

Full Higher Separate content. ★ = Higher Tier. ◆ = Separate Science only.

Q1. Distinguish between continuous and discontinuous variation. Give ONE example of each.

[3 marks]

Q2. Define mutation and describe THREE causes of mutations.

[3 marks]

Q3. Explain why mutations are important for evolution.

[2 marks]

★ HIGHER TIER

Q4. ★ Explain why most mutations have no effect on the protein produced.

[2 marks]

Total: 10 marks

Q1 (3 marks)

Distinguish between continuous and discontinuous variation. Give ONE example of each.

- Continuous: a range of values — controlled by many genes + environment — normal distribution (e.g. height, mass) [1]
- Discontinuous: distinct categories, no intermediates — usually one gene (e.g. ABO blood type, tongue rolling) [1]
- Continuous influenced by environment; discontinuous usually not [1]

Q2 (3 marks)

Define mutation and describe THREE causes of mutations.

- Mutation: a change in the DNA base sequence [1]
- Causes: UV radiation [1]; X-ray/ionising radiation [1]; certain chemicals (mutagens) [1] — accept: errors during DNA replication

Q3 (2 marks)

Explain why mutations are important for evolution.

- Mutations are the only source of new alleles [1]
- New alleles provide variation for natural selection to act upon — without mutation, evolution could not occur [1]

Q4 (2 marks) [★ HT]

★ *Explain why most mutations have no effect on the protein produced.*

- Many mutations are silent — do not change the amino acid (the genetic code is degenerate: multiple codons code for same amino acid) [1]
- Mutations in non-coding DNA (introns) have no effect on the protein sequence [1]