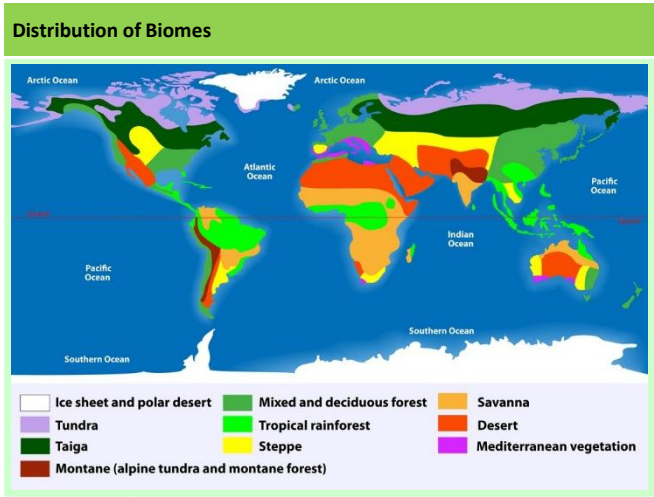


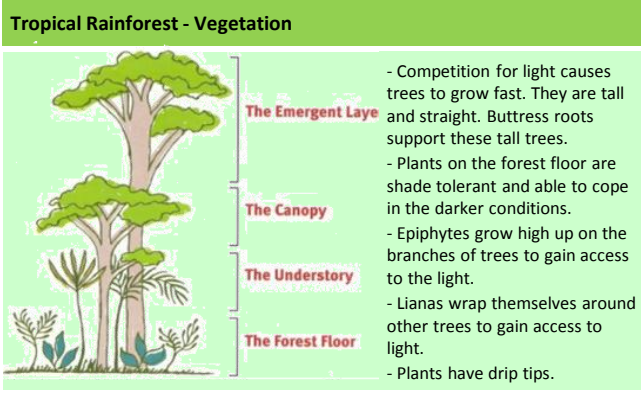
Ecosystem - Key terms	
Key term	Definition
Ecosystem	A community of plants and animals that interact with one another and their physical environment.
Abiotic	Relating to non living things.
Biotic	Relating to living things.
Producer	An organism or plant that is able to absorb energy from the sun through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



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.

### 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.



### Protecting Malaysia

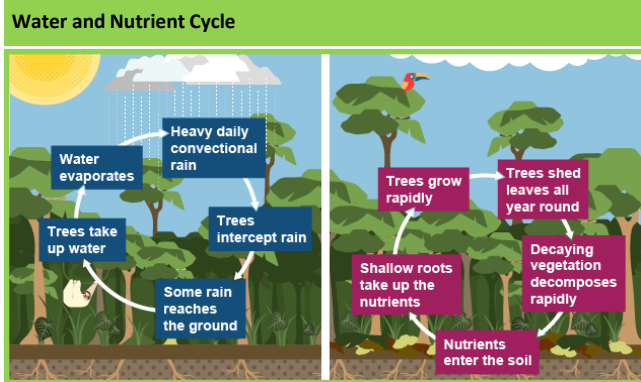
- Selective logging. Only fell fully grown trees. Mark sustainable trees for sale.
- Conservation & education. WWF (NGO) educate and train conservation workers. Buy threatened areas.
- Ecotourism. Minimises damage to the environment and benefits locals. This creates incentive to protect the forest.
- 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 Malaysia

<b>Economic development</b>	•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.
<b>Soil erosion</b>	•Land left unprotected from heavy rain leads to landslides and flooding. •Nutrients are washed away decreasing nutrients in the soil. •Rivers silt up.
<b>Contribution to climate change</b>	•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).
<b>Others</b>	•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.

# Unit 1b

# The Living World



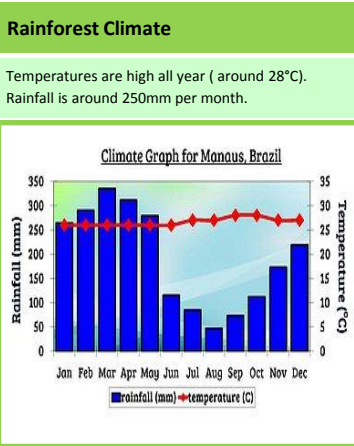
### Tropical Rainforest - Animals

- 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.

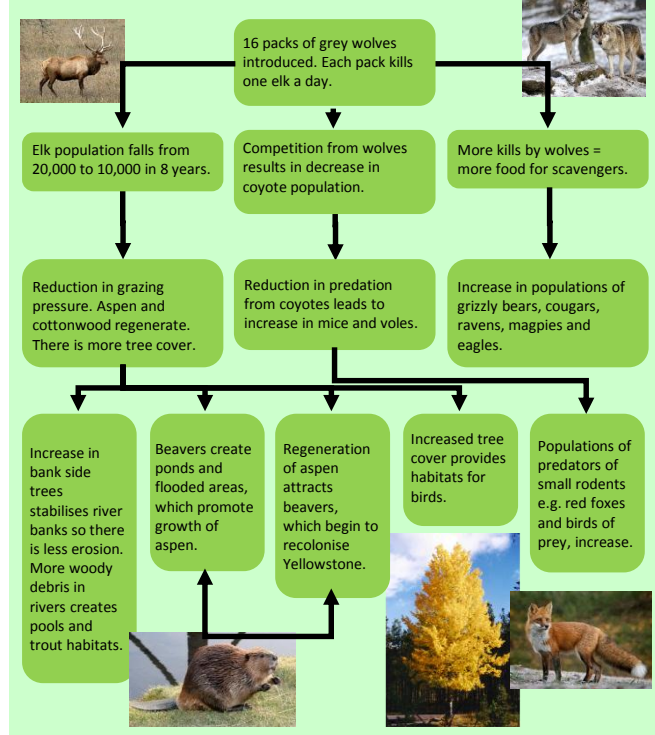


Trophic levels		
Trophic Level	Source of Energy	Examples
Producers	Solar energy	Green plants, photosynthetic protists and bacteria
Herbivores	Producers	Grasshoppers, water fleas, antelope, termites
Primary Carnivores	Herbivores	Wolves, spiders, some snakes, warblers
Secondary Carnivores	Primary carnivores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

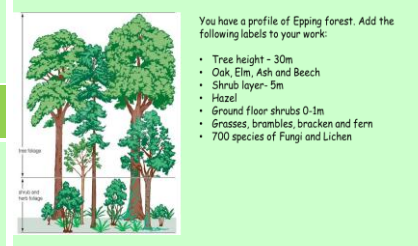


### Ecosystem - A question of scale

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 – Epping Forest

Epping forest is a temperate deciduous forest in North London, to the South of Essex. It is 19km long and 4km wide. Although 70% of Epping forest is deciduous woodland (mostly beech) there are a number of other natural environments including grasslands and marshes.



**Biodiversity** of the forest has remained naturally high, thanks to careful management, so there is a complex foodweb composed of thousands of **species**. Epping forest is home to: 20 species of dragonfly  
 A large number of native **tree** species including **Oak**, Elm, Ash and **Beech**.  
 A lower **shrub** layer of Holly and Hazel at 5m overlying a field layer of grasses, brambles, bracken, fern and flowering plants, **177** species of moss and **lichen** grow at Epping Forest.  
 Mammals, amphibian and **reptile** species call Epping Forest their home.  
 38 species of **birds**  
 700 species of **Fungi** can be found at Epping forest.

### Polar/tundra plants

Plants also have adapted to the Arctic tundra by developing the ability to grow under a layer of snow, to carry out photosynthesis in extremely cold temperatures, and for flowering plants, to produce flowers quickly once summer begins. A small leaf structure is another physical adaptation that helps plants survive.

### Cold Environments



Polar areas are very cold, temperatures are never normally below -40 degrees and can reach -90 degrees. Rainfall and snowfall are low (no more than 100mm a year in polar regions) mainly in the summer.

### Polar/tundra - Challenges

- Extreme Temperatures** Temperatures drop below -50 degrees in Winter
- Inaccessibility** – The polar regions are extremely inhospitable and difficult to reach. There is poor infrastructure around both poles.
- Water Supply/Sunlight** - low rainfall and 6 month period of darkness makes agriculture difficult

### Melting permafrost - Causes

Permafrost comprises 24% of the land in the Northern Hemisphere, and stores massive amounts of carbon. As a result of climate change, permafrost is at risk of melting, releasing the stored carbon in the form of carbon dioxide and methane, which are powerful heat-trapping gases.

### Svalbard – The World’s Most Northerly Inhabited Town

- Opportunities**
- Tourism – cruise ships visiting from North America, Europe
  - Fossil fuel extraction e.g. coal
  - Fishing e.g. Atlantic Cod
  - Geothermal energy (near to constructive plate margin)

### Polar/tundra - 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.
- Geothermal energy** - with many polar areas close to plate margins there is the opportunity to utilise geothermal energy
- Tourism**
- Biodiversity** - only possible where there is access to water through irrigation.

### Permafrost - Solutions

- Planning – Limit development to protect permafrost
- Energy production – Use renewable energy and limit use of fossil fuels.
- Ecotourism – Small, guided tourist groups
- Crop rotation - Keeps nutrients in the soil by avoiding monoculture.
- Appropriate Technology - Use of suitable crops, magic stones, terraces.

### Challenges

- Temperatures drop to -20°C.
- Lack of roads mean due to permafrost – strong reliance on snowmobiles.
- Struggle to grow crops due to lack of sunlight and permafrost.
- Polar bears roaming

### Polar/tundra Animals

The limited number of producers means the number of consumers is also low.  
 Animals need to be able to tolerate the low temperatures in polar/tundra regions. Many do this by migrating during the harsh winter months. They also need to find ways to cope with the limited availability of warmth. Small ears (stop heat loss) and body fat are common.

