

Variation, mutations and the Human Genome

Project: practice questions

5 questions • 13 marks • mark scheme at the back

For Edexcel GCSE Biology 1BI0 and Combined Science 1SC0. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Name

Total / 13

1 Most phenotypic features are the result of [1 mark]

- A. ☐ a single gene
- B. ☐ multiple genes
- C. ☐ a single chromosome
- D. ☐ the Y chromosome

2 Identical twins have the same genes. One twin has a scar on her arm and is heavier than her sister. (a) Name the type of variation shown by the scar. (1) (b) Suggest two reasons why the twins have different masses. (2) (c) State one cause of genetic variation between non-identical siblings. (1) [4 marks]

3 The masses of five pea seeds were 0.42 g, 0.38 g, 0.45 g, 0.40 g and 0.35 g. Calculate the mean mass. [2 marks]

Answer =

- 4** (a) State how extensive genetic variation arises in a population. (1) (b) Describe the effects mutations can have on the phenotype. (2) **[3 marks]**

- 5** Discuss the outcomes of the Human Genome Project and its potential applications within medicine. **[3 marks]**

Mark scheme

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

1. [1]

B B: multiple genes (1)

2. [4]

- (a) environmental variation / acquired characteristic (1)
- (b) different diet (1)
- different amount of exercise (1) allow other suitable environmental factors
- (c) sexual reproduction / mutation (1)

3. [2]

- $0.42 + 0.38 + 0.45 + 0.40 + 0.35 = 2.00$ (1)
- $2.00 \div 5 = 0.40$ g (1)

4. [3]

- (a) through mutations (1)
- (b) most have no effect (1)
- some have a small effect, and rarely a single mutation significantly affects the phenotype (1)

5. [3]

- the human genome has been mapped / the sequence of bases in human DNA identified (1)
- genes linked to inherited disorders can be identified so people can be tested / their risk predicted (1)
- treatments or drugs can be developed or matched to a person's genes (1)
- concern: genetic information could be used unfairly or cause worry (1)
- Max 3