



Rewarding Learning

**General Certificate of Secondary Education
2023–2024**

**Single Award Science:
Biology**

Unit 1

Higher Tier

[GSA12]

MONDAY 13 NOVEMBER 2023, 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

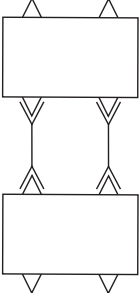
Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

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) Grass → insects → spiders → frogs → foxes [1] (ii) Increase in stoats [1] stoats have more voles to eat [1] [2] (b) Any two from: • more food • more habitats • more shelter/more camouflage/more protection from predators • more animals/plants/insects [2] (c) A living factor [1] (d) Carbon dioxide levels/size of ice fields/pH/temperature/water levels [1] (e) As the concentration of acid rain decreases the number of lichen on trees increases over time [1] (f) (i) Spruce [1] (ii) 20% [1]	AVAILABLE MARKS 10
2 (a) (i)  [1] (ii) Antigen [1] (iii) Lymphocytes [1] (b) Active immunity/creates memory lymphocytes [1] Advantage - long lasting [1] [2]	5

3 Indicative content

- protein found in meat, nuts, seeds, seafood, beans, peas, poultry, eggs
- growth/repair
- crush food
- place in a test tube/boiling tube/on a spotting tile
- add biuret reagent
- (if the biuret reagent changes) colour from blue
- to purple/lilac then protein is present

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe how to carry out the food test investigation using five to seven of the points above, 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 use some appropriate specialist terms throughout to describe how to carry out the food test investigation using three or four of the points above, 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 partially describe how to carry out the food test investigation using one or two of the above points. However, these are not presented in a logical sequence. 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]

6

- 4 (a) Not native/introduced by man/spread rapidly/outcompete native species [1]
- (b) Primary consumers [1]
- (c) Reduce numbers/eliminate Himalayan balsam [1]

3

			AVAILABLE MARKS
5	(a) Percentage of adults who drink alcohol decreases with age [1] more men than women drink alcohol (in any or all age groups) [1]	[2]	4
	(b) (i) Drinking a large volume of alcohol in a short period of time (ii) Causes liver disease/affects development of the foetus	[1] [1]	
6	(a) More open wounds/patients have weak immune systems	[1]	3
	(b) Any two from: • testing patients on admission • isolate patients with MRSA • strict hygiene conditions	[2]	
7	(a) (i) Sensory neurone (ii) Synapse	[1] [1]	3
	(b) Reflex actions do not involve thinking time	[1]	
8	(a) Phototropism	[1]	3
	(b) More light/more photosynthesis/more growth	[1]	
	(c) C	[1]	
9	(a) The smaller the height the greater the grain yield/as the years increase the average height decreases/as the years increase the grain yield increases (or converse)	[1]	8
	(b) (i) A process that modifies [1] the genome [1] of an organism	[2]	
	(ii) Any two from: • spread of genes to the wild • unforeseen outcomes • moral issues	[2]	
	(iii) Insulin	[1]	
	(c) Jersey [1] higher amount of fat present in the milk [1]	[2]	

10 (a) aa	[1]	AVAILABLE MARKS								
(b) 1	[1]									
(c) Brother	[1]									
(d) <table border="1"> <tr> <td></td><td>A</td><td>a</td></tr> <tr> <td>A</td><td>AA</td><td>Aa</td></tr> <tr> <td>a</td><td>Aa</td><td>aa</td></tr> </table>			A	a	A	AA	Aa	a	Aa	aa
	A	a								
A	AA	Aa								
a	Aa	aa								
Both parents correct [1] correct cross [1]	[2]	6								
(e) 75%	[1]									
11 (a) (i) Oestrogen	[1]									
(ii) The uterus lining is repaired/builds up	[1]									
(iii) Both oestrogen and progesterone [1] fall to a low level [1]	[2]	9								
(b) Contraceptive pill/hormone implants [1] prevents the ovaries from releasing ova/stops development of an ovum [1]	[2]									
(c) (i) Zygote	[1]									
(ii) Have half the normal number of chromosomes	[1]									
(iii) 5	[1]									
Total		60								