

WJEC (Wales) Biology A-level

Unit 2.1 - Biodiversity and classification

Flashcards

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Define classification



Define classification

The process of naming and organising organisms into groups based on their characteristics and evolutionary history.



Can the classification of an organism change?



Can the classification of an organism change?

Yes, the classification of an organism may change as new information becomes available.



Name the seven groups in the hierarchy of taxons, from largest to smallest.



Name the seven groups in the hierarchy of taxons, from largest to smallest.

Kingdom → Phylum → Class → Order
→ Family → Genus → Species



What is the five kingdom classification system?



What is the five kingdom classification system?

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



What is the three domain classification system?



What is the three domain classification system?

A method of classification in which organisms are categorised into three groups; Archaea, Bacteria and Eukarya.



How was the three domain system of classification developed?



How was the three domain system of classification developed?

- By analysing molecular differences between organisms to determine their evolutionary relationships
- Evidence showed that the kingdom 'prokaryotae' could be divided into two groups. All other organisms are eukaryotes.



What do organisms in the same domain
have in common?



What do organisms in the same domain have in common?

Organisms in the same domain share a distinctive pattern of ribosomal RNA.



What is Bacteria?



What is Bacteria?

- One of the three domains
- Consists of 'true' bacteria
- Also known as Eubacteria



What is Archaea?



What is Archaea?

- One of the three domains
- Made up of primitive bacteria existing in extreme environments, e.g. extremophile prokaryotes
- Also known as Archaeobacteria



What is Eukarya?



What is Eukarya?

- One of the three domains
- Consists of all eukaryotic organisms



Outline the features of the kingdom
Prokaryotae.



Outline the features of the kingdom Prokaryotae.

- Unicellular prokaryotes
- Lack a true nucleus and membrane-bound organelles
- Rigid cell wall



Outline the features of the kingdom Plantae.



Outline the features of the kingdom Plantae.

- Multicellular eukaryotes
- Photoautotrophs
- Cellulose cell walls



Outline the features of the kingdom
Animalia.



Outline the features of the kingdom Animalia.

- Multicellular eukaryotes
- No cell wall
- Heterotrophic
- Nervous coordination



Outline the features of the kingdom
Fungi.



Outline the features of the kingdom Fungi.

- Eukaryotes
- Heterotrophic
- Chitin cell walls
- Grow by producing branching filaments, hyphae
- Asexual reproduction via spores



Outline the features of the kingdom
Protoctista.



Outline the features of the kingdom Protocista.

- Mainly unicellular eukaryotes
- No differentiation into tissues



How are different types of evidence used in classification?



How are different types of evidence used in classification?

- **Observations** (e.g. fossils) - organisms grouped based on similar physical characteristics.
- **Biochemical methods** (e.g. DNA genetic fingerprinting)



What is DNA profiling?



What is DNA profiling?

- Method of determining the characteristics of an individual's DNA
- Percentage of DNA or proteins shared between species is used to estimate relatedness



State the advantage of using
biochemical methods of classification.



State the advantage of using biochemical methods of classification.

Biochemical methods reduce mistakes made from observing physical features alone (due to morphological convergence).



Compare homologous and analogous features.



Compare homologous and analogous features.

- Homologous features have evolved from the **same structure** for **different functions**. They indicate a common ancestor
- Analogous features are structures that have evolved **independently** for the **same function**



Give an example of a homologous feature.



Give an example of a homologous feature.

Pentadactyl limb (found in mammals, birds and reptiles).



Give an example of an analogous feature.



Give an example of an analogous feature.

The wings of birds and insects.



Define species.



Define species.

A group of organisms that can interbreed to produce **fertile offspring**.



What are the two components to a binomial name?



What are the two components to a binomial name?

- **Generic name** - the Genus to which the organism belongs (Capitalise this one!)
- **Specific name** - the species the organism belongs to



What is the advantage of the binomial naming system?



What is the advantage of the binomial naming system?

It is **universal**; an organism's binomial name is the same everywhere in the world.



Define biodiversity.



Define biodiversity.

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



What mechanism has generated biodiversity?



What mechanism has generated biodiversity?

Natural selection



When measuring the biodiversity of a habitat, what must ecologists consider?



When measuring the biodiversity of a habitat, what must ecologists consider?

- Species richness
- Species evenness



Define species richness.



Define species richness.

The number of different species found within an area.



Define species evenness.



Define species evenness.

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



How can biodiversity in a habitat be assessed?



How can biodiversity in a habitat be assessed?

Using Simpson's Diversity Index.



What is Simpson's Diversity Index?



What is Simpson's Diversity Index?

- A measurement of diversity that considers both species richness and evenness
- A value between **0 and 1** is found
- The closer the value is to 1, the greater the biodiversity



How can we calculate genetic diversity within a species?



How can we calculate genetic diversity within a species?

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



What is polymorphism?



What is polymorphism?

The presence of different phenotypes among members of a single species.



How can biodiversity be assessed at the molecular level?



How can biodiversity be assessed at the molecular level?

Using DNA fingerprinting and sequencing.



What is DNA sequencing?



What is DNA sequencing?

Determining the entire DNA nucleotide base sequence of an organism.



How is DNA sequencing used to measure biodiversity?



How is DNA sequencing used to measure biodiversity?

Comparisons between members of the same species can identify variation in base sequences and hence estimate genetic diversity.



What is an adaptation?



What is an adaptation?

A feature of an organism that increases its chance of survival in its environment.



Describe the three types of adaptation.



Describe the three types of adaptation.

- **Anatomical** - changes to physical features
- **Physiological** - changes to bodily processes
- **Behavioural** - changes to actions

