



Rewarding Learning

General Certificate of Secondary Education

**Double Award Science
Biology**

Unit B1

Higher Tier

[GDW12]

Assessment

**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.

Additional Guidance for use with Double Award (Biology) Mark Schemes

This document aims to provide additional guidance notes to assist teachers with the application of the mark schemes for Double Award Biology. It is not intended to be wholly prescriptive but, rather, to assist with clarifying the mark scheme so that it can be applied consistently and accurately.

1. Symbols and terms used in the mark scheme

Symbol	Explanatory note
;	A semi-colon separates the marks to be awarded, e.g. if there are 2 marks to be awarded, there will be 2 semi-colons – one after each marking point.
/	A solidus gives the acceptable alternatives for a particular mark. Answers separated by a solidus can only be awarded 1 mark.
()	Text inside brackets is not required to gain a mark, it is added to provide context or clarification for the marker.
Bold	Text in bold in the mark scheme is an essential requirement in an answer if the mark is to be awarded.
Allow	This shows where the mark scheme has been expanded with other acceptable answers.
Not allow	An unacceptable response – no mark is to be awarded.
E.C.F.	Error carried forward. This allows candidates to gain credit for answers where an error has been made at some point in a (usually) mathematical answer. It prevents penalising a candidate twice.

2. Spelling

Although we encourage correct spelling of all Biological terms, in most cases, candidates are not penalised for an incorrect spelling as long as the spelling is not of another, similar word and the marker can recognise the correct word. There are a few exceptions to this, however. If two Biological words are very similar markers must ensure that they are used in the correct context. In these papers the notable example is ureter/urethra.

3. Alternative wording

We have not included all the alternatives for common words. Teachers should use their professional judgement to decide if a candidate means the same in his/her response as is noted on the mark scheme, e.g. if the mark scheme states 'increases', markers would award answers such as 'rises'; 'goes up'.

4. Allowing converse responses

We have noted in the mark schemes where the converse response to that asked for in the question, is acceptable. In these cases, marks can only be awarded if the candidate clearly shows that he/she is referring to the converse situation.

For example, a question might ask for the difference in the shape of spongy mesophyll cells compared to palisade mesophyll cells. The correct answer, as per the mark scheme, is rounder/shorter/less rectangular/more irregular. The candidate will gain the mark for writing any one of these words or phrases. However, if the candidate refers to palisade mesophyll cells he/she must state this i.e. '**palisade mesophyll cells** are more rectangular'. In summary, if the candidate does not qualify his/her answer, it is assumed that he/she is referring to the subject of the question (first item/condition etc mentioned in the question).

5. Calculations

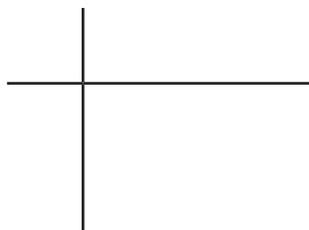
Full marks are always given for a correct answer, even if a candidate does not show any working. If the answer is incorrect then markers will look at any working shown and will award marks as per the guidance in the mark scheme. Note that if the question requires an answer to be given to two decimal places, then the correct rules of rounding up or down will need to be applied in order to gain full marks.

6. Correct responses with incorrect responses

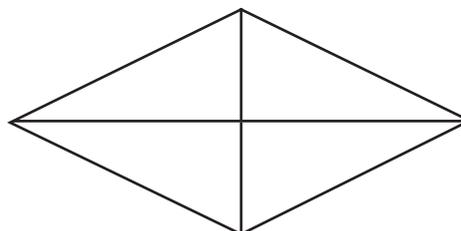
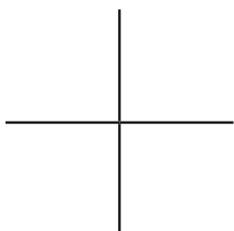
Occasionally, candidates will give you a correct answer and an incorrect answer (e.g. the correct answer is 'increases', candidate writes 'increases or decreases'). In this case, the incorrect answer will cancel out the correct answer and the candidate will be awarded 0 marks.

7. Punnett Squares

Candidates are awarded a mark in genetics questions for knowing how to draw a Punnett square. The minimum acceptable response is shown below where the two lines clearly separate the gametes from the results of the cross.



Candidates will **not** be awarded the mark if the following shapes are drawn for Punnett squares.



8. Guidance for awarding marks on Quality of Written Communication (QWC) questions in DAS Biology

- (a) Mark candidate's work according to the points in the **indicative content and instructions** for the particular question.
- (b) Use the number of indicative content marks obtained to place the candidate into the appropriate marking band, A, B, C or D.
See table below.

Number of indicative marking points given in the candidate's response	Marking band for candidate
5 or 6	A
3 or 4	B
1 or 2	C
0/no response	D

- (c) Consider the Quality of Written Communication of the candidate's response.

The **minimum** requirement for the Quality of Written Communication mark is that the candidate must have **at least one** sentence starting with a capital letter and ending with a full stop.

If Quality of Written Communication mark (QWC) is to be awarded then it will give the candidate the top mark **within the band** they are already in from their indicative content marks.

The QWC mark **does not** take candidate into the next band.

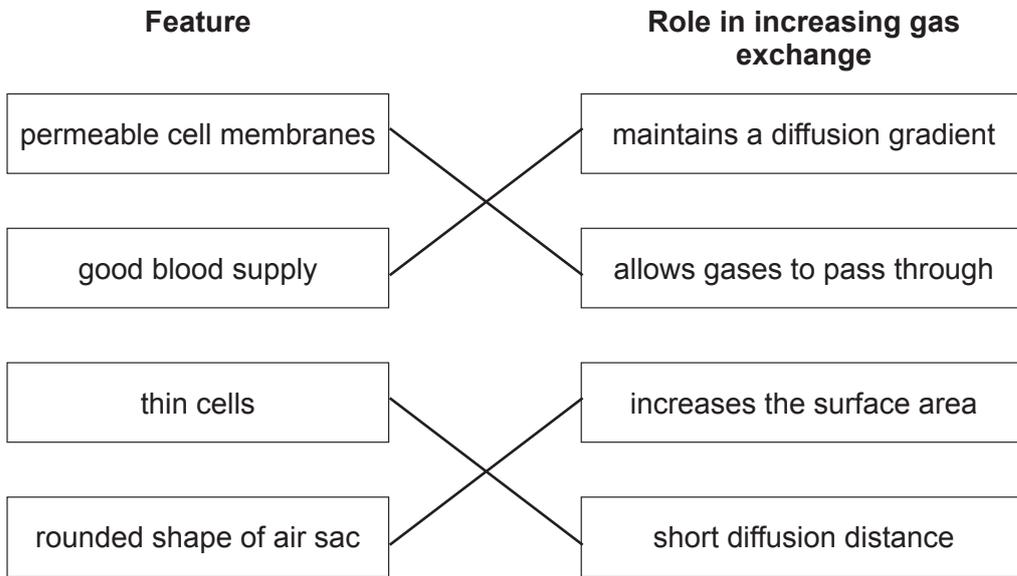
When QWC mark is being awarded:–

Marking band	Number of indicative points	Total mark
A	5 or 6	6
B	3 or 4	4
C	1 or 2	2
D	0/no response	0

When QWC mark is not being awarded:–

Marking band	Number of indicative points	Total mark
A	5 or 6	5
B	3 or 4	3
C	1 or 2	1
D	0/no response	0

1 (a)



3/4 correct = [3] marks

2 correct = [2] marks

1 correct = [1] mark

Must have only one line from each feature. If there are two lines from a feature do not award the mark unless one line has been scored out

[3]

(b) (i) stomata/stoma;

[1]

(ii) (the stomata) allow diffusion/movement of gases/CO₂ or O₂;

[1]

(c) (i) get less light/are further from the leaf surface/are lower in the leaf/
/most of the light has already been absorbed;

[1]

(ii) rounder/not rectangular/shorter/irregular;
allow converse – see explanatory notes

[1]

AVAILABLE
MARKS

7

2 (a) Indicative content

Name the substrates and products of the enzymes protease and lipase:
 protein; – must be in this order unless protein stated as substrate and amino acids as product
 amino acids;
 lipids/fats; – must be in this order unless lipids/fats stated as substrate and fatty acids and glycerol as products
 fatty acids and glycerol; – need both fatty acids and glycerol

Describe the lock and key model of enzyme action:
 enzyme and substrate are complementary;
 enzyme is the lock and substrate is the key;
 term active site correctly described or used;

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 or four 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 one or two points 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]

(b) Any **two** from:

pH;
 temperature;
 enzyme concentration;
 substrate concentration;

[2]

AVAILABLE
MARKS

8

			AVAILABLE MARKS	
3	(a) (i)	4;	[1]	
	(ii)	mice; foxes, pine martens and crows; – any order but must have all three	[2]	
	(iii)	decreases; Any two from: less insects; less mice; less food; (for pine martens/insects/mice) Alternative answer: no change in number of pine martens; insects eat more grass; mice eat the same number of insects;	[3]	
	(iv)	foxes/crows;	[1]	
(b)	(i)	(1285 – 1114 =) 171; 171 ÷ 1285 × 100; 13.31; 13.3/13.30 = 2 marks correct answer with no working shown = 3 marks	[3]	
	(ii)	Any two from: competition for/lack of – food/insects/shoots and buds/blaeberry; competition for/lack of – mates; competition for/lack of /loss of – habitat /nest sites; disease; more predation/more predators/more crows/more foxes	[2]	12
4	(a) (i)	auxin;	[1]	
	(ii)	(shoot) tip;	[1]	
	(b)	Any three from: auxin/hormone moves/diffuses into agar block; auxin/ hormone moves/diffuses into shoot from agar block; even/equal distribution of auxin/hormone; even/equal cell elongation on both sides of plant shoot;	[3]	5

			AVAILABLE MARKS	
5	(a) (i)	receptor; CNS/brain and spinal cord; effector/muscles/glands;	[3]	8
	(ii)	motor (neurone);	[1]	
	(b)	synapse;	[1]	
	(c)	diameter/thickness of neurone; whether the neuron is covered or not;	[2]	
	(d)	slower (in hormonal)/faster in nervous system ;	[1]	
6	(a) (i)	A – pelvis; B – cortex; C – medulla;	[3]	8
	(ii)	ureters/ureter; urethra; – in this order – spellings must be correct	[2]	
	(b)	decreases; increases; decreases; – in this order	[3]	
7	(a)	A – nitrogen fixing; B – decay/decomposing; C – denitrifying; If candidates write the processes instead of the bacteria then minus a maximum of one mark.	[3]	7
	(b)	anaerobic/no oxygen/waterlogged;	[1]	
	(c) (i)	feeding/eating/ingestion;	[1]	
	(ii)	proteins/amino acids;	[1]	
	(d)	excretion/urination/egestion/defecation;	[1]	
8	(a)	increasing; yeast cells are reproducing/multiplying/dividing/have glucose;	[2]	9
	(b)	start at 5; decreases immediately at the start; must decrease over four hours;	[3]	
	(c)	at start – red; – allow yellow after 4 hours – yellow;	[2]	
	(d)	lactic acid/lactate; alcohol/ethanol/carbon dioxide/CO ₂ ; – not allow carbon monoxide/CO	[2]	

- 9 (a) photosynthesis and respiration; respiration; [2]
- (b) $2.8 + 1.6$;
= 4.4; correct answer (4.4) with no working out shown = 2 marks [2]
- (c) (i) 20°C ; [1]
- (ii) most photosynthesis/biggest difference in CO_2 taken in compared to released/biggest difference between photosynthesis and respiration; [1]

Total

AVAILABLE MARKS
6
70