



Edexcel GCSE Combined Science • Topic 4 Natural selection and genetic modification

Agriculture and evaluating biotechnology: practice questions

2 questions · 8 marks · mark scheme at the back

For Edexcel GCSE Combined Science 1SC0, **Higher tier** is only on the Higher paper.

Name

Total / 8

- 1** In a practice data set, a non-GM crop yields 5.0 tonnes per hectare. A GM crop yields 6.5 tonnes per hectare. Calculate the percentage increase in yield. **[2 marks]**

Answer =

[illegible]

- 2** Evaluate the use of genetic engineering and selective breeding in modern agriculture. [6 marks]
Include practical and ethical implications in your answer.

[illegible]

Mark scheme

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

1. [2]

- $(6.5 - 5.0) \div 5.0 \times 100$ (1)
- 30% (1)

2. [6]

Level 3 5-6	A balanced evaluation which covers benefits and risks of both methods, includes practical and ethical implications, and reaches a justified conclusion.
Level 2 3-4	A partly balanced evaluation covering benefits and risks of both methods, or giving more detail for one method. Some practical or ethical implications are given.
Level 1 1-2	A basic answer with one or two valid points. There is little or no evaluation.

Indicative content

- selective breeding: higher yield, disease resistance, better quality food
- selective breeding: takes many generations, reduces genetic variation, so risk of disease affecting all
- genetic engineering: new characteristics such as insect resistance or higher nutritional value
- genetic engineering: quicker and more precise than selective breeding
- genetic engineering: costly, unknown effects on the environment or health, genes may spread to wild species
- ethical: some people think it is wrong to alter genes / interfere with nature
- ethical: concerns about animal welfare
- a justified conclusion, for example weighing increased food production against risks