

Keywords

- Biodiversity** - the variety of living organisms.
- Carriion** - decaying flesh and tissue of dead animals.
- Community** - made up of the populations of different species living in a habitat.
- Competition** - the negative interaction between two or more organisms which require the same limited resource.
- Consumers** - feed on other organisms for their energy. Can be primary, secondary or tertiary.
- Decomposers** - organisms which feed on dead and decaying organisms. They break down the biomass and release nutrients into the soil.
- Deforestation** - the removal and destruction of trees in forest and woodland.
- Ecosystem** - the interaction between the living organisms and the different factors of the environment.
- Global warming** - the increase of the average global temperature.
- Habitat** - where a living organism lives.
- Interdependence** - the interaction between two or more organisms, where it is mutually beneficial.
- Population** - the number of individual organisms of a single species living in a habitat.
- Predators** - organisms which kill for food.
- Prey** - the animals which are eaten by the predators.
- Producers** - convert the sun's energy into useful compounds through photosynthesis. They are green plants or algae.
- Scavengers** - organisms which feed on dead animals (carriion).
- Species** - organisms of similar morphology which can interbreed to produce fertile offspring.

Abiotic & Biotic factors

Abiotic factors are the non-living factors of an environment. E.g. moisture, light, temperature, CO₂, wind, O₂ or pH.

Biotic factors are the living factors of an environment. E.g. predators, competition, pathogens, availability of food.

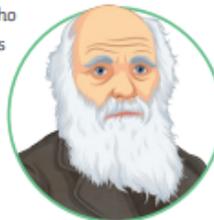
Adaptions

Adaptations are specific features of an organism which enable them to survive in the conditions of their habitat.

Adaptations can be structural, behavioural or functional:

- Structural adaptations** are features of the organism's body e.g. colour for camouflage.
- Behavioural adaptations** are how the organism behaves e.g. migration to a warmer climate during colder seasons.
- Functional adaptations** are the ways the physiological processes work in the organism e.g. lower metabolism during hibernation to preserve energy.

A plant or animal will not physically change to adapt to its environment in its lifetime. Instead, there is natural variation within the species and only organisms whose features are more advantageous in the environment survive. The survivors then go on to reproduce and pass on their features to some of their offspring. The offspring who inherit these advantageous features are better equipped to survive. Charles Darwin described this process as 'survival of the fittest'.



Deforestation and Remissions

Humans use land for buildings, quarrying, mining, agriculture and landfill. As the human population increases and we take more land, there is less space for other organisms to live.

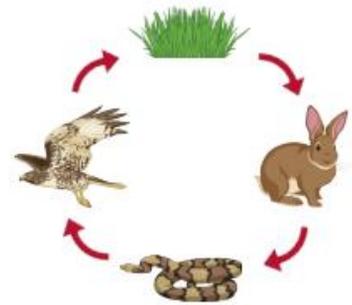
Deforestation (to use wood as a fuel/material or to clear space for other uses) destroys habitats where other organisms live.

Peat bogs are produced when decomposition occurs over a very long time. Peat stores a lot of carbon and can be extracted for use by gardeners or as an energy source. Burning peat releases a lot of carbon dioxide into the atmosphere which contributes to the greenhouse effect.

Trees absorb carbon dioxide for photosynthesis, so as they are cut down and removed, less carbon dioxide is taken from the atmosphere. Furthermore, when the trees are burned, they release carbon dioxide back into the atmosphere. The excess carbon dioxide can lead to global warming and the changes to the ecosystem cause reduced biodiversity.

Food Chains

The source of all energy in a food chain is the sun's radiation. It is made useful by plants and algae which produce organic compounds through photosynthesis.

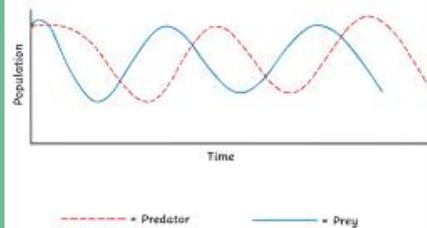


The living organisms use the energy to produce biomass and grow.

When a living organism is consumed, some of the biomass and energy is transferred. Some of the energy is lost.

Remember: the arrow in a food chain indicates the direction of the flow of energy.

Populations of predators and prey increase and decrease in cycles. The size of the predator population depends on the size of the prey population and vice versa. Overall, there is a stable community.



Competition

Species will compete with one another and also within their own species to survive and to reproduce.

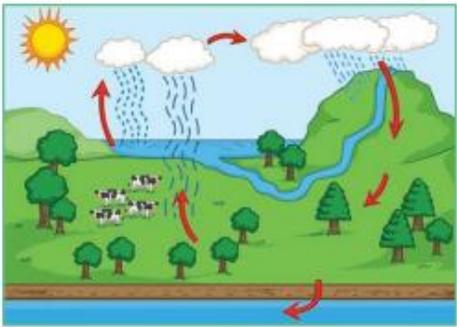
Mutualism occurs when both species benefit from a relationship.

Parasitism occurs when a parasite only benefits from living on the host.

Animals compete for resources such as food, water and space/shelter. They may also compete within their own species for mates.

Plants compete for resources including light, water, space and minerals. All these resources are needed for photosynthesis so the plant can make its own food. Plants do not need to compete for food.

Water Cycle



Convection is the movement caused within a fluid as the hotter, less dense material rises and colder, denser material sinks under the influence of gravity. This results in the transfer of heat.

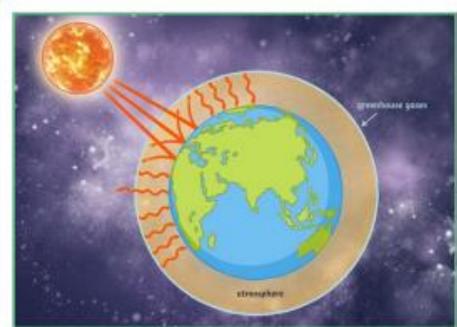
Evaporation occurs when heat energy from the surroundings (or a heat source) is transferred to water particles as kinetic energy. The particles begin to move more rapidly and can turn from a liquid into a gas.

Condensation occurs when moving particles transfer kinetic energy to the surroundings. The particles begin to move even more slowly and can turn from a gas into a liquid.

Precipitation occurs when rain, snow, sleet, or hail falls to (or **condenses** on) the ground.

Transpiration is the process by which water is carried through plants from roots to the stomata on the underside of leaves and it evaporates into the surroundings.

Global Warming



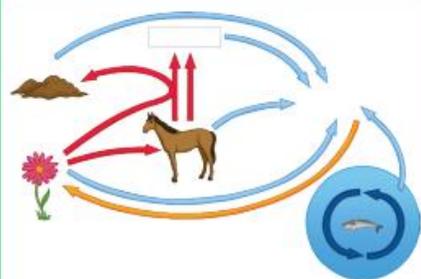
The **greenhouse effect** is the natural process where some of the Sun's radiation is trapped within the insulating layer of the atmosphere. This maintains a temperature suitable to support life on Earth.

Most of the radiation from the Sun is absorbed by the Earth when it reaches the surface. The rest of the infrared radiation is reflected from the surface and absorbed by the greenhouse gases and clouds in the atmosphere. This is then re-emitted in all directions.

However, due to many contributing factors, the global temperature is gradually increasing. Several gases, called greenhouse gases, trap the heat around the Earth; the most concerning is carbon dioxide. Human activities contribute to the excess amount of carbon dioxide in the atmosphere and so are a cause of global warming.

Global warming leads to the melting of ice caps, rising sea levels, flooding, changes to climate, changes in migration patterns, changes in species distribution and reduction in biodiversity.

Carbon Cycle

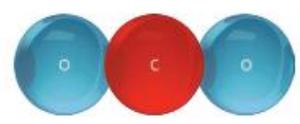


The main focus on the carbon cycle is its transfer to and from the atmosphere. When carbon is in the atmosphere, it combines with oxygen to form carbon dioxide, a greenhouse gas.

Carbon is transferred from the atmosphere when plants absorb carbon dioxide for photosynthesis and when the gas is dissolved into oceans.

Carbon is transferred to the atmosphere through respiration by animals, plants and bacteria and by combustion of fossil fuels (coal, oil and natural gas).

Dead animals and plants are decomposed and their matter is broken down by microbes and fungi. These organisms are collectively called decomposers. When the organisms are broken down, the microbes and fungi release carbon dioxide into the atmosphere through respiration.



RPI: Field Techniques Quadrats and Transects

The distribution of an organism is affected by the environment and abiotic factors.

Quadrats can be used to measure the frequency of an organism in a given area e.g. the school field. You could count the individual organisms or estimate the percentage cover. You must collect data from at least two areas to make a comparison. Quadrats should always be placed randomly.

Transects are used to measure the change of distribution across an area e.g. from the edge of a river and moving further from the water's edge. You could either count the number of organisms touching the transect at regular intervals or use a quadrat placed at regular intervals along the transect.

$$\text{mean} = \frac{\text{total number of organisms}}{\text{number of quadrats}}$$



Biodiversity & Waste Management

Biodiversity is the variety of living organisms on the earth or in an ecosystem. It is important in helping to maintain stable ecosystems. Organisms are often interdependent, relying on others as food sources, or to create suitable environmental conditions to survive. Human survival is also dependent on this biodiversity.

The global human population has exceeded 7 billion. Human population has increased due to modern medicine and farming methods, reducing famine and death from disease. This means a greater demand for food, resources and water. It also means more waste and emissions are created.



Sewage, toxic chemicals, household waste and gas emissions pollute the water, land and air, killing plants and animals and reducing biodiversity.

Maintaining Ecosystems & Biodiversity

There are many ways that biodiversity and ecosystems are maintained:

- Breeding programmes can help to protect endangered species from extinction.
- Conservation programmes can help to protect and preserve specialised ecosystems and habitats such as peat bogs and coral reefs.
- Reintroduction of hedgerows and field margins on agricultural land can help improve biodiversity by breaking up the monoculture crops.
- Sustainable forestry programmes help to manage the woodlands and reduce the deforestation to a sustainable rate.
- Societies actively encourage recycling and reusing of products and packaging to reduce the household waste going to landfill sites.

Unfortunately these programmes can be difficult to manage. They are often expensive and are difficult to regulate. People who are employed in certain areas, e.g. tree felling, cannot always transfer their skills to an environmentally friendly role and so become unemployed. It is difficult to maintain biodiversity whilst preventing crops being overrun with pests and weeds, which would affect food security for the human population.

