



General Certificate of Secondary Education
2025

Single Award Science

Unit 4

Booklet B

Higher Tier

[GSA44]

MONDAY 9 JUNE, 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.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

Levels of response

Tasks and questions requiring candidates to respond in extended writing are marked in terms of levels of response. In deciding which level of response to award, examiners should look for the 'best fit' bearing in mind that weakness in one area may be compensated for by strength in another. In deciding which mark within a particular level to award to any response, examiners are expected to use their professional judgement. The following guidance is provided to assist examiners.

- **Threshold performance:** Response which just merits inclusion in the level and should be awarded a mark at or near the bottom of the range.
- **Intermediate performance:** Response which clearly merits inclusion in the level and should be awarded a mark at or near the middle of the range.
- **High performance:** Response which fully satisfies the level description and should be awarded a mark at or near the top of the range.

Quality of written communication

Quality of written communication is taken into account in assessing candidates' responses to all tasks and questions that require them to respond in extended written form. These tasks and questions are marked on the basis of levels of response. The description for each level of response includes reference to the quality of written communication.

For conciseness, quality of written communication is distinguished within levels of response as follows:

Level 1: Quality of written communication is basic.

Level 2: Quality of written communication is good.

Level 3: Quality of written communication is excellent.

In interpreting these level descriptions, examiners should refer to the more detailed guidance provided below:

Level 1 (Basic): The candidate makes only a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

Level 2 (Good): The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning clear.

Level 3 (Excellent): The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a sufficiently high standard to make meaning clear.

Listing

Where one response is required to gain a mark, candidates will not gain credit if a correct response is given alongside one or more incorrect responses. This is referred to as listing.

Section A – Biology

AVAILABLE
MARKS

- 1 (a) Chlorophyll [1]
- (b) Place the plant in a dark cupboard [1] for 48 hours [1] [2]
- (c) 4 2 3 1 [2]
(Any **two** in the correct order [1])

(d)

What is the risk?	What could happen?	How can we prevent this from happening?
ethanol is flammable	ethanol could catch fire	Turn off the Bunsen burner before using ethanol [1]
iodine is a stain	iodine could stain your hands	Use a dropper/wear gloves [1]

[2]

- (e) Inside of leaf shaded (green part) [1]

8

- 2 (a) 18 (°C) [1]
- (b) 18 + 17 [1]
35 (°C) [1] [2]
- (c) There are different starting temperatures [1]
- (d) Crisp [1]
the crisp had a higher temperature **rise** than the other foods [1] [2]
- (e) Bar chart [1]

7

3 (a) Indicative content

- remove a thin piece of onion skin
- so that light can pass through
- place this on a microscope slide
- add iodine/stain
- to make the cells easier to see
- lower the coverslip gently at an angle using forceps
- to avoid getting air bubbles

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe how to prepare a microscope slide using six or more 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 to describe how to prepare a microscope slide using four or five of 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 prepare a microscope slide 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 have made limited use of specialist terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit	[0]

[6]

(b) (i) Makes the cells **appear** four times bigger [1]

(ii) Focus knob [1]

(iii) **A**
plant cells have a cell wall [1]

Section A Total

AVAILABLE
MARKS

9

24

Section B – Chemistry

			AVAILABLE MARKS
4	(a) (i)	Baseline correctly labelled [1]	
	(ii)	The water will dissolve the ink sample [1] and it will move up the filter paper and separate into different colours [1] [2]	
	(iii)	C [1]	
	(iv)	$\frac{3}{6}$ [1] 0.5 [1] [2]	
	(b) (i)	(Simple) distillation [1]	
	(ii)	(Liebig) condenser [1]	9
	(iii)	So the student does not get burnt [1]	
5	(a) (i)	Balance [1]	
	(ii)	Carbon dioxide [1]	6
	(iii)	1.0 (mol/dm ³) [1]	
	(iv)	$\frac{0.5}{40}$ [1] 0.0125 [1] (g/s) [2]	
	(b)	60, 65, 70, 75 and 80 [1]	
6	(a) (i)	All points plotted correctly [2] (3 points plotted correctly [1]) straight line through all points [1] [3]	8
	(ii)	As the concentration of acid increases the time for the calcium to disappear decreases [1]	
	(b)	Any two from: • same volume of acid • same mass of calcium • same temperature of acid [2]	
	(c)	Concentration of acid [1]	
	(d)	To make the results more reliable [1]	
Section B Total			23

Section C – Physics

				AVAILABLE MARKS
7	(a)	66–32 [1] 34°C [1]	[2]	9
	(b)	All bars plotted [2] (3 bars plotted [1]) axis label with temperature /°C [1]	[3]	
	(c)	Matt black shiny black matt white shiny white (any two in the correct order [1])	[2]	
	(d)	Temperature – dependent [1] surface colour – independent [1]	[2]	
8	(a)	$(80.0 + 84.5 + 83.4) = \frac{247.9}{3}$ [1] 82.63333 [1] 82.6 s [1]	[3]	5
	(b)	It was not used when calculating the average	[1]	
	(c)	Copper	[1]	
9	(a) (i)	Stopwatch started when sound made [1] and stopped when echo is heard [1]	[2]	6
	(ii)	$\frac{850}{2.5}$ or $\frac{1700}{5.0}$ [1] 340 (m/s) [1]	[2]	
	(b) (i)	As the air temperature increases the speed of sound increases	[1]	
	(ii)	331 (m/s)	[1]	
10	(a)	To allow the distance to be measured	[1]	3
	(b)	Person Y because their reactions are being tested	[1]	
	(c)	Any value less than 18.6 cm	[1]	
Section C Total				23
Total				70