CAIE Biology A-level

Topic 18: Biodiversity, Classification and Conservation

Flashcards

Define the biological species concept.

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In this concept, a species is defined as a group of individuals that interbreed to produce fertile offspring. It is not based on their similarities in appearance.

Define the morphological species concept.

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The morphological species concept classifies species by their morphological similarities (how they look), not by their ability to reproduce or their DNA.

Define the ecological species concept.

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In this concept, a species is a group of organisms that are adapted to a particular niche in an ecosystem.

Outline the main features of the domains Archaea, Bacteria and Eukarya.

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Archaea	Bacteria	Eukarya
Prokaryotic cells	Prokaryotic cells	Eukaryotic cells
DNA is circular, most have histones, plasmids are present	DNA is circular, plasmids are present	DNA is linear and found within the nucleus, histones are present
Cell wall present	Cell wall made of peptidoglycan	Cell wall present in plants and fungi
Do not have organelles	Do not have organelles	Cells have organelles
70S ribosomes	Ribosomes have prokaryotic and eukaryotic features; transcription is similar to eukarya	80S ribosomes

List the levels of taxonomic classification.

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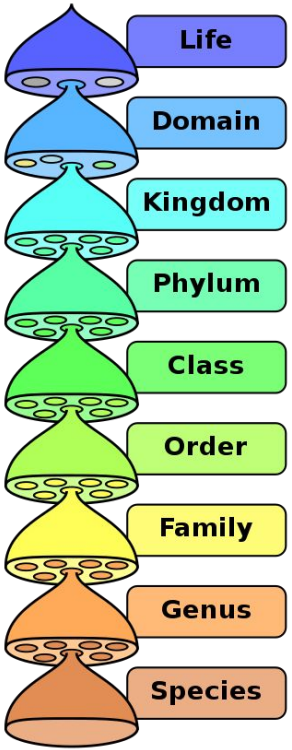
domain, kingdom, phylum, class, order, family, genus, species



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Outline the main features of the kingdoms Protoctista, Fungi, Plantae and Animalia.

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Protoctista	Fungi	Plantae	Animalia
Unicellular or multicellular	Mainly multicellular	Multicellular	Multicellular
Some have a cell wall	Cell wall made of chitin	Cell wall made of cellulose	Do not have a cell wall
Autotrophic or heterotrophic nutrition	Heterotrophic nutrition	Autotrophic nutrition	Heterotrophic nutrition

Why are viruses not included in any of the three domains?

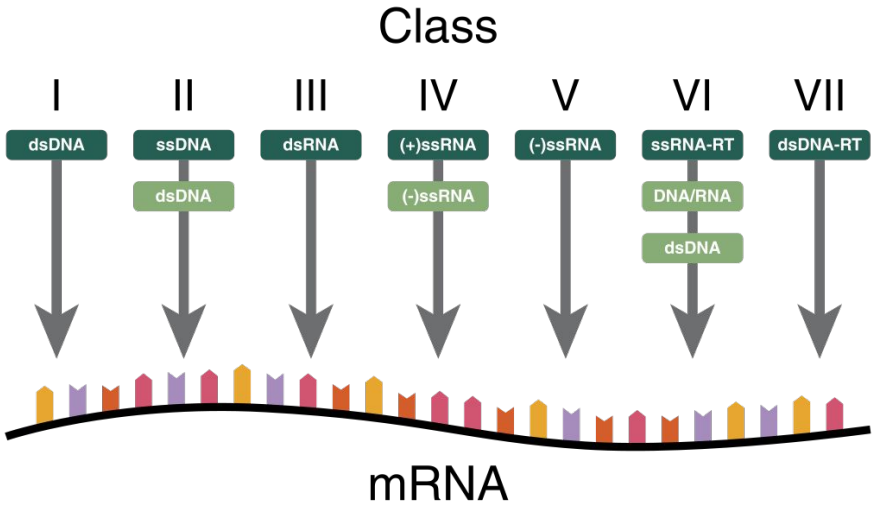
Why are viruses not included in any of the three domains?

Viruses are acellular and do not share any characteristic features with cells in the domains.

How are viruses classified?

How are viruses classified?

Viruses are grouped according to their nucleic acids e.g. RNA or DNA, double-stranded or single-stranded.



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What is meant by the term ecosystem?

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

What is meant by the term niche?

What is meant by the term niche?

Describes how an organism ‘fits’ into an ecosystem and its role in that environment.

What is biodiversity?

What is biodiversity?

Biodiversity refers to the variation of living organisms.

List the three levels at which biodiversity can be considered.

List the three levels at which biodiversity can be considered.

- Variation of ecosystems or habitats
- Number and abundance of species
- Genetic variation within a species

Why is random sampling important for investigating biodiversity in an area?

Why is random sampling important for investigating biodiversity in an area?

It avoids bias, which makes the results more reliable.

Describe how random sampling and frame quadrats can be used to assess the abundance of a species.

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The study area is divided into a grid. A random number generator is used to obtain coordinates. At the coordinates, the frame quadrat is placed on the ground and the abundance of the species within the quadrat is recorded.

How can the abundance of a species within a quadrat be estimated?

How can the abundance of a species within a quadrat be estimated?

- The number of organisms within the quadrat can be counted (**species richness**).
- The percentage cover can be estimated. This is useful for species that are very abundant.

When is it appropriate to use transects rather than random sampling of an area?

When is it appropriate to use transects rather than random sampling of an area?

Transects are used to measure the change in abundance and distribution of a species across a habitat, rather than within the habitat only. A gradual change in an abiotic factor often causes the change in species abundance.

Describe how systematic sampling and a belt transect can be used to assess the abundance and distribution of a species.

Describe how systematic sampling and a belt transect can be used to assess the abundance and distribution of a species.

A belt transect is drawn from one part of a habitat to another. The frame quadrat is placed at regular intervals along the belt transect and the abundance of a species is measured.

Describe the difference between a line transect and a belt transect.

Describe the difference between a line transect and a belt transect.

- **Line transect** - all organisms touching the line are recorded
- **Belt transect** - only organisms in the frame quadrat at each interval are recorded

What method is used to investigate populations of motile organisms?

What method is used to investigate populations of motile organisms?

Mark-release-recapture

Outline the mark-release-recapture method.

Outline the mark-release-recapture method.

- A group of organisms of the target population are caught, counted and marked
- The marked organisms are released back into their habitat
- After a period of time, organisms of the same population are captured again
- The proportion of marked to unmarked organisms in the captured group is assumed to be the same as the proportion of marked to unmarked in the whole population
- $$\text{estimated population size} = \frac{\text{number of individuals in first sample} \times \text{number of individuals in second sample}}{\text{number of marked individuals in second sample}}$$

How is Spearman's rank correlation coefficient used in investigations of species populations?

How is Spearman's rank correlation coefficient used in investigations of species populations?

Spearman's rank tests whether there is a correlation between two data sets e.g. to see if there is a correlation between distribution of organisms and an abiotic factor like soil pH.

Outline the difference between Pearson's and Spearman's correlation coefficients.

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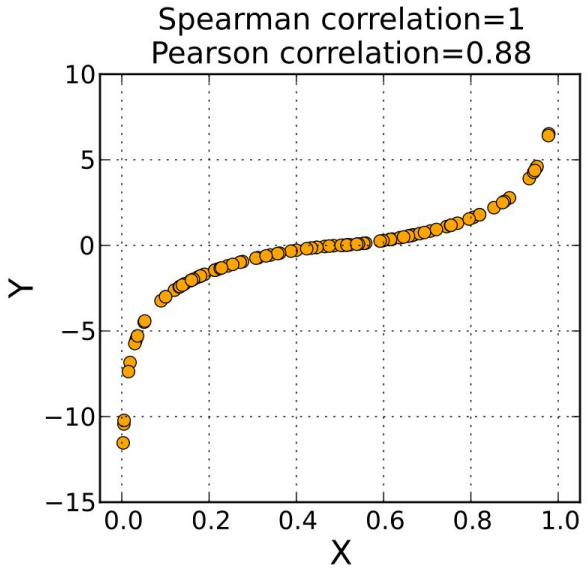
Pearson's correlation coefficient is used for linear correlations between two data sets.

Spearman's correlation coefficient works for linear correlations and monotonic relationships (does not increase/decrease by the same amount each time).



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Explain what the values of *D* mean for Simpson's Index of Diversity.

Explain what the values of *D* mean for Simpson's Index of Diversity.

D is the index of diversity. A high value for D means there is a lot of diversity, so species richness and species evenness is high.

Outline the threats to biodiversity in ecosystems.

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Some of the threats include climate change, deforestation and destruction of habitats, pollution, introduction of new species, and hunting by humans.

Why does biodiversity need to be maintained?

Why does biodiversity need to be maintained?

- To maintain stable ecosystems
- Ethical reasons
- Aesthetic reasons
- Many plant species are yet to be discovered and may contain chemicals that could be used in future medicines

List methods of protecting endangered species.

List methods of protecting endangered species.

- National parks
- Zoos
- Botanic gardens
- Frozen zoos
- Seed banks

Give examples of methods of assisted reproduction for conservation efforts.

Give examples of methods of assisted reproduction for conservation efforts.

- In vitro fertilisation (IVF)
- Embryo transfer
- Surrogacy

State what is meant by an ‘alien species’.

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An alien species (also known as an introduced species) is one which is living in a habitat it is not native to. The species may arrive there intentionally or unintentionally.

What effects can an alien species have on a habitat?

What effects can an alien species have on a habitat?

- An alien species represents a new competitor for resources. They may outcompete the native species, resulting in extinction
- The alien species may be predators of a native species
- The alien species may bring new diseases into the habitat

What is the role of the World Wide Fund for Nature (WWF)?

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WWF is a non-governmental organisation. It aims to conserve biodiversity on a global level, protect and restore ecosystems, promote the use of sustainable resources and reduce pollution and waste.

What is the role of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)?

What is the role of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)?

CITES is an agreements between governments. It regulates wildlife trade to ensure it is not a threat to their survival. It prevents overexploitation of resources, particularly of endangered species.