

WJEC (Wales) Biology A-level

Topic 2.1 - Biodiversity and classification

Definitions and Concepts

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Adaptation - A feature of an organism that increases its chance of survival in its environment. Adaptations may be anatomical, physiological or behavioural.

Anatomical adaptations - Changes to the physical features of an organism that increase its chance of survival in its environment.

Animalia - A biological kingdom consisting of multicellular, heterotrophic eukaryotes that do not have a cell wall.

Archaea - One of the three domains made up of primitive bacteria existing in extreme environments, e.g. extremophile prokaryotes.

Bacteria - One of the three domains that consists of true bacteria.

Behavioural adaptations - The ways in which an organism acts differently to increase its chance of survival in its environment.

Binomial system - The universal system of naming organisms using their genus and species.

Biodiversity - The number and variety of living organisms in a given region. It is affected by environmental, genetic and human factors.

Classification - The organisation of organisms into groups.

DNA profiling - A method of determining the characteristics of an individual's DNA. The percentage of DNA or proteins shared by organisms can be used to estimate relatedness.

DNA sequencing - Determining the entire DNA nucleotide base sequence of an organism. Comparisons between members of the same species can identify variation in base sequences and hence estimate genetic diversity.

Domain - The highest taxonomic rank. There are three domains; Archaea, Bacteria and Eukaryota.

Eukarya - One of the three domains that consists of all eukaryotic organisms.

Five kingdom classification system - The classification of organisms into five major kingdoms: Animalia, Fungi, Plantae, Prokaryotae and Protoctista.

Fungi - A biological kingdom consisting of heterotrophic eukaryotes that have chitin cell walls and reproduce asexually by producing spores.

Genetic biodiversity - A measure of the variety of genes that make up a species. It can be assessed by determining the proportion of the population that possess a certain allele or the number of alleles at a locus.

Kingdom - The second highest taxonomic rank. There are five kingdoms: Animalia, Fungi, Plantae, Prokaryotae and Protoctista.



Linnaean system - The classification of organisms into kingdom, phylum, class, order, family, genus and species.

Morphological convergence - The independent evolution of analogous features in unrelated organisms due to exposure to similar environments or selection pressures.

Natural selection - The process by which the frequency of 'advantageous' alleles gradually increases in a population's gene pool over time.

Physiological adaptations - The internal body changes that an organism undergoes to increase its chance of survival in its environment.

Plantae - A biological kingdom consisting of multicellular eukaryotes that have a cellulose cell wall and can photosynthesise.

Prokaryotae - A biological kingdom consisting of unicellular prokaryotes which lack a true nucleus and membrane-bound organelles.

Proportion of polymorphic gene loci - A measure of genetic biodiversity. Calculated using:

$$\text{proportion of polymorphic gene loci} = \frac{\text{number of polymorphic gene loci}}{\text{total number of loci}}$$

Protocista - A biological kingdom consisting of unicellular eukaryotes.

Simpson's Index of Diversity (D) - A measurement of diversity that considers both species richness and evenness. A value between 0 and 1 is found and the greater the value, the greater the diversity. Calculated using the formula:

$$D = 1 - \frac{\sum n(n-1)}{N(N-1)}$$

Species - A group of similar organisms that are able to breed with one another to produce living, fertile offspring.

Species evenness - The number of individuals of each species living together in a community.

Species richness - The number of different species found within an area.

Taxonomic hierarchy - The arrangement of organisms into successive levels of classification known as taxonomic groups.

Three-domain system - A method of classification in which organisms are categorised into three groups; Archaea, Bacteria and Eukaryota.

