens of Alaska pay reduced taxes. / Trucks can only pass to Prudhoe bay for 10 weeks of the year, it is too dangerous otherwise. The pipeline allows it to pass all year
Disadvantages
The pipeline can stop the migration of Caribou, a common species to Alaska / The pipeline is an environmental eyesore. / The temperature of the oil could cause permafrost to melt, this could cause subsidence and the pipeline could collapse – a major disaster

Cold - Opportunities

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

Local Benefits:
- Increased job prospect 44,800 people employed in Oil /
- Every direct oil and gas job generates 20 additional jobs /
- 90% of the state revenue is generated from oil /
- Increased demand for housing, helps to boost construction industry
- No taxation allows standard of living to increase, along with personal wealth. This helps to increase spending – **a multiplier effect**
  Charities and NGO's benefit from generous donations each year
- Investment in the future, Alaskans are paid dividends, meaning future generations benefit whether they are involved in oil or not.

National Benefits:
- Lots of investment from companies such as BP or Royal Dutch Shell, places Alaska on the map.
- As there is no income tax in Alaska, this is helping to attract lots of skilled workers to the areas.
- Alaska is seen to be a world leader in oil exploration, their knowledge has attracted lots of attention from other countries wishing to make money from oil.

Tourism

Tourism contributes significant amounts to the Alaskan economy. Tourists are attracted by the epic scenery, adventure activities they can get involved in and the chance to view rare wildlife. Over 2 million visitors last year.

Energy Creation

Renewable energy is created in huge amounts, be it through hydroelectric power during the melting seasons when huge amounts of meltwater come from the hills.
Alaska is also found within the ring of fire and they make regular use of geothermal energy which they can sell. (6.5 million megawatt hrs last year)

Managing Alaska

There are many different ways in which Alaska is managed > scan the QR code to see the different ways in which Alaska is managed.

How sustainable is economic activity in Alaska?

Case Study of Alaska

Opportunities Fishing for Salmon accounts for 1 in 10 jobs / Oil is extracted from Prudhoe Bay, sent down the 800km Trans-Alaskan Pipeline before being exported to the world/ Over 1 million tourists in 2016 / Production of Geothermal Energy

Challenges: As production rises in Salmon globally the price decreases as does income/Transporting Oil from A-B can be dangerous (Exxon Valdez) / Increased building subsidence / Remote accessibility / Ageing Population.

Cold Environment plants and animals

Description	Explanation
Grow close to the ground	Reduce damage caused by wind and ice particles
Small leaves	Conserve water which can be lost through the leaf surface
Shallow root systems	Allows the plant to grow in the active layer and avoid the permafrost
Grow in close proximity to one another	Each plant acts as a barrier for others for the wind and ice particles
Stem, buds and leaves are covered in small hairs	Creates a layer of insulation for protection against cold temperatures
Can photosynthesise in extremely cold weather conditions	Allows the plant to store energy despite a lack of sunlight for large parts of the year
Develop and produce seeds in a relatively short time	Allows for germination to be possible in a small favourable climatic window of time
Ability to survive on bare rock (Lichen)	Survival of a species where soil does not exist