



Rewarding Learning

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

**Single Award Science:
Biology**

Unit 1

Higher Tier

[GSA12]

FRIDAY 17 MAY 2024, 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)	To lower/reduce blood glucose levels	[1]	AVAILABLE MARKS
	(ii)	Better control over blood glucose levels/reduces the need for multiple injections per day	[1]	
	(iii)	1500 ÷ 8000 [1] × 100 = 18.75 [1]	[2]	
	(b)	Any two from:		
		- chemical messenger - travels in the blood - to a target organ - produced by a gland	[2]	
2	(a)	Range of species/different types of living organism in a particular area	[1]	6
	(b) (i)	Bigger boats/fishing for longer/more nets/more fishing boats	[1]	
	(ii)	Any two from:		
		- quotas - fishing bans - restrictions on net sizes - closed seasons - decommission boats	[2]	4

3 (a) Indicative content:

- number of pots each with a different number of seeds
- any **two** from: same type/volume of compost/same amount of water/same light/same temperature/left for the same length of time/same size of pot/same type of seed
- (at end measure) mass/number of leaves/any suitable plant feature
- most growth would be in pots with the fewest seeds (or converse)
- due to reduced competition between the plants (or converse)
- for limited water/space/nutrients/light

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe how to investigate the effect of planting density on plant growth using five, six or 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 investigate the effect of planting density on plant growth 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 describe how to investigate the effect of planting density on plant growth 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]

- (b) (i) Water [1]
glucose [1] [2]
- (ii) Chloroplast [1]
- (iii) Endothermic [1]

10

4 (a) **B A D C**

- All correct [2]
Any **two** in the correct order [1] [2]

- (b) (i) There are very few individual rooms in hospitals [1]
- (ii) Better hygiene/clean up body fluids immediately [1]

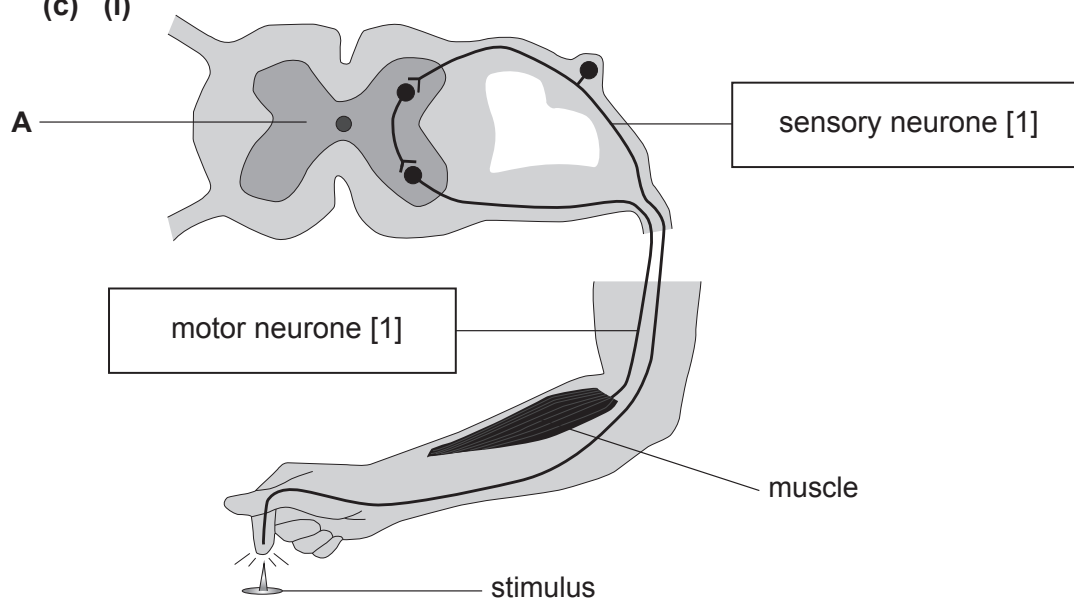
4

AVAILABLE
MARKS

			AVAILABLE MARKS															
5	(a)	Simple cell which has the ability to divide [1] to form cells of the same [1] type [2]	8															
	(b) (i)	Can produce larger quantities in a shorter period of time [1]																
	(ii)	More blood flow to the (heart muscle) cells [1] more glucose/oxygen to the (heart muscle) cells [1] [2]																
	(c)	Lack of exercise/smoking/stress [1]																
	(d)	X Z W Y All correct [2] Any two in the correct order [1] [2]	9															
6	(a) (i)	Any two from: • The heart rate of student 2 increased more than student 1 [1] • the heart rate of student 2 increased faster than student 1 [1] • the heart rate of student 1 levels off but the heart rate of student 2 does not level off [1] [2]																
	(ii)	All points plotted correctly [2] 5 points plotted correctly [1] points joined with straight lines [1] [3]																
	(iii)	135 – 75 = 60 [1] 60 ÷ 5 = 12 [1] [2]																
	(b)	Strengthened heart muscle [1] increased cardiac output when at rest [1] [2]	5															
7	(a) (i)	3 [1]																
	(ii)	<table><tr><td colspan="2"></td><td colspan="2">Poppy</td></tr><tr><td colspan="2"></td><td>t</td><td>t</td></tr><tr><td rowspan="2">Adrian</td><td>T</td><td>Tt</td><td>Tt</td></tr><tr><td>T</td><td>Tt</td><td>Tt</td></tr></table> [1] gametes [1] offspring [2]				Poppy				t	t	Adrian	T	Tt	Tt	T	Tt	Tt
		Poppy																
		t	t															
Adrian	T	Tt	Tt															
	T	Tt	Tt															
	(iii)	100% [1]																
	(b)	Outward appearance/physical expression of the genotype [1]																

- 8 (a) Discontinuous [1]
- (b) Any **two** from:
- dominance of hand has no effect on reaction times in males
 - females have faster reaction times with the dominant hand than the non-dominant hand
 - males have slower reaction times with dominant hand than females with the dominant hand
 - males have faster reaction times with the non-dominant hand than females with the non-dominant hand
- [2]

(c) (i)



(ii) Effector

(iii) Spinal cord

(iv) Synapse

9 (a) 37.2 to 37.4

(b) (i) $37.7 - 37.1 = 0.6$

(ii) Maintain the uterus lining

(c) day 1 to day 5 – (uterus lining) breaks down
day 6 to day 12 – (uterus lining) builds back up again

(d) Contraceptive pill/hormone implant

Total

**AVAILABLE
MARKS**

8

6

60