

Variation 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** Two identical twins are brought up in different houses. At age 16 they have different body masses. Explain why their body masses are different. [2 marks]

- 2** A population of grasshoppers living in grass contains green grasshoppers and brown grasshoppers. The grass dries out and turns brown. Birds eat the grasshoppers that they can see. Explain how the population of grasshoppers changes over many generations. [4 marks]

- 3** (a) Describe how a farmer could use selective breeding to produce cattle that give more milk. (3) (b) Give one risk of selective breeding in animals. (1) [4 marks]

4

Higher tier

[4 marks]

Human insulin can be made by genetically engineered bacteria. Describe the main steps in the process of genetic engineering.

5

Many crops are genetically modified (GM). Give one benefit of GM crops and one concern about them. [2 marks]

6

Triple only

[4 marks]

A sheep can be cloned using a skin cell from an adult sheep. Describe how a cloned embryo is made and used.

Mark scheme

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

1. [2]

- they have the same genes / genome, so the difference is not genetic (1)
- different environmental conditions, for example diet or exercise (1)

2. [4]

- there is variation in colour (caused by different alleles) (1)
- brown grasshoppers are better camouflaged / less likely to be seen and eaten (1)
- so more brown grasshoppers survive and breed (1)
- they pass on the allele for brown to offspring, so the proportion of brown grasshoppers increases over generations (1)

3. [4]

- choose / select parents (cows and bulls) with the desired characteristic / high milk yield (1)
- breed them together (1)
- choose the best offspring and breed them together, repeating over many generations (1)
- inbreeding / breeds prone to disease or inherited defects (1) allow reduced genetic variation

4. [4] Higher tier

- enzymes are used to isolate / cut out the human insulin gene (1)
- the gene is inserted into a vector, for example a bacterial plasmid (or virus) (1)
- the vector is used to insert the gene into the bacterial cells (1)
- the bacteria multiply and make insulin / develop with the desired characteristic (1)

5. [2]

- benefit: increased yields / resistant to insects, herbicides or disease / bigger, better fruits (1)
- concern: effect on populations of wild flowers or insects / effects of eating GM crops on human health have not been fully explored (1) ignore 'unnatural' unqualified

6. [4] Triple only

- the nucleus is removed from an unfertilised egg cell (1)
- the nucleus from the adult body (skin) cell is inserted into the egg cell (1)
- an electric shock stimulates the egg cell to divide to form an embryo (1)
- when it is a ball of cells, the embryo is inserted into the womb of an adult female (1)