

Definitions and Concepts for Edexcel Biology GCSE

Topic 9: Ecosystems and Material Cycles

*Definitions in **bold** are for higher tier only*

Definitions marked by '' are for separate sciences only*

Abiotic factors - The non-living aspects of an ecosystem, e.g. temperature, light intensity, moisture and pollutants.

Belt transect - A line along a sampled area upon which quadrats are placed at intervals to determine the abundance and distribution of organisms in an ecosystem.

Biodiversity - The variety of living organisms in an ecosystem.

***Biofuel** - A renewable energy source produced from biomass.

Biomass - The total mass of organic material, measured in a specific area over a set period.

Biotic factors - The living components of an ecosystem, e.g. food availability, competition, predators and other species.

***Blackspot fungus** - An indicator species that is found on rose leaves. It is sensitive to the concentration of sulfur dioxide in the atmosphere so its presence indicates clean air.

***Blood worm** - A type of indicator species that is adapted to live in water with high levels of pollution.

Captive breeding program - The breeding of endangered animals in enclosures (such as zoos) to increase population numbers and preserve biodiversity.

Carbon cycle - The cycle through which carbon (in the form of carbon dioxide) moves between living organisms and the environment. It involves respiration, photosynthesis and combustion.

Community - All of the populations of different species living together in a habitat.

Competition - When different organisms compete for the same resources (e.g. light, water, mates, territory) in an ecosystem.

***Compost** - Dead and decaying organic matter, commonly used as a fertiliser.

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Conservation - The maintenance of ecosystems and biodiversity by humans in order to preserve the Earth's resources.

Crop rotation - The practice of growing different crops each year in a cycle. This replenishes nutrients that may have been depleted by the previous crop.

Decomposers - Organisms that release enzymes which catalyse the breakdown of dead plant and animal material into simpler organic matter. In the nitrogen cycle, decomposers break down proteins and urea into ammonia.

Decomposition - The breakdown of dead materials into simpler organic matter. *The rate of decomposition is affected by temperature, water content and oxygen availability.

Denitrifying bacteria - Anaerobic microorganisms (found in waterlogged soils) responsible for the conversion of nitrate ions to nitrogen gas.

Desalination - A process that removes salts from saline water to produce potable water.

Ecosystem - The community of organisms (biotic) and non-living (abiotic) components of an area and their interactions.

***Efficiency of biomass transfer:** The efficiency of biomass transfer between trophic levels is calculated using:

$$\text{efficiency} = \frac{\text{biomass available after transfer}}{\text{biomass available before transfer}} \times 100$$

***Efficiency of energy transfer** - The efficiency of energy transfer between trophic levels is calculated using:

$$\text{efficiency} = \frac{\text{energy available after transfer}}{\text{energy available before transfer}} \times 100$$

Eutrophication - The process in which pollution by nitrogen-containing fertilisers results in algal blooms and subsequent oxygen level reduction in bodies of water.

Fertilisers - Natural or artificial materials that are added to soils to provide essential nutrients and improve plant growth.

Fish farming - The breeding of fish commercially in enclosures for food to combat overfishing.

***Food chain** - Describes the feeding relationships between organisms and the resultant stages of biomass transfer. It takes the form:

producer → primary consumer → secondary consumer → tertiary consumer

***Food security** - Ensuring that populations have access to adequate amounts of safe and nutritious food.



***Freshwater shrimp** - A type of indicator species sensitive to dissolved oxygen concentrations and only found in clean water.

***Indicator species** - A species whose presence or absence in an environment provides an indication of environmental conditions, e.g. pollution levels.

Interdependence - The dependence of different organisms on each other for survival, e.g. plants depend on pollinators, herbivores depend on plants.

***Lichen** - A type of indicator species that is used to monitor air pollution.

Mutualism - The interaction between two organisms where both benefit as a result of their relationship.

Nitrifying bacteria - Microorganisms found in the soil responsible for the conversion of ammonium ions into nitrite and then nitrate ions.

Nitrogen cycle - The cycle through which nitrogen moves between living organisms and the environment, involving four types of bacteria; decomposers, nitrifying bacteria, nitrogen-fixing bacteria and denitrifying bacteria.

Nitrogen fixation - The conversion of atmospheric nitrogen gas into ammonia by nitrogen-fixing bacteria in the soil or root nodules of legumes. It can also occur via lightning.

Nitrogen-fixing bacteria - Microorganisms responsible for the conversion of atmospheric nitrogen gas into nitrogen-containing compounds. They can be free-living or mutualistic.

Non-indigenous species - A foreign species that does not naturally occur in an area. They may be introduced deliberately or accidentally.

Parasitism - The interaction between two organisms where only one organism, the parasite, benefits whilst the host does not.

***Pollution** - Contamination or destruction of the natural environment due to human intervention.

Population - All organisms of the same species living with one another in a habitat.

Potable water - Water that is safe to drink.

Predators - Consumers that prey on and eat other animals.

Prey - Animals that are eaten by predators.

***Pyramid of biomass** - A table of the dry mass of living material at each trophic level of a food chain. This forms the shape of a pyramid.

Quadrat - A square grid of known area used in sampling to determine the abundance and distribution of organisms in an ecosystem.

Reforestation - The replanting of forests in an effort to restore biodiversity.



Reverse osmosis - A method of desalination that uses a partially permeable membrane to remove impurities from drinking water.

Seed bank - A storage of viable seeds to protect biodiversity.

***Sludgeworm** - A type of indicator species adapted to live in water with high levels of pollution.

***Stonefly larvae** - A type of indicator species sensitive to dissolved oxygen concentrations and only found in clean water.

***Sustainable** - The ability to maintain something for future generations.

Thermal desalination - A method of desalination that uses heat to separate pure water from salts in salt water.

***Trophic level** - The position of an organism in a food chain.

Water cycle - The cycle through which water moves between living organisms and the environment. It involves evaporation, transpiration, condensation and precipitation.

