Ecology

Ecology - is the study of interactions between living things and their environment.

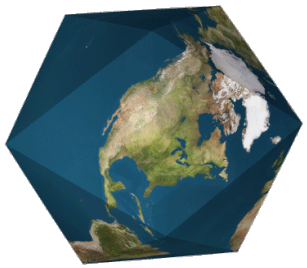
Biosphere - is the part of the planet containing living things.

Ecosystem - a group of organisms that interact with their environment together.

Habitat - the place an animal or plant lives.

Population - members of the same species living in an area.

Community - all the different populations (species) in an area.



ENVIRONMENTAL FACTORS

Biotic factors - living factors.
Examples - Food, competition,etc.

Abiotic factors - non-living factors.
Examples - Altitude, Aspect

Climatic factors - weather over a long time.
Examples - Temperature, rainfall

Edaphic Factors - Factors to do with soil.
Examples - pH, water content

Energy Flow

Producers - Organisms that carry out photosynthesis.

Consumers - take in food from another organism.

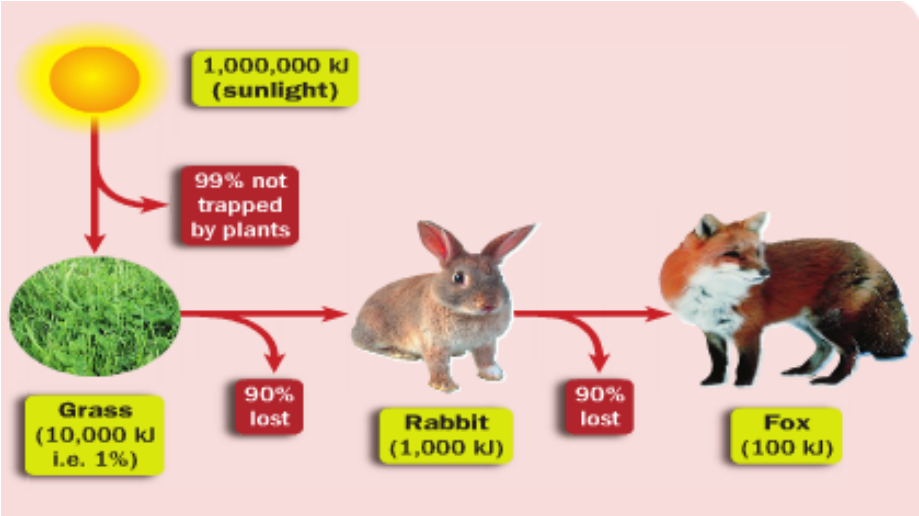
Food Chain - the sequence in which an organism is eaten by the next one in the chain.

In a grassland habitat an example of a food chain is

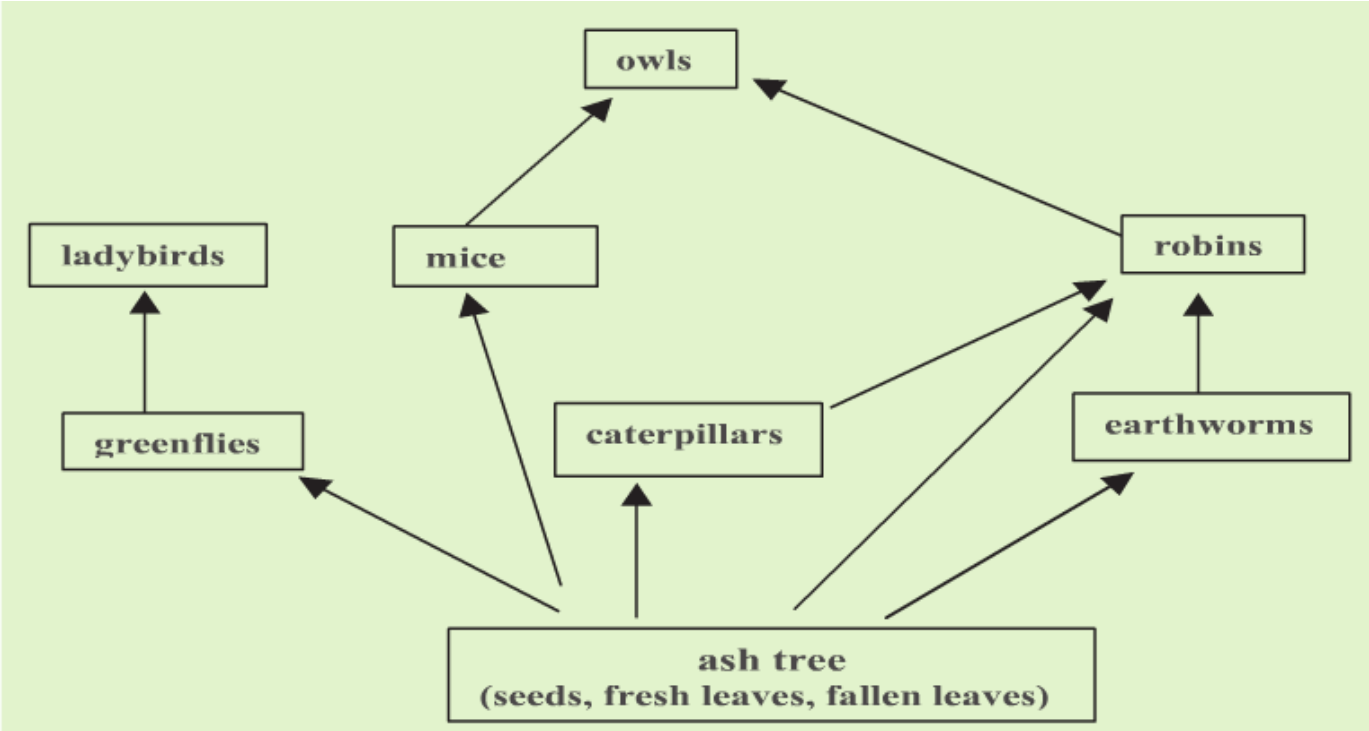
Buttercup → Caterpillar → Thrush → Fox

Energy Flow

Energy comes from the sun.
Plants catch the energy and change it into sugars.
The plants are then eaten by consumers.
These consumers get around 10% of the energy from the plant.
If these consumers are eaten they pass on about 10% of their energy.
Food chains can only be a certain length as the energy eventually runs out.



Food Web



Food chain = Ash tree → Caterpillars → Robins → Owls

Producer = Ash tree

Primary consumer = Caterpillar

Herbivore = mice / caterpillar / greenfly / earthworm

Omnivore = Robin

Ecological niche - is the role an organism plays in the community.
2 organisms with the same niche must compete with each other.

An example is how birds eat.

Magpies eat from fences, gutters

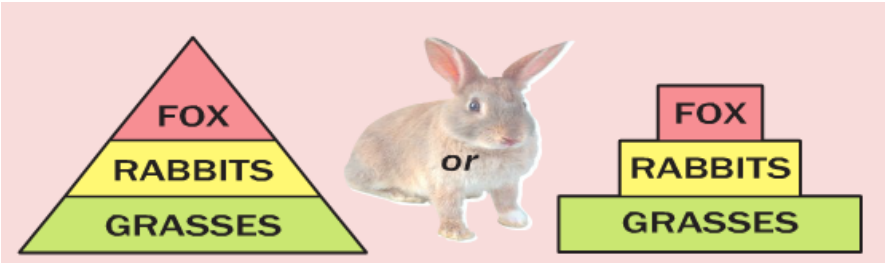
Swallows eat in flight

A Thrush eats from the soil

Pyramid of numbers

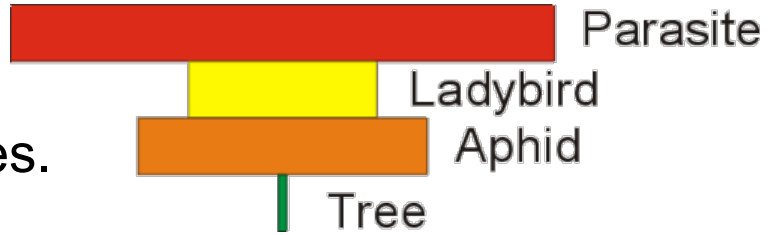
This represents the number of organisms at each trophic level in a food chain.

The number of organisms at each level normally decreases as you go up.
This is due to the decrease in energy.



In the example above, there is lots of grass, less rabbits and even fewer foxes

Sometimes you can have an inverted pyramid of numbers. This is where the number of organisms actually increases.



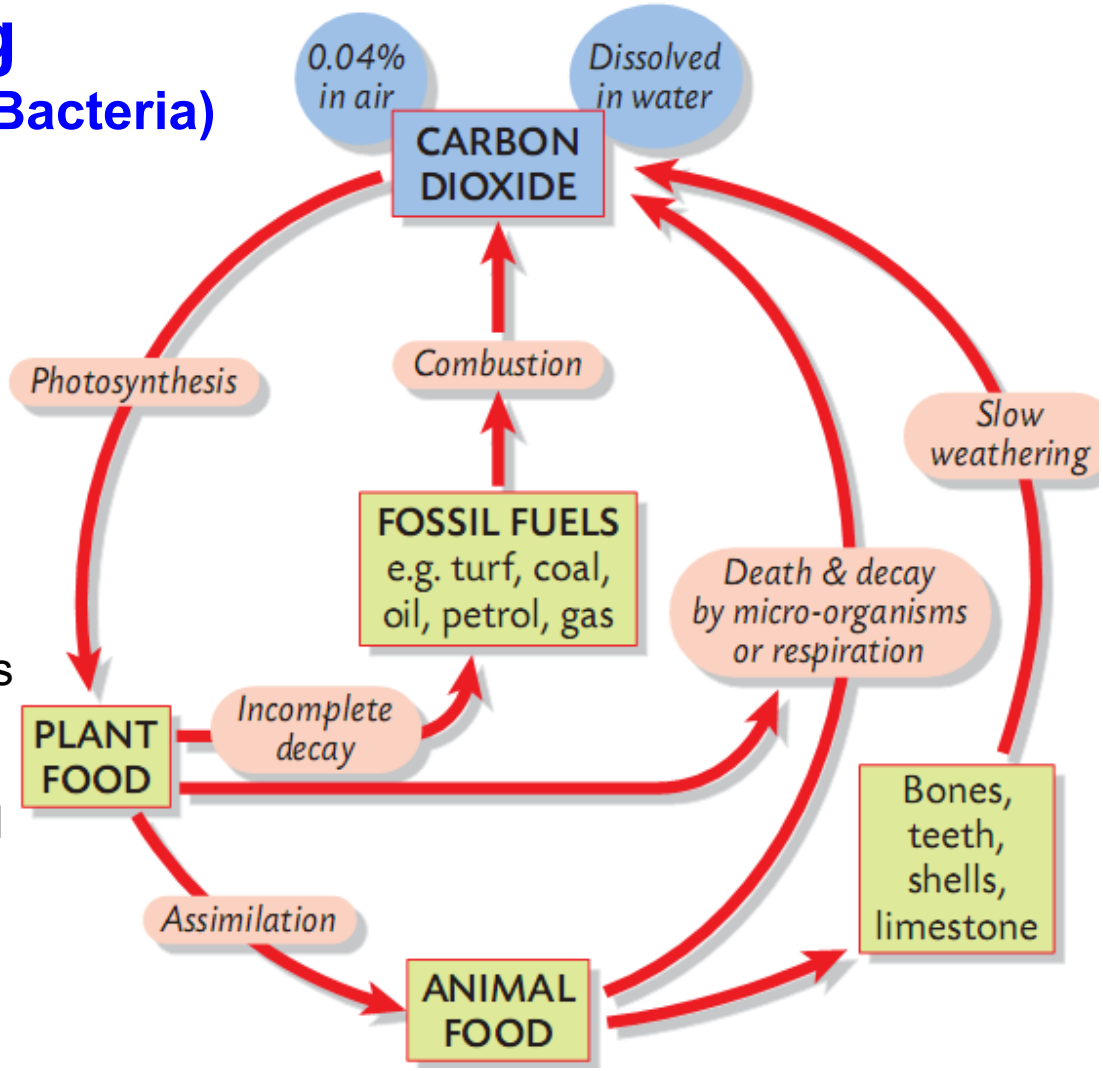
Nutrient Recycling
(Saphrophytes - Fungi & Bacteria)

Carbon is recycled in nature.
This is the **Carbon Cycle**.

Plants take in carbon dioxide and make wood. When they die they release the carbon dioxide.

Animals are made of carbon. We get carbon from eating plants and other animals.

Micro-organisms, like fungi and bacteria return carbon dioxide to the air by decomposing dead plants and animals.

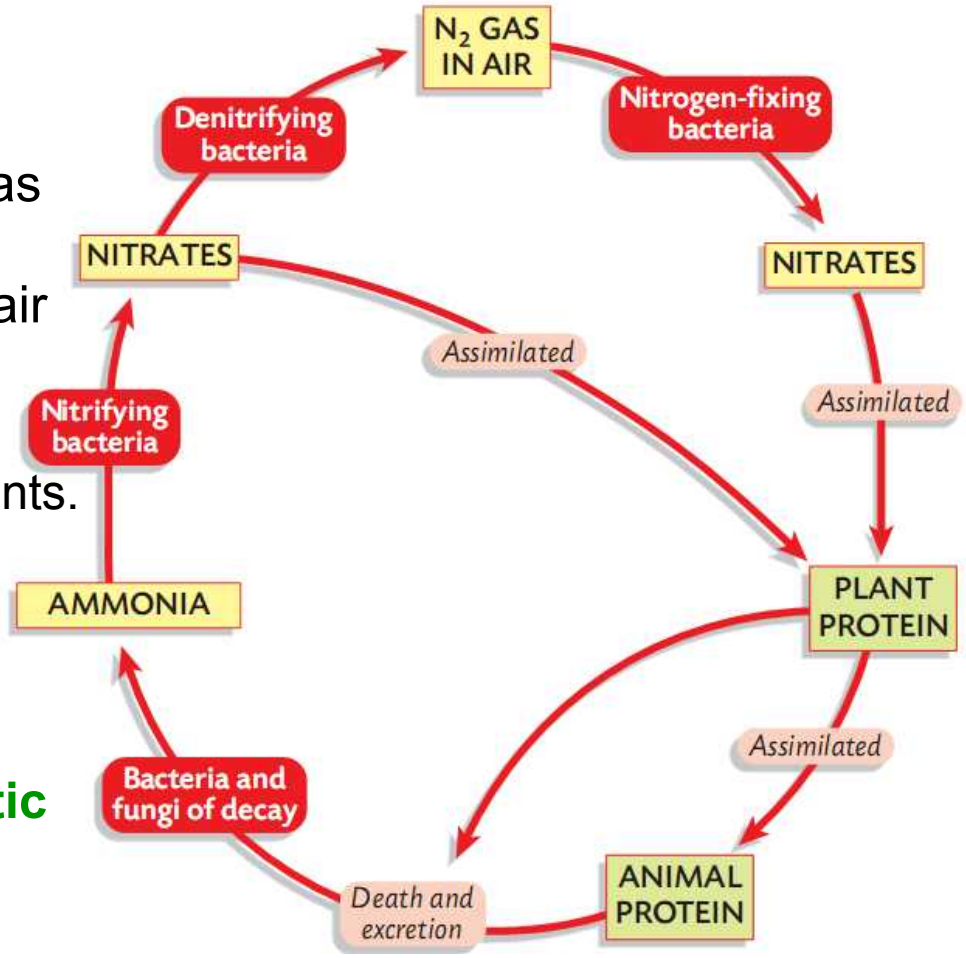


Nitrogen Cycle

Nitrogen is the most abundant gas in air. It takes up 70%.
The Nitrogen is taken out of the air by **Nitrogen-fixing bacteria**.

The bacteria live on the roots of plants. They get food from the plants and they give the plants **Nitrates**. Without these bacteria no plants would grow.

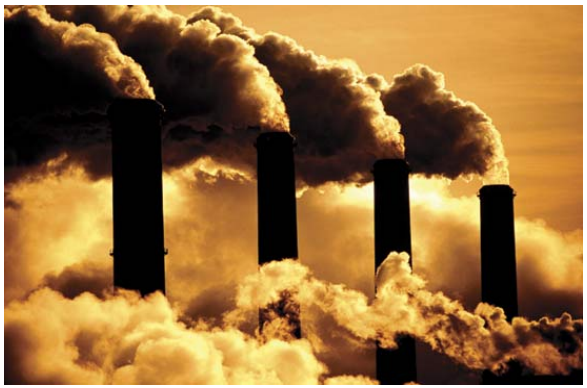
This relationship is called **symbiotic** as both organisms benefit.

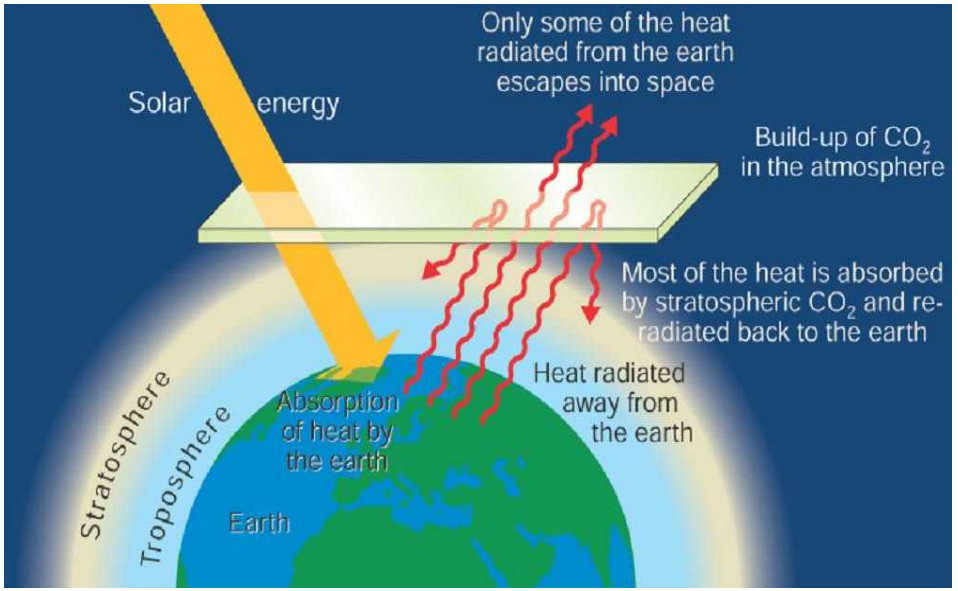


Global Warming

Since the 1970's scientists have realised that the world's CO_2% has been increasing.
CO_2 is produced mostly from burning fossil fuels.

In the atmosphere CO_2 traps heat and warms up the planet. That's why it is called a **'greenhouse' gas**.





Warming **oceans** store the heat and ocean currents change.
When the currents heat and change they also change the wind and rain patterns.
This causes floods and droughts, stronger hurricanes and storms in different places

Pollution

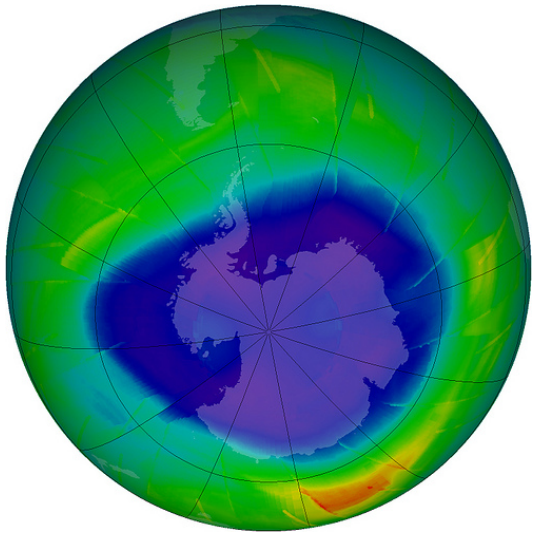
Pollution is any harmful addition to the environment.

Pollutants are substances that cause pollution.

Types of pollution

Domestic pollution - from houses
Agricultural pollution - sprays, slurry on fields and in rivers
Industrial pollution - smoke and fumes, acid rain etc.

Ozone



Ozone depletion is an example of air pollution.

Ozone (O_3) is a gas that absorbs harmful ultraviolet (UV) light.
A hole was first noticed in 1984 over Antarctica.
There is also a hole at the Arctic, Australia and sometimes over Europe.

Ozone loss is caused by,
CFCs (ChloroFluroCarbons) in aerosols, **Freon** gas in fridges and others.

A decrease in Ozone causes,
Skin cancers, damage to crops, damage to animals,
Plankton reduction - which affects birds, fish, whales and Oxygen levels.

Control of Ozone loss
CFCs are now **banned** and fridges are **recycled** carefully and not just dumped.

Conservation

Conservation is the wise management of our existing natural resources.

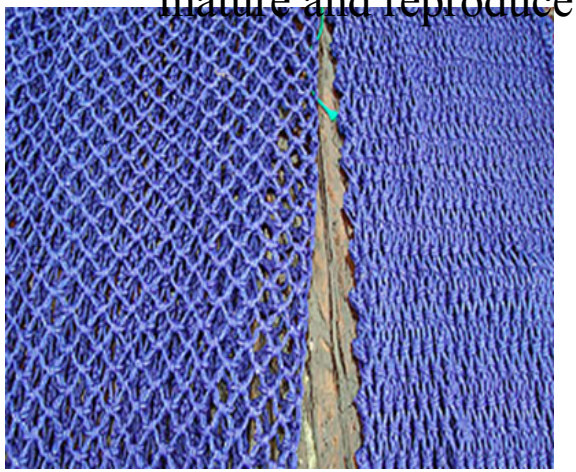
We use natural resources everyday.
These include oil for plastics and fuel, gas for heating and cooking.
Coal, peat and others for electricity.

We also use fish for food, grasses and cereals, especially corn.
We also change the landscape for roads and houses and other buildings.

Conservation practice

Fisheries

- The use of small-mesh nets can result in too many young fish being caught
- Using larger meshed nets to allow the young to escape,
mature and reproduce



Square mesh– does not alter its shape under tension allows young fish to escape

Diamond mesh netting – closes under tension and prevents young fish escaping

Waste Management

Farming

The main problems here are the waste products from farms i.e.

- slurry
- silage effluent
- overuse / incorrect use of chemical fertilisers and animal manures - excess of these may enter watercourses and cause *algal blooms* and

Eutrophication -

A condition where lakes become over-enriched with nutrients, from artificial fertilisers washed into rivers and lakes.

Agriculture solution

Spreading the **slurry** on the land as a fertiliser, must be managed accurately in order to maximise the crop production and minimise their impact on the environment.

Soil Nutrient Programmes aim to ensure optimum crop amounts and rotation of crops so that soils don't use up all their nutrients.

Problems with Waste Disposal

- Availability of suitable landfill sites.
- The toxic fumes from incineration (CO_2 and other oxides).
- Decaying waste produces methane gas which contributes to
  the “greenhouse effect”.
- Harmful substances may leak into groundwater supplies (wells, lakes, reservoirs).
- Plants and animals in rivers and lakes are killed through direct poisoning or eutrophication.

Green Bin Recycling

Old Style Landfill

Modern Landfill

Role of micro-organisms in Waste Management

Composting is a process during which micro-organisms decompose organic matter into**compost.** This recycles all the nutrients required for plant growth.

Fungi break down the 'tougher' materials in the waste such as **cellulose**. They penetrate the composting material and help improve aeration and drainage in the compost heap.

Temperatures within a compost heap can reach**70°C** as the bacteria and fungi work to breakdown the material.

Waste Minimisation

Reduce – use less, minimise waste.

Reuse – use again for different purpose.

Recycle – change, recover some material and use again.