



Rewarding Learning

**General Certificate of Secondary Education
2024**

**Double Award Science
Biology**

Unit B2

Higher Tier

[GDW42]

TUESDAY 11 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 Double Award Science.

Candidates must:

- AO1** Demonstrate knowledge and understanding of:
- scientific ideas; and
 - scientific techniques and procedures;
- AO2** Apply knowledge and understanding of and develop skills in:
- scientific ideas; and
 - scientific enquiry, techniques and procedures; and
- AO3** Analyse scientific information and ideas to:
- interpret and evaluate;
 - make judgements and draw conclusions; and
 - 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. The exception to this for GCSE Double Award Science is when examiners are marking complex calculations when the Examiners are briefed to mark by error or omission. 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 'carry error through' rule so that candidates are not penalised more than once for a computational error. To avoid a candidate being penalised, marks can be awarded where correct conclusions or inferences are made from their incorrect calculations.

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

In deciding which level of response to award, examiners should look for the number of indicative content points in candidate responses to ensure that the answer has been written to coincide with the question. In deciding which mark within a particular level to award to any response, quality of communication will be assessed and 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.
- ***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 bands of response. The description for each band of response includes reference to the quality of written communication.

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

- Band A: Quality of written communication is excellent.
Band B: Quality of written communication is good.
Band C: Quality of written communication is basic.
Band D: Response not worthy of credit.

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

Band A (Excellent): Excellent reference to scientific terminology. 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.

Band B (Good): Good reference to scientific terminology. 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.

Band C (Basic): Basic reference to scientific terminology. 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.

1 (a) A – penis; B – urethra	[2]	AVAILABLE MARKS 5
(b) C – carries sperm (from the testes); D – adds fluid/semen to the sperm/nourishes sperm	[2]	
(c) allows sperm to swim	[1]	
2 (a) one antibody labelled 	[1]	7
(b) complementary to the shape; of antigen	[2]	
(c) stops spread of microorganisms/prevents reproduction of microorganism	[1]	
(d) phagocyte; engulf/surround; digest	[3]	

3 (a) (i)

List 1

Statement	Description
A	water moved out of the cells in region X into the pure water
B	water moved into the cells in region X from the pure water
C	there is no movement of water between the cells in region X and the other potato cells

List 2

Statement	Explanation
D	because osmosis is the movement of water from a more concentrated solution to a dilute solution
E	because osmosis is the movement of water from a dilute solution to a more concentrated solution
F	because osmosis is the movement of water between two solutions with the same concentration

[2]

- (ii) level of concentrated sugar solution increased/went up;
water moved into the concentrated sugar solution from the potato [2]

- (b) (i) became smaller/shrank;
became smaller/shrank [2]

- (ii) pulls away from the cell wall/moves away from the cell wall [1]

AVAILABLE
MARKS

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- 4 (a) (i) **uncontrolled/abnormal** cell division/mitosis [1]
- (ii) UV light/UV radiation [1]

(b) Indicative content

1. larger nucleus;
2. thicker membrane;
3. larger cells;
4. irregular arrangement;
5. malignant;
6. not encapsulated;
7. spreading (into blood vessels)/travels/moves around the body/tumour cells spread/normal cells do not spread.

Band	Response	Mark
A	Candidates use appropriate terms throughout to give at least five points from the indicative content. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5]–[6]
B	Candidates use appropriate terms throughout to give at least three points from the indicative content. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3]–[4]
C	Candidates use appropriate terms throughout to give at least one point from the indicative content. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

AVAILABLE
MARKS

8

- 5 (a) B;
Any **two** from:
B consumes more units of alcohol than A and C/most units of alcohol;
more than the recommended limit for a week/16 units consumed by B;
binge/all units consumed in one day/all consumed in a short period of time [3]

(b)

Statement	True	False	Can't tell
For men only, the total deaths from all causes is lowest for men who drink one unit of alcohol per day.	✓		
Fewer men than women died from cardiovascular disease .		✓	
Women who drink one unit of alcohol per day have less risk of dying from cardiovascular disease than women who drink no units of alcohol per day.	✓		
The trend for deaths from cardiovascular disease for young women would be the same as for these middle aged women.			✓

[4]

7

- 6 (a) ovaries [1]
- (b) Petri dish [1]
- (c) (i) 16 [1]
- (ii) no fertilisation/egg and sperm might not have fused/zygote may die before it divides [1]
- (d) **lining** of uterus [1]
- (e) formation of different tissues/formation of different cells/cells become specialised [1]
- (f) lack of sperm/sperm without flagella/erectile dysfunction/impotence/cancer;
blocked oviducts/lack of ova/hostile vagina/uterus/lack of hormones/cancer [2]

8

			AVAILABLE MARKS
7	(a) blockage; coronary; respire; glucose; oxygen (either order)	[5]	13
	(b) (i) 72.4/100 or 0.724; × 5762 = 4171.688; equals 4172	[3]	
	(ii) <u>more</u> people on target/ <u>greater</u> percentage people on target/ <u>lower</u> average blood pressure/3% more on target	[1]	
	(iii) <u>not much difference</u> in number of people on target/ <u>percentage</u> people on target/average blood pressure/only a 3% difference in percentage on target (must be different to ii)	[1]	
	(iv) they have other risk factor/named, e.g. obesity/smoking/stress/ high cholesterol/may still have narrowed coronary artery/genetics	[1]	
	(c) (i) stent	[1]	
8	(a) antibiotic	[1]	6
	(b) (i) Northern Ireland	[1]	
	(ii) Wales	[1]	
	(c) take measures/know what is happening/prevent an outbreak/control a spread	[1]	
	(d) (i) helps reduce transmission/spread	[1]	
	(ii) people vulnerable/already ill/immune system is compromised	[1]	
9	(a) Any four from: some (garter) snakes developed a mutation; snakes who were not resistant/not mutated died; resistant/mutated snakes survived/population increased; they reproduced; passed on the gene for resistance (to their offspring)	[4]	5
	(b) newts will not all be eaten/some newts will survive/newts will not become extinct/population of newts increase	[1]	

10	(a)	(i)	entire genetic makeup of an organism/individual	[1]	AVAILABLE MARKS								
		(ii)	restriction	[1]									
		(iii)	sticky ends	[1]									
	(b)	(i)	reproduce/clone	[1]									
		(ii)	they have the human gene	[1]									
	(c)	(i)	protein	[1]									
(ii)		amino acids	[1]	7									
11	(a)	(i)	father	[1]	7								
		(ii)	TT	[1]									
		(iii)	50%/1.1	[1]									
	(b)	(i)	female with Tay Sachs	[1]									
		(ii)	<table border="1"><tr><td></td><td>T</td><td>t</td></tr><tr><td>T</td><td>TT</td><td>Tt</td></tr><tr><td>t</td><td>Tt</td><td>tt</td></tr></table>			T	t	T	TT	Tt	t	Tt	tt
		T	t										
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[1] each correct parent [1] correct cross			[3]										
Total					80								