



**General Certificate of Secondary Education
2019–2020**

**Single Award Science:
Biology**

Unit 1

Higher Tier

[GSA12]

WEDNESDAY 6 NOVEMBER 2019, MORNING

**MARK
SCHEME**

General Marking Instructions

Introduction

Mark schemes are intended to ensure that the GCSE examinations are marked consistently and fairly. The mark schemes provide markers with an indication of the nature and range of candidates' responses likely to be worthy of credit. They also set out the criteria which they should apply in allocating marks to candidates' responses.

Assessment objectives

Below are the assessment objectives for GCSE Single Award Science

Candidates must:

- AO1** Demonstrate knowledge and understanding of scientific ideas, scientific techniques and procedures;
- AO2** Apply knowledge, skills and understanding of scientific ideas, scientific enquiry, techniques and procedures; and
- AO3** Analyse information and ideas to interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 16-year-old which is the age at which the majority of candidates sit their GCSE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 16-year-old GCSE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Marking Calculations

In marking answers involving calculations, examiners should apply the 'own figure rule' so that candidates are not penalised more than once for a computational error.

Types of mark schemes

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

1	(a)	(i)	Glucose carbon dioxide (do not accept symbols)	[2]	AVAILABLE MARKS							
		(ii)	Exothermic	[1]								
		(iii)	<table border="1"><thead><tr><th>Process</th><th>Plants</th><th>Animals</th></tr></thead><tbody><tr><td>photosynthesis</td><td>✓</td><td>X</td></tr><tr><td>respiration</td><td>✓</td><td>✓</td></tr></tbody></table> [1] mark for each correct line	Process		Plants	Animals	photosynthesis	✓	X	respiration	✓
Process	Plants	Animals										
photosynthesis	✓	X										
respiration	✓	✓										
	(b)	(i)	Chloroplast	[1]	7							
		(ii)	Make its own food/not dependent on other organisms for food	[1]								
2	(a)	Any two from: - removal of habitats - removal of food (variety of food) - removal of shelter - no camouflage for small birds and mammals - protection from birds of prey			[2]	4						
		(b)	Maintain field margins/don't plant crops to the edge of the field/ use fertilisers efficiently		[1]							
		(c)	Use brownfield sites/sites that previously had housing/old industrial site instead of agricultural land		[1]							

3 (a) (i) Florey/Chain [1]

(ii) Needed to be purified [1]

(b) Indicative content:

- in vitro testing
- on cells or tissues (in a lab)
- to find out if the drug works
- animal testing
- animals have similar organs to humans
- on whole body systems
- clinical trials
- tested on humans/volunteers
- to discover side effects/work out the dosage

Band	Response	Mark
A	Candidates must use appropriate specialist terms to describe the stages of testing using six or more of the above points in a logical sequence. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Candidates must use appropriate specialist terms to describe the stages of testing using four or five points in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates must describe the stages of testing using one, two or three points. They use limited spelling, punctuation and grammar and the form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

8

4 (a) No more of the **species** left alive/no living examples of the **species** left [1]

(b) $70\,000 - 2850 = 67\,150$ [1]

$67\,150 \div 70\,000 \times 100$ [1]

$= 95.9\%$ [1]

[3]

(c) Introduce rangers to stop poachers/stricter penalties for poachers/introduce nature reserves (to prevent habitat destruction) [1]

(d) (i) Black Rhinos feed on thorny bushes/fruit/woody plants [1]

(ii) Less competition/get more light/more space/more water/
more minerals

[1]

7

			AVAILABLE MARKS
5	(a)	Cornflakes 3.0 [1] Crackers 2.5 [1]	[2]
	(b)	To compare the different foods	[1]
	(c)	(i) Ethanol [1] clear to cloudy white emulsion [1]	[2]
		(ii) $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{energy}$	[1]
6	(a)	(i) Phototropism	[1]
		(ii) Auxin	[1]
		(iii) (Auxin) moves away from the light/moves down the shaded side; [1] causes uneven cell elongation [1]	[2]
	(b)	More light for more photosynthesis/more growth	[1]
7	(a)	(i) The skin/mucous membranes/blood clotting	[1]
		(ii) Produce antibodies [1] antibodies are complementary in shape to the antigens [1] causes the microorganisms to be clumped/immobilised [1]	[3]
	(b)	Any two from: • body produces own antibodies • slower acting • lasts for a long time	[2]
	(c)	1967–1968 [1] Explanation for 1967: there is a steep decline in the number of deaths from measles Explanation for 1968: there is a steep decline in the number of deaths from measles/decreases and stays low [1]	[2]
	(d)	Antibiotics only treat bacterial infections	[1]
			6
			5
			9

- 8 (a) Allele: a particular form of a gene [1]
Dominant: will always be expressed/will override the recessive allele [1] [2]

(b) (i)

	A	a
A	AA	Aa
a	Aa	aa

Gametes [1]

offspring [1]

[2]

(ii) 25%

[1]

5

- 9 (a) Has genes removed or added/the genome has been modified [1]

(b) Any **two** from:

- larger quantities
- quicker
- reduces the risk of allergies

[2]

(c) Diabetes

[1]

4

10 (a) Any **three** from:

- there is variation among phenotypes (finches) in a population
- the better adapted will survive
- to reproduce
- and pass on their genes to the next generation

[3]

(b) Gradual changes in organisms/finches/beaks [1]
over a long period of time [1]

[2]

5

Total

60