

Agriculture and evaluating biotechnology: practice questions

4 questions • 14 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 / 14

1 **Triple only** [3 marks]

Explain one advantage and one disadvantage of using fertilisers to increase crop yields.

2 **Triple only** [3 marks]

Ladybirds can be released in a greenhouse to control aphids. Explain one advantage and one disadvantage of using biological control instead of chemical pesticides.

3 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 =

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

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Mark scheme

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

1. [3] Triple only

- advantage: supply mineral ions / nitrates that plants need for growth (1)
- so crop yield increases (1)
- disadvantage: can be washed into rivers / lakes (1)
- causing water pollution / harm to wildlife (1)
- allow disadvantage: costly (1) so increases the farmer's costs (1)
- Max 3

2. [3] Triple only

- advantage: no chemical residue on the food / chemical pesticides not needed (1)
- so less harm to people or other organisms / the ladybirds target only the pest / keep working over a long time (1)
- disadvantage: slower / may not remove all the pests (1)
- allow disadvantage: the control organism may become a pest / eat other organisms (1)
- Max 3

3. [2]

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

4. [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