

CAIE Biology A-level

Topic 18 - Biodiversity, Classification and Conservation

Definitions and Concepts

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Abiotic factors - The non-living aspects of an ecosystem e.g. light, temperature, water availability, oxygen availability and soil pH.

Abundance - The number of individuals per species in a specific area at any given time.

Alien species - A species that is not native to an ecosystem. It may be introduced deliberately or accidentally into the environment.

Animalia - One of the Kingdoms of living organisms. Members are multicellular eukaryotes without cell walls.

Archaea - One of the Domains of living organisms. Members are single-celled prokaryotes with ether-linked cell walls.

Bacteria - One of the domains of living organisms. Members are prokaryotes with ester-linked cell walls.

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 genes, species and habitats within ecosystems or habitats.

Biological species concept - Defines a species as a group of organisms whose members can interbreed to produce fertile offspring.

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

Classification - The process of grouping organisms based on their phylogenetic characteristics or evolutionary heritage.

Climate change - Long-term changes in usual weather and temperature patterns.

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

Conservation - The maintenance of ecosystems and biodiversity by humans in order to preserve the Earth's resources. The conservation of species requires the preservation of gene pools.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): A treaty that regulates the trade of plants and wild animals across international borders.

Culling - Separating organisms based on whether they have desirable characteristics. Organisms with undesirable characteristics may be killed. May serve as a method of animal population control, including in conservation efforts.

Distribution - The spread of living organisms in an ecosystem.



DNA virus - A virus whose genetic material is DNA. This group is subdivided according to whether the DNA is single-stranded or double-stranded.

Domain - The highest taxonomic rank. It is the broadest classification of living organisms.

Ecological species concept - Defines a species as a group of organisms that are adapted to a particular niche.

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

Embryo transfer - Implantation of embryos into a uterus during assisted reproduction e.g. IVF.

Eukarya - A Domain of living organisms. Members are eukaryotes - their cells have a nucleus which contains DNA.

Frozen zoo - A collection of genetic material, such as DNA, gametes and tissues, extracted from organisms and preserved at very low temperatures.

Fungi - A Kingdom of living organisms. Members are non-photosynthetic eukaryotes with chitin cell walls.

Habitat - The region where an organism normally lives.

International Union for Conservation of Nature (IUCN) - An international organisation that promotes the conservation of nature and sustainable use of natural resources through scientific research, management of field projects and implementation of legislation.

In vitro fertilisation (IVF) - An assisted reproduction technique which involves collecting male and female gametes, fusing them in the laboratory and stimulating embryo growth before embryo transfer.

Lincoln index - A statistical measure used to estimate population sizes of animal species. It is based on the mark-release-recapture method.

Line transect - A line along a sampled area. The species touching the transect at regular intervals are recorded to determine the abundance and distribution of organisms in an ecosystem.

Mark-release-recapture - A method of estimating the population size of motile organisms. It involves capturing a sample of the population, marking them and releasing them. At a later date, another sample is captured and the number of marked individuals recorded. The population size can be estimated using the following equation:

$$\text{estimated population size} = \frac{\text{number of individuals in first sample} \times \text{number of individuals in second sample}}{\text{number of marked individuals in second sample}}$$

Morphological species concept - Defines a species as a group of organisms that share similar physiology and appearance.



Niche - Describes how an organism 'fits' into an ecosystem and its role in that environment.

Nucleic acid - A polymer of nucleotides that stores genetic information, e.g. DNA or RNA.

Pearson's linear correlation - A statistical test which determines the strength of the linear correlation between two variables. A value of 1 indicates perfect positive correlation and -1 indicates perfect negative correlation.

Plantae - One of the Kingdoms of living organisms. Members are photosynthetic eukaryotes.

Protocista - One of the Kingdoms of living things. Members include any eukaryotic organism that is not a plant, animal or fungus.

Quadrat - A square grid of a known area used in sampling to determine the abundance of organisms in a habitat. There are two types: point quadrats and frame quadrats.

Random sampling - A sampling technique used to avoid bias e.g. creating a square grid and generating random coordinates.

RNA virus - A virus whose genetic material is RNA. This group is subdivided according to whether the RNA is single-stranded or double-stranded.

Seed bank - A storage of seeds to preserve genetic material.

Simpson's Index of Diversity - A measure of biodiversity in a habitat which takes both species richness and species abundance into consideration. It can be calculated using the formula:

$$D = 1 - \left(\sum \left(\frac{n}{N} \right)^2 \right)$$

Spearman's rank correlation - A statistical test which determines the strength of the non-linear correlation between two variables.

Species - A group of organisms that can successfully reproduce with one another, producing fertile offspring.

Surrogacy - One female individual carries the offspring of another female.

Taxonomic hierarchy - The non-overlapping classification of living organisms according to their common ancestors. There are smaller groups within larger groups. In order from the largest group to the smallest group: Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species.

Virus - A non-living microorganism that consists of genetic material surrounded by a protein husk.

World Wide Fund for Nature (WWF) - An international non-governmental organisation committed to the preservation of wildlife and reduction of human effects on the environment.

