Subject specific vocabulary

These are the definitions of key terms used in our AS Environmental Science specification (7446).

Students should be familiar with and gain an understanding of these terms.

Abiotic factors

Physical factors such as light, temperature and water.

Acidification

A process in which the pH drops as the conditions become more acidic.

Acidophile

An organism that thrives under acidic conditions. Many acidophiles are bacteria or archaea.

Acoustic monitoring

Monitoring environmental sounds eg to detect the presence of dolphins and whales or bats.

Aerobic process

A process that takes place in the presence of oxygen.

Afforestation

Planting trees to increase the area of forest.

Albedo

A measure of the reflectivity of a surface. More reflective surfaces have high albedos. A surface that reflects all light has an albedo of 100%, while one that absorbs all light has an albedo of 0%.

The albedo of an area can affect the local climate.

Anaerobic process

A process that takes place in the absence of oxygen.

Antarctic Treaty (1959)

An international agreement signed by many countries to protect and manage Antarctica. Aspects of the treaty include control of military activities, waste disposal, mineral exploitation, wildlife conservation and tourism.

Anthropogenic

Adjective describing outcomes caused by human activities.

Aquifer

A rock which contains water that is abstracted by humans.

Archaea

Microorganisms similar to bacteria, including the first life-forms to develop on Earth. Archaea are the only organisms that produce methane from the decomposition of organic matter.

Artificial insemination

A form of selective breeding where semen is collected from a chosen male to be inserted artificially into the chosen female to cause her to become pregnant. It also allows semen to be stored for later use or the transport of semen without having to bring the animals together.

Atmosphere

The gases surrounding the Earth. Different layers are characterised by their temperature, density, turbulence and composition.

Beating tray

A method of sampling invertebrates on the branches of bushes and small trees.

Biodiversity

A measure of the variety and abundance of wildlife species.

A common quantitative method of measuring biodiversity is Simpson's Diversity Index.

Biogeochemical cycle

A series of linked processes which use and re-use elements such as carbon, nitrogen, phosphorus, iron and sulfur, as they move between biotic and abiotic reservoirs.

Bioleaching

A method of using bacteria to dissolve metals from low grade ores.

Biological corridor

A habitat that links other habitats so that animals can move between them.

Biomass

The total mass of living, or recently living material in an area.

Biome

A large geographical region with particular climatic features, in which a characteristic, unique community of species lives eg Taiga, coral reefs, temperate grasslands, tundra, tropical rainforest. Don't confuse the terms biome and ecosystem. Biome refers to the total area where the community of species is found, whereas ecosystem refers to a particular community and its interactions. So, there are many tropical rainforest ecosystems but only one biome.

Biomimetics

The study of living organisms so the knowledge gained can be applied to engineering or other technological developments.

Captive breeding and release programmes (CBR)

A method of boosting wild populations by keeping a breeding population in captivity. Some of the offspring produced may be released to join the wild population.

Carbon Capture and Storage (CCS)

A method to reduce carbon dioxide emissions, by removing the gases and storing them in underground geological structures.

Carbon footprint

An estimate of the total releases of greenhouse gases caused by the actions of an individual, group of people, an organisation or activity. The amounts of all greenhouse gases are expressed as the equivalent amount of carbon dioxide.

Carbon sequestration

Any process which removes carbon dioxide from the atmosphere, such as afforestation or underground storage (carbon capture).

Centre of diversity

A geographical region with a high plant biodiversity, especially of the wild relatives of crop species.

Cirrus cloud

Thin, wispy clouds, usually found at altitudes above 6000m.

Cirrus clouds can reflect infrared energy emitted by the Earth's surface and emit infrared produced from absorbed sunlight.

Climax community

The relatively stable community of species present at the end of ecological succession.

Cnidarians

A taxon of animals that includes corals and jellyfish.

Colonisation media

A method of demonstrating the presence of species by providing places that they can colonise which can then be checked.

Community of species

A community of species is made up of the populations of all the species living in a particular area.

Contour ploughing

A soil erosion control measure where land is cultivated by ploughing horizontal furrows along the contours of the land.

Convention on International Trade in Endangered Species (CITES)

The Convention on International Trade in Endangered Species (of wild fauna and flora).

CITES is an international agreement that controls the international trade in certain species of plants and animals and their products.

Coppicing

The process of regularly cutting down tree branches close to ground level. The regrowth produces thin straight branches. It was traditionally done on a cycle of six to ten years for making fence panels and wall panels. Short-rotation willow coppice is now used as a biofuel.

Cradle to Cradle design (C2C)

The concept of designing items such that all the materials used can be reused or disposed of without leaving toxic or harmful wastes. The concept is based on the natural systems that recycle elements without depleting resources or causing harmful wastes to build up.

Crop wild relatives (CWRs)

These are wild plant varieties or species that are closely related to domesticated crops. CWRs may contain genetic characteristics that can be used in crop breeding programmes.

Cryosphere

All the frozen water on Earth.

Culling

Reducing the population of a species by selective killing.

Cut-off ore grade

The lowest purity of a mineral that can be exploited economically.

DAFOR scale

A qualitative scale that judges the abundance of organisms. Initials stand for Dominant, Abundant, Frequent, Occasional, Rare.

Debt for nature swaps

Agreements whereby an organisation agrees to pay part of a country's debt in return for a commitment to a wildlife conservation programme.

Decomposers

Organisms that break down dead organic matter, releasing nutrients in the process. Many bacteria and fungi are decomposers. They secrete enzymes onto the dead organic matter and absorb the products of digestion.

Deflected succession

Natural ecological succession is stopped by human actions. Long-term continuation of the actions that deflect succession will create a plagioclimax.

Deforestation

The action of removing trees, resulting in a reduction in forest area.

Dendrochronology

The method of determining the age of a piece of wood using the characteristic sequence of sizes of growth rings in the wood.

Detritivores

These are heterotrophic animals that ingest and digest dead organic matter.

Examples include: earthworms, millipedes, woodlice, dung beetles and slugs.

They often break up the dead organic matter into smaller pieces, providing access to decomposers.

Dynamic equilibrium

A balance created by active processes whose impacts cancel each other out.

Ecological niche

The role that an organism plays in its habitat, including its use of resources and its inter-relationships with other species.

Ecological succession

The sequences of changes in community composition which changes as an area is colonised and develops until a climax community is eventually produced. The time period in which a species can survive depends upon the ease with which it colonises and the biotic and abiotic conditions that it is able to survive.

Ecosystem

The community of organisms living in an area, their inter-relationships and interactions with their abiotic environment eg tropical rainforest, savannah grassland, coral reef. Do not confuse the term ‘ecosystem’ with ‘biome’.

EDGE species (Evolutionary Distinct and Globally Endangered)

These are species that are threatened with extinction and have few relatives that are genetically similar. This genetic uniqueness means they should be a high priority for conservation.

eDNA

eDNA is DNA detected in environmental samples such as water or soil that is used to confirm the presence of the species that produced it.

El Niño

The name given to events when the wind and ocean currents in the equatorial Pacific Ocean slow significantly or reverse. It alters heat distribution and weather patterns around the Pacific area and elsewhere in the world.

El Niño events are caused by natural processes, but may be made more frequent by human activities.

It is also called ENSO: El Niño Southern Oscillation.

Embryo transfer

The transfer of fertilised eggs or embryos from one female to another, such as from a rare species into a female of a closely related species that is more common. This enables more young to be produced than could be achieved through normal breeding. It is also used in livestock breeding.

Endemic

An endemic species is indigenous ('native') to a particular area and is not naturally found elsewhere. (It is also used in disease epidemiology to mean a disease that is normally present).

Eradication

The reduction of the population of a species by removal or culling.

EU Common Fisheries Policy

The European Union agreement to manage fishing and aquaculture. It attempts to balance the needs of the member states, their fishing industries with sustainable exploitation of the environment.

European Union Common Fisheries Policy (EU CFP)

This is a set of regulations intended to ensure the sustainable management of fish stocks within the EU.

Eutrophictation

The process by which nutrient levels in a water body increase to excessive levels such that the growth and subsequent die-off of plants and algae cause deoxygenation.

Ex-situ conservation

The conservation of a species in an area which is not its natural habitat.

Feedback mechanisms

A process where an action has consequences which affect the original process.

Positive feedback mechanisms increase the rate of the original action while negative feedback mechanisms reduce it.

Flagship species

High-profile species that can be used to raise support for the conservation of their habitat and all the other species that live there.

Gravimetry

A geological exploration technique that detects changes in the force of gravity.

Greenhouse gas (GHG)

A gas that absorbs infra-red radiation emitted by the Earth's surface and causes atmospheric heating. Carbon dioxide and water vapour are the main naturally occurring greenhouse gases. Anthropogenic greenhouse gases include carbon dioxide, methane, NOx, CFCs and tropospheric ozone.

Haber process

The industrial process that combines nitrogen from air with hydrogen from natural gas to produce ammonia.

Habitat

The place where an organism, species or population lives.

Halophyte

An organism that thrives in conditions with a high salt concentration.

Hard release

The release of animals from captivity where they are not provided with post-release support such as food.

Hydrology

The study and understanding of the movement, distribution and properties of water in the environment.

Hydrosphere

All the water on Earth, found in solid, liquid or gaseous form in a variety of reservoirs, including the oceans, ice caps, rivers and lakes, soil, groundwater, atmosphere and living organisms.

Hydrothermal deposition

The deposition of mineral deposits from hot mineral-rich solutions.

In-situ conservation

The conservation of a species in its natural environment.

Insolation

Sunlight that reaches a particular location.

International Tropical Timber Organisation (ITTO)

An intergovernmental organisation which promotes the conservation and sustainable management, use and trade of tropical forest resources.

International Union for Conservation of Nature (IUCN)

An organisation of 1,300 government and non-governmental organisations that provides information on the status of the natural world and the measures needed to safeguard it.

Meetings every four years drive their global agenda and have produced major agreements such as CITES and the Ramsar convention.

International Whaling Commission (IWC)

The IWC is an international organisation which aims to ensure the sustainable exploitation of whales.

Keystone species

A species that has much more important ecological functions within their ecosystem than their abundance might suggest. Such roles may include the control of the populations of other species, the provision of food or species that control structural habitat features, such as beavers creating dams.

Kick sampling

A method of sampling aquatic invertebrates by disturbing the substrate.

K-selected species

Species that have a relatively low breeding capacity: they often mature at a later age and have few young.

La Niña

The name given to events when the wind and ocean currents in the equatorial Pacific Ocean increase in strength.

Also, see El Niño.

Lasky's principle

The theoretical model stating that, as the purity of available mineral deposits declines in a linear fashion, there is a logarithmic increase in the amount of the material present.

Leachate

Drainage water that carries other substances, either in solution or as suspended solids.

Light traps

A method of sampling populations of night-flying organisms that are attracted to lights, especially moths.

Lincoln index

A catch, mark, release, recapture method of estimating animal populations.

Lithosphere

The relatively hard outer layer of the Earth comprising the crust and upper layer of the mantle. It is the source of mineral resources such as metal ores and affects soil formation and properties.

Local Nature Reserve (LNR)

LNRs are designated under the National Parks and Access to the Countryside Act (1949) for their local importance for wildlife, geology, education or public enjoyment. They are controlled or owned by local authorities.

Magnetometry

A method of detecting mineral deposits based on their magnetism.

Magnetosphere (of Earth)

The magnetic field around Earth which deflects charged particles travelling from the Sun.

Marine Conservation Zone (MCZ)

MCZs are designated under UK law to protect a range of nationally important marine wildlife, habitats, geology and geomorphology, and can be designated anywhere in English and Welsh territorial and offshore waters.

Marine Nature Reserve (MNR)

MNRs were designated under the Wildlife and Countryside Act (1981) by Natural England (or CCW).

Lundy Island and Skomer Island were MNRs. They have been re-designated as Marine Conservation Zones.

Marine Protected Area (MPA)

A general name for marine areas that are legally protected for their wildlife, historical and cultural features. The legal protection is provided by the laws of the country involved.

Metamorphic processes

Geological processes that change the form of a rock with heat and/or pressure, but without melting it.

Methane hydrate

A solid compound of methane trapped in ice crystals, often found in marine sediments.

Montreal protocol

The international agreement that controlled the manufactured and use of CFCs and other ozone depleting substances.

Mulch

Material placed on the soil surface to reduce evaporation losses and reduce weed growth.

Multicropping

A form of polyculture where two or more different crops are grown in an area at the same time.

National Nature Reserve (NNR)

They are designated under UK law by the National Parks and Access to the Countryside Act (1949). They include important habitats with complete communities of species. They are designated by Natural England (or CCW).

Natura 2000

A network of protected sites in the EU that combine the SPAs and SACs set up under the EU birds and habitats directives.

ODS

Ozone depleting substance.

Overburden

The soil and rock above a mineral deposit that must be removed to provide access.

Ozone layer

The region of the stratosphere with higher concentrations of ozone.

Pathogens

Organisms that cause disease.

Peat bog

A wetland area with an accumulation of dead plant material, especially moss.

Permafrost

A layer of soil in which the water is permanently frozen, often trapping bubbles of gases such as methane.

Photoautotroph

An organism that produces high-energy food substances using sunlight in photosynthesis.

Photochemical smogs

Atmospheric pollution events in which pollutants such as hydrocarbons, NOx and tropospheric ozone interact to produce more toxic pollutants such as PANs (peroxy acetyl nitrates).

Phytomining

A method used to extract metals that have been absorbed and concentrated by plants. It can be used as a method to exploit low purity metal deposits or decontaminate polluted areas.

Pioneer species

One of the first species to colonise an area at the start of ecological succession. They are usually well adapated to extreme abiotic factors.

Pitfall trap

A method of sampling populations of mobile animals that live on the soil surface, by collecting individuals that fall into traps set into the ground.

Plagioclimax

A community of species that does not develop to a natural climatic climax community, but is maintained by external influences which prevent this, including human activities such as burning, grazing or ploughing.

Ploughing

The cultivation of the soil by turning over the surface layer.

Polar vortex winds

Winds that blow around the north and south poles in a circular manner which reduce the mixing of polar air masses with the rest of the atmosphere.

Pollarding

The process of regularly cutting down tree branches above ground level, usually to prevent the regrowth being eaten by animals such as livestock or deer. It is usually done on a cycle of 5 to 30 years.

Pollen analysis

The use of the pollen present in environmental samples. This can be used to deduce the climate when historic sediments were deposited.

Population

All the individuals of a species living in a particular area.

Proterozoic marine sediments

These include the iron oxide deposits produced by the reaction of dissolved iron minerals with the oxygen produced by photosynthesis. This occurred in the early Proterozoic era and delayed the build-up of oxygen in the atmosphere.

Proxy data

The use of data that can be collected to predict the values of a related factor that cannot be measured, eg data on tree rings, pollen, coral growth and plankton in marine sediments can be used to determine historic climates.

Quadrat

An area, usually square or circular, in which samples are taken. The size of the quadrats depends upon the organisms being studied.

Ramsar site

A wetland site designated to protect its biodiversity under an international agreement: The Ramsar Convention on Wetlands (1971), especially as a habitat for water birds. They are designated in the UK by DEFRA.

Range of tolerance

The range of conditions within which a species can survive.

Remote sensing

Any method of monitoring the features of a location from another location, normally used to describe surveys from satellites or high-flying aircraft.

Resistivity

A method of predicting the mineral composition of mineral deposits underground using the ease with which they conduct electricity.

Re-wilding

The process of creating habitats that are similar to the conditions present before the natural habitat was changed by human actions.

r-selected species

Species that have a relatively high breeding capacity: they often mature at a young age and have large numbers of young.

Salinity

A measure of the salt concentration of a solution.

Satellite imagery

The collection of images using satellites: visible light, infra-red, microwaves etc.

Secondary succession

Ecological succession that takes place in an area where the existing climax community has been disturbed or destroyed.

Seismic surveys

These use sound waves produced at the surface that reflect off underground geological structures to determine the depth and shape of the rock structures. The reflected sound waves are detected by geophones at the surface.

Sere

A stage in ecological succession in the changes that occur, eventually producing the climax community.

Simpson's Index of Biodiversity

A quantitative measure of the number of species and the abundance of each in an area.

Sites of Special Scientific Interest (SSSI)

SSSIs are designated by Natural England (or CCW) under UK law by The Wildlife and Countryside Act (1981) because of their importance for plants, animals, geological features or land forms.

Soft release

The release of animals from captivity where they are provided with post-release support such as food.

Sonograms

A graph showing the volumes of sounds at different frequencies.

Special Area of Conservation (SAC)

SACs are designated by Natural England (or CCW) under the EU Habitats Directive to protect internationally important habitats for rare and vulnerable species.

Special Protection Area (SPA)

SPAs are designated by Natural England (or CCW) under the EU Birds Directive to protect areas for rare and vulnerable bird species.

Species

A group of organisms that resemble each other more than other organisms and naturally interbreed to produce fertile offspring.

Strip cropping

The growth of more than one crop in alternating narrow strips, so that different sowing and harvesting times reduce soil erosion because the whole field is never all bare at the same time.

Surber sampler

A method of sampling aquatic invertebrates by disturbing the substrate that produces more reliable quantitative data than kick sampling.

Sweep nets

A method of sampling populations of flying insects and invertebrates among vegetation.

Taxon

A group of organisms based on their biological similarities eg domain, kingdom, phylum, class, order, family, genus, species.

Terracing

The replacement of a sloping landscape by the creation of a series of narrow horizontal stepped strips, often used to reduce soil erosion.

Thermal stratification

The changing temperatures in different layers of the atmosphere.

Thermohaline circulation

The movement of ocean currents caused by changes in temperature, salinity and density.

Tied ridging

A method of reducing soil erosion by creating a grid of raised ridges that cause rainfall to collect, increasing infiltration and reducing runoff.

Tipping point

A tipping point is reached when the changes caused by human activities cause further changes such that the human activities are no longer needed to maintain the changes.

Tüllgren funnel

A piece of equipment used to extract invertebrates from soil or leaf litter.

Turbidity

A measure of the level of suspended solids in water which affects the ability of light to penetrate the water.

Universal Soil Loss Equation (USLE)

A formula that can be used to calculate rates of soil erosion.

Vavilov centre

An area of the world, identified by the Russian zoologist Nikolai Vavilov, where crop plants were first domesticated and where wild varieties are still found.

Wildlife and Countryside Act (1981)

A UK law that provides protection for many wildlife species and designated protected areas such as SSSIs. Most birds and many mammals are protected.

Windbreaks

Hedgerows and rows of trees that reduce wind velocity to reduce soil erosion.