

The development of understanding of genetics and evolution: practice questions

6 questions • 20 marks • mark scheme at the back

For AQA GCSE Biology 8461 and Combined Science: Trilogy 8464. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Name

Total / 20

1 **Triple only** [2 marks]

Darwin published his theory of evolution by natural selection in 1859, but it was only gradually accepted. Give two reasons why.

2 **Triple only** [4 marks]

A new mountain range separates one population of a species of bird into two populations that cannot meet. Describe the steps that could lead to the formation of two new species.

3 **Triple only** [3 marks]

Gregor Mendel carried out breeding experiments on plants in the mid-19th century. (a) State one observation Mendel made. (1) (b) Explain why the importance of his discovery was not recognised until after his death. (2)

- 4** (a) Describe two ways in which fossils may form. (2) (b) Give one reason why the fossil record is incomplete. (1) **[3 marks]**

[illegible]

- 5** Define extinction and describe one factor that could cause a species to become extinct. **[2 marks]**

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- 6** Some bacteria have become resistant to antibiotics. MRSA is an example. Explain how antibiotic-resistant strains of bacteria develop and spread, and describe how the rate of their development can be reduced. **[6 marks]**

[illegible]

Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [2] Triple only

- it challenged the idea that God made all the animals and plants that live on Earth (1)
- there was insufficient evidence at the time to convince many scientists (1)
- the mechanism of inheritance and variation was not known (until 50 years later) (1)
- Max 2

2. [4] Triple only

- the populations are isolated / cannot interbreed (1)
- there is variation / mutations in each population (1)
- the environments are different, so natural selection acts differently / different characteristics are best suited (1)
- over many generations the populations become so different that they can no longer interbreed to produce fertile offspring (1)

3. [3] Triple only

- (a) the inheritance of each characteristic is determined by 'units' that are passed on to descendants unchanged (1)
- (b) when he published, chromosomes / the behaviour of chromosomes in cell division had not been observed (1)
- (b) so scientists could not link his 'units' to any structure in cells / could not explain how they were inherited (1)
- (b) allow for 1 mark: few scientists read or understood his work
- Max 3 (max 2 for part b)

4. [3]

- (a) parts of organisms have not decayed because one or more conditions needed for decay are absent (1)
- (a) parts of the organism are replaced by minerals as they decay (1)
- (a) preserved traces, such as footprints, burrows or rootlet traces (1)
- (b) early forms of life were soft-bodied, so left few traces / traces were destroyed by geological activity (1)
- Max 3 (max 2 for part a)

5. [2]

- no remaining individuals of a species are still alive (1)
- any one from: new predator / new disease / new, more successful competitor / change in the environment / a catastrophic event such as a volcanic eruption or asteroid collision (1)

6. [6]

Level 3 5-6	A clear, logical explanation of how resistance arises and spreads, with at least two ways to reduce the rate of development, explained.
Level 2 3-4	Explains some of how resistance arises or spreads, and gives at least one way to reduce the rate.
Level 1 1-2	Simple statements, for example that bacteria become resistant or that antibiotics should be used carefully.

Indicative content

- bacteria reproduce at a fast rate, so can evolve rapidly
- mutations produce new strains, some of which are resistant to antibiotics
- antibiotics kill non-resistant bacteria but the resistant ones survive and reproduce
- the population of the resistant strain rises
- the strain spreads because people are not immune and there is no effective treatment
- doctors should not prescribe antibiotics inappropriately, such as for viral infections or non-serious infections
- patients should complete the course of antibiotics so that all bacteria are killed
- restrict agricultural use of antibiotics