

# Edexcel IAL Biology A-level

## 5.15-5.26 - Changes to Populations and the Environment

### Flashcards

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# What is succession?



# What is succession?

A directional change in a community over time



# What is meant by primary succession?



What is meant by primary succession?

Where an area previously devoid of life is colonised by **pioneer species**



# What is a pioneer species?



# What is a pioneer species?

Species that can survive in hostile environments and colonise bare rock or sand, e.g. lichen



# Summarise the process of primary succession



# Summarise the process of primary succession.

- **Pioneer species** colonise the area
- They die, decompose and add nutrients to the ground
- Over time, this allows more complex organisms to survive



# What are series?



# What are seres?

Various intermediate stages in succession in an ecosystem progressing towards a climax community



# Define secondary succession



Define secondary succession.

A type of succession in which a habitat is re-colonised after a disturbance



What is the climax community and how is it reached?



# What is the climax community and how is it reached?

- The final stage of succession, where the ecosystem is balanced and stable
- Reached when the soil is rich enough to support large trees or shrubs and the environment is no longer changing



How does succession affect species diversity and the stability of a community?



How does succession affect species diversity and the stability of a community?

Succession increases species diversity and the stability of the community



Describe four pieces of evidence for  
climate change



## Describe four pieces of evidence for climate change

- Records show increasing levels of CO<sub>2</sub>, a greenhouse gas
- Changing patterns in temperature records
- Analysis of pollen grains from peat bogs indicates which plant species were present when the peat formed
- Dendrochronology



# What is dendrochronology?



## What is dendrochronology?

A new tree ring is added each year due to the growth of cambium cells. Width of ring indicates the temperature and moisture of that year



# What is anthropogenic climate change?



# What is anthropogenic climate change?

Changes in meteorological conditions caused by human activity e.g. deforestation, burning fossil fuels, intensive agriculture



# What is the greenhouse effect?



# What is the greenhouse effect?

Greenhouse gases e.g. carbon dioxide and methane absorb infrared radiation from the Sun. Warms the Earth's surface and atmosphere



Suggest two controversial scientific debates surrounding climate change



Suggest two controversial scientific debates surrounding climate change

- What should be done to reduce climate change?
- To what extent are human actions responsible for climate change?



# Why might scientific conclusions on controversial issues differ?



## Why might scientific conclusions on controversial issues differ?

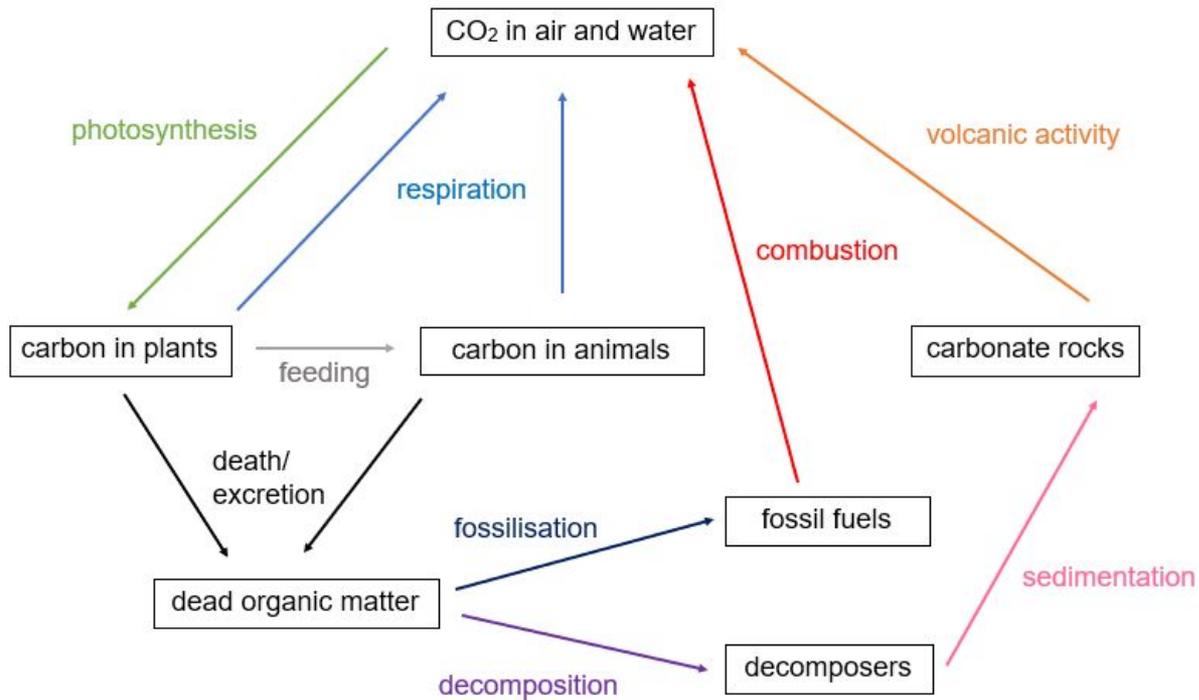
- May require suggestions rather than empirical fact
- Depends on intention of researcher - subconscious bias or pressure from an institution



# Outline the processes in the carbon cycle



# Outline the processes in the carbon cycle



How can knowledge of the carbon cycle be used to reduce atmospheric carbon dioxide levels?



How can knowledge of the carbon cycle be used to reduce atmospheric carbon dioxide levels?

- Increase photosynthetic absorption of  $\text{CO}_2$  = reforestation
- Reduce  $\text{CO}_2$  release = burn fewer fossil fuels



# How can models of future climate change be generated?



How can models of future climate change be generated?

By extrapolating data



# Why do climate change models have limitations?



# Why do climate change models have limitations?

Models assume the pattern continues and do not consider factors that may change later e.g. reduction in greenhouse gas emissions



State two geological effects of climate change



# State two geological effects of climate change

- Rainfall patterns change
- Seasonal cycles change



# How can climate change affect plants and animals?



# How can climate change affect plants and animals?

- Distribution of species & migratory patterns change. Many species move north to cooler areas. Increases interspecific competition
- Selection pressures change. Natural selection may not occur quickly enough in some populations.
- Disruption to life cycles and development e.g. sex of reptiles



Explain how increasing temperature above the optimum affects the rate of an enzyme-controlled reaction



# Explain how increasing temperature above the optimum affects the rate of an enzyme-controlled reaction

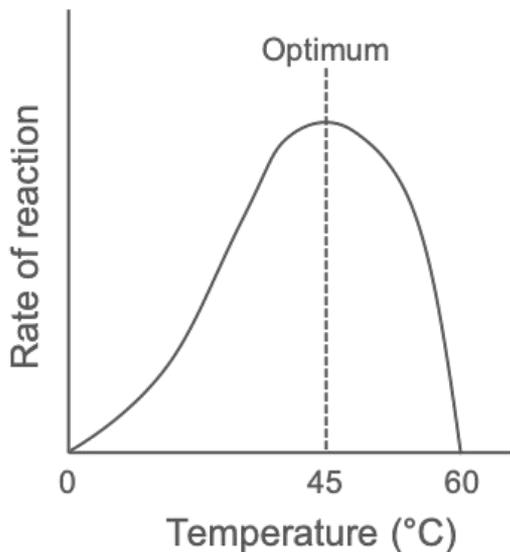
- Temperature increases above the optimum
- Increased vibrations break hydrogen and ionic bonds in tertiary structure
- Active site changes shape, enzyme is denatured
- No more enzyme-substrate complexes can form
- Rate of reaction decreases



Draw a graph to show the effect of increasing temperature on the rate of an enzyme-catalysed reaction



Draw a graph to show the effect of increasing temperature on the rate of an enzyme-catalysed reaction



# What is $Q_{10}$ ?



What is  $Q_{10}$ ?

Temperature coefficient. Measures the rate of change of a reaction when temperature is increased by  $10^{\circ}\text{C}$ .



How can increased temperature due to climate change affect organisms on a molecular scale?



# How can increased temperature due to climate change affect organisms on a molecular scale?

- Organisms typically have proteins adapted to work optimally in their natural climate
- Many proteins and enzymes rely heavily on their specific tertiary structures to function correctly
- If the temperature increases significantly, the proteins may denature and will be unable to function correctly



# What is evolution?



## What is evolution?

Change in allele frequency in gene pool of a population. Results in development of new dominant characteristics



# What is natural selection?



## What is natural selection?

The process by which organisms which are better adapted to their environment are able to survive and reproduce. This contributes to evolution over time



# How does natural selection lead to evolution?



## How does natural selection lead to evolution?

- Random mutations result in new alleles.
- Some alleles provide an advantage, making an individual more likely to survive and reproduce
- Offspring receive the new allele & frequency increases over many generations. Frequency of unfavourable alleles decreases



# Why does natural selection occur?



# Why does natural selection occur?

1. Predation
2. Disease
3. Competition

All result in differential survival and reproduction



# What is speciation?



# What is speciation?

The formation of new species due to the evolution of two reproductively separated populations



What are the two different types of speciation?



# What are the two different types of speciation?

- Allopatric speciation
- Sympatric speciation



# What is meant by allopatric speciation?



What is meant by allopatric speciation?

Speciation resulting from a physical barrier e.g. river, mountain range. The environments occupied by the two groups are different, and therefore different alleles are favoured



# What is meant by sympatric speciation?



What is meant by sympatric speciation?

Speciation resulting from a non-physical barrier e.g. a mutation that no longer allows two organisms to produce fertile offspring. Any changes in anatomy or behaviour may also prevent breeding



# What is reforestation?



# What is reforestation?

The replanting of trees to replenish forests that have been destroyed



# What are biofuels?



## What are biofuels?

Fuels which have been made from biomass (plant and animal matter). They can be a carbon-neutral and renewable alternative to fossil fuels



# What is sustainability?



## What is sustainability?

The ability to maintain a process or supply over time. Sustainable resource use can help to manage the conflict between human needs and conservation

