



**General Certificate of Secondary Education
2022–2023**

**Single Award Science:
Biology**

Unit 1

Higher Tier

[GSA12]

WEDNESDAY 22 FEBRUARY 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)	$32 \times 2 = 64$	[1]	AVAILABLE MARKS
	(ii)	Humans are the most advanced but have fewer chromosome pairs than other species	[1]	
	(b) (i)	DNA	[1]	
	(ii)	Double helix	[1]	
	(iii)	Nucleus	[1]	
	(c) (i)	All bars plotted correctly [2] 3 bars plotted correctly [1]	[2]	
	(ii)	As age increases average number of cases increases (for both males and females) [1] females have a higher average number of cases than males [1]	[2]	
	(d)	Uncontrolled cell division	[1]	
	(e)	UV light	[1]	
				11

2 (a) Indicative content

- record pulse rate at rest
- use the stopwatch to time the period of exercise
- record pulse rate immediately after exercise is finished
- record time taken to return to resting pulse rate
- exercise for the same length of time/do the same type of exercise/same number of skips
- wear sensible trainers/make sure no-one is standing behind you when skipping
- the fitter student's pulse rate recovers the fastest/does not go up as much

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe how you would carry out the investigation using 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 you would carry out the investigation using four or five 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 you would carry out the investigation using one to three 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) Glucose [1]
carbon dioxide [1]

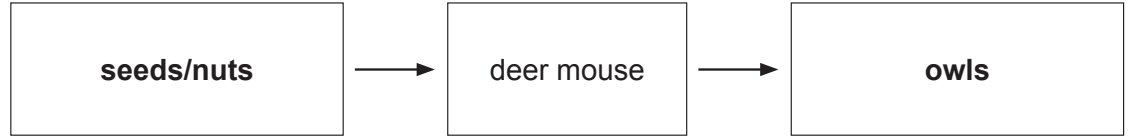
[2]

- (ii) Exothermic

[1]

AVAILABLE
MARKS

9

3	(a) (i) Pancreas [1]	AVAILABLE MARKS
	(ii) Any two from: • converts glucose to glycogen • increased respiration • greater uptake of glucose into cells [2]	
	(b) (i) Repair and build-up of the uterus lining/stimulation of ovulation [1]	
	(ii) Egg released on day 14/ovulation [1] sperm can be alive (on day 14) and fertilisation can occur [1] [2]	6
4	(a) Tissues [1] organs [1] [2]	
	(b) (i) Bone marrow [1] leukaemia is cancer of the blood [1] [2]	
	(ii) Any two from: • transfer of viruses or diseases from other animals • formation of tumours • development of unwanted cell types [2]	
	(c) Can use stem cells to produce large numbers [1] of different types of plants [1] [2]	8
5	(a) (i) Increased [1] camouflaged/can blend in/survive/are not eaten [1] reproduce and pass on their genes to the next generation [1] [3]	
	(ii)	
	 <pre> graph LR A[seeds/nuts] --> B[deer mouse] B --> C[owls] </pre> [1]	
	(b) Sunlight [1] trapped by chloroplasts/chlorophyll [1] [2]	
		6
6	(a) (i) Florey/Chain [1]	
	(ii) Bacteria [1]	
	(iii) Lymphocytes are creating antibodies [1] phagocytes are engulfing clumps of bacteria [1] [2]	

				AVAILABLE MARKS									
(b)	(i)	1000 – 280 = 720 [1] 720/1000 × 100 = 72 [1]	[2]	7									
	(ii)	Any one from: - strict hygiene conditions - isolating patients - not overusing antibiotics	[1]										
7	(a)	(i) <table border="1"><tr><td></td><td>R</td><td>R</td></tr><tr><td>R</td><td>RR</td><td>RR</td></tr><tr><td>r</td><td>Rr</td><td>Rr</td></tr></table> [1] gametes – they can be in either order [1] correct offspring genotypes from cross		R	R	R	RR	RR	r	Rr	Rr	[2]	6
	R	R											
R	RR	RR											
r	Rr	Rr											
	(ii)	Rough coat	[1]										
	(b)	(i) To help people understand the process/help people understand the choices they might have to make	[1]										
		(ii) They might not provide insurance/insurance may be more costly	[1]										
		(iii) Cystic fibrosis/Down's syndrome	[1]										
8	(a)	(i) X at right hand side of box (anywhere from top of right-hand side of box to halfway down right-hand side of box)	[1]	7									
		(ii) Tip of the seedling	[1]										
		(iii) Cells elongate more (in section A) [1] seedling will bend to right [1]	[2]										
	(b)	(i) As the auxin concentration increases the growth of the seedling speeds up and then slows down	[1]										
		(ii) Any two from: - no growth response in shoots at very low auxin concentrations - growth response of shoots speeds up more (than roots) [1] - both roots and shoots growth response increases and then decreases - at higher auxin concentrations the growth response in both the shoots and the roots slows down [1]	[2]										
Total				60									