

OCR (B) Biology GCSE Topic B6.1: How was the theory of evolution developed?

Flashcards

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What is evolution?







What is evolution?

A gradual change in the inherited traits within a population over time. Occurs due to natural selection.







Outline the theory of natural selection







Outline the theory of natural selection

- 1. Genetic variation exists due to spontaneous mutations
- 2. Competition between organisms
- 3. A mutation may give an organism a selective advantage
- 4. Organism is better adapted to the environment and survives
- 5. Organism reproduces, passing on its beneficial alleles
- 6. Frequency of advantageous alleles increase







Why does competition between organisms in a habitat exist?







Why does competition between organisms in a habitat exist?

The resources within a habitat required for survival are limited







Give some examples of competition between organisms within a habitat







Give some examples of competition between organisms within a habitat

Competition between animals for food, shelter, mates etc.

Competition between plants for light, water, minerals etc.

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Define species







Define species

A group of similar organisms that are able to breed with one another to produce fertile offspring







Define speciation







Define speciation

The formation of new species in the course of evolution, often due to the evolution of two isolated populations







Explain how a physical barrier may result in speciation







Explain how a physical barrier may result in speciation

- A physical barrier (e.g. deforestation) separates two populations of the same species
- The two populations experience different environmental conditions
- They evolve different traits
- Eventual formation of two new species







How can the observation of fossils provide evidence for evolution?







How can the observation of fossils provide evidence for evolution?

- Older fossils (found in rocks deeper in the ground) contain simpler organisms. Newer fossils (found closer to the surface) contain more complex organisms. Comparisons of fossils show that simple organisms evolved into more complex life forms.
- Fossils can be organised into chronological order, allowing the changes in organisms over time to be observed







Describe how antibiotic resistance in bacteria illustrates the process of evolution







Describe how antibiotic resistance in bacteria illustrates the process of evolution

- 1. Genetic variation exists due to spontaneous mutations
- 2. A mutation may give a bacterium antibiotic-resistance
- 3. If an antibiotic is administered, the bacterium is better adapted and survives, whilst other bacteria are killed
- 4. Bacterium reproduces, passing on its resistant variant
- 5. Frequency of antibiotic-resistant allele increases







Why is the development of antibiotic resistance in bacteria a good study for evolution?







Why is the development of antibiotic resistance in bacteria a good study for evolution?

Bacteria reproduce very rapidly, allowing the first-hand observation of evolution







Using what pieces of evidence did Darwin and Wallace develop the theory of evolution? (biology only)







Using what pieces of evidence did Darwin and Wallace develop the theory of evolution? (biology only)

- Fossil evidence
- Selective breeding
- Comparisons of the traits of isolated populations of the same species







What is selective breeding?







What is selective breeding?

The process by which humans artificially select organisms with desirable characteristics and breed them to produce offspring with similar phenotypes







Outline the main steps involved in selective breeding







Outline the main steps involved in selective breeding

- 1. Identify a desired characteristic e.g. disease resistance
- 2. Select parent organisms that show the desired traits and breed them together
- 3. Select offspring with the desired traits and breed them together
- 4. Process repeated until all offspring have the desired traits







What is the main advantage of selective breeding?







What is the main advantage of selective breeding?

Creates organisms with desirable features:

- Crops produce a higher yield of grain
- Cows produce a greater supply of milk
- Plants produce larger fruit







What are the disadvantages of selective breeding? (4)







What are the disadvantages of selective breeding? (4)

- Reduction in the gene pool (which becomes especially harmful if sudden environmental change occurs)
- Inbreeding results in genetic disorders
- Development of other physical problems e.g. respiratory problems in bulldogs
- Unknowingly selecting harmful recessive alleles







How can selective breeding provide evidence for evolution? (biology only)







How can selective breeding provide evidence for evolution? (biology only)

Selective breeding demonstrates that traits can be passed down from parents to offspring.

It shows that new varieties of organisms can gradually form with time as desired traits are selected. This can be applied to natural selection in the wild.







How can comparisons of the traits of isolated populations of the same species provide evidence for evolution? (biology only)







How can comparisons of the traits of isolated populations of the same species provide evidence for evolution? (biology only)

Comparisons of populations that were once one species show that members of the same species may evolve differently when living in different environments.







How has the theory of evolution by natural selection impacted modern biology and society? (biology only)







How has the theory of evolution by natural selection impacted modern biology and society? (biology only)

- Enables the classification of organisms into taxa
- Influences modern medicine by emphasising the importance of finishing antibiotic treatments and the need for the constant production of new antibiotics
- Highlights the importance of high genetic diversity in habitats which aids conservation projects



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Why do some individuals accept the theory of evolution? (biology only)







Why do some individuals accept the theory of evolution? (biology only)

- A large amount of evidence supports this theory
- Previously collated data may support this theory
- They may have conducted their own research and come to a similar conclusion







Why do some individuals not accept the theory of evolution? (biology only)







Why do some individuals not accept the theory of evolution? (biology only)

- It may contradict religious beliefs
- Different people may interpret the evidence in different ways
- Lack of understanding or awareness of the evidence that supports evolution



