WJEC Wales Biology GCSE

2.4 (e) to (i) - Evolution

Flashcards

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 animals within a habitat

Give some examples of competition between animals within a habitat

Competition between animals for food, shelter, mates etc.

Give some examples of competition between plants within a habitat

Give some examples of competition between plants within a habitat

Competition between plants for light, water, minerals etc.

Describe the role of Darwin in the development of the theory of evolution by natural selection

Describe the role of Darwin in the development of the theory of evolution by natural selection

- Studied a variety of organisms whilst travelling on the HMS beagle
- Noted that traits can be passed from parents to offspring
- Proposed the idea of ‘survival of the fittest’
- Established the theory of natural selection and published his ideas in ‘On the Origin of Species’

Describe the role of Wallace in the development of the theory of evolution by natural selection

Describe the role of Wallace in the development of the theory of evolution by natural selection

- Proposed a theory of natural selection that was similar to Darwin's, although the mechanisms were different
- Gathered greater evidence (e.g. studying warning colouration in butterflies) to support the theory

How can the effect of camouflage on predator-prey populations be modelled?

How can the effect of camouflage on predator-prey populations be modelled?

1. Take a piece of blue paper
2. Disperse an equal number of blue and white straws across the paper (**straws represent prey populations**)
3. Set a stopwatch for 30s and instruct a volunteer to collect as many straws as possible (**volunteer represents predator**)
4. Record the number of blue and white straws remaining
5. Repeat three times

Describe the limitations of this model

Describe the limitations of this model

Model	Reality
Straws do not move	Prey move - speed affects likelihood of capture
Extreme difference in straw colours	Prey more similar in colour
Paper is one colour	Environment is not one colour
Potential bias by volunteer	No bias
Not affected by other factors	Other factors affect survival

What is meant when a species is described as being extinct?

What is meant when a species is described as being extinct?

All members of the species have died

Why may some species become extinct? (3)

Why may some species become extinct? (3)

- Organisms not adapted to their environment
- Organisms have not adapted rapidly enough to changing environmental conditions
- Outcompeted by better adapted species

Give some examples of modern day evolution

Give some examples of modern day evolution

- Antibiotic-resistant bacteria
- Pesticide resistance
- Warfarin-resistant rats

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

Why are bacteria becoming increasingly resistant to antibiotics?

Why are bacteria becoming increasingly resistant to antibiotics?

Due to overprescription and antibiotic misuse e.g. not completing the entire course

How can we reduce the spread of antibiotic-resistant bacteria?

How can we reduce the spread of antibiotic-resistant bacteria?

- Prescribe antibiotics only when necessary
- Ensure patients complete their antibiotic courses
- Reduce the use of antibiotics in farming
- Improve hygiene in hospitals

What is the genome?

What is the genome?

The entire genetic material of an organism

What is the Human Genome Project?

What is the Human Genome Project?

- Scientific research project involving thousands of scientists across the globe which successfully mapped the entire human genome
- Scientists now aim to identify the function of every gene in the human genome

How can the results of the Human Genome Project be applied to medicine?

How can the results of the Human Genome Project be applied to medicine?

- Enables scientists to understand how lifestyle factors interact with genes - identifying predisposition to disease and possible preventions
- Disease-causing alleles identified more rapidly and the appropriate treatments prescribed earlier on
- Scientists can predict an individual's response to certain drugs. New drugs can be developed which are tailored to a specific allele.