Rewarding Learning

General Certificate of Secondary Education
2021–2022

Double Award Science
Biology

Unit B1

Higher Tier

[GDW12]

TUESDAY 17 MAY 2022, 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.

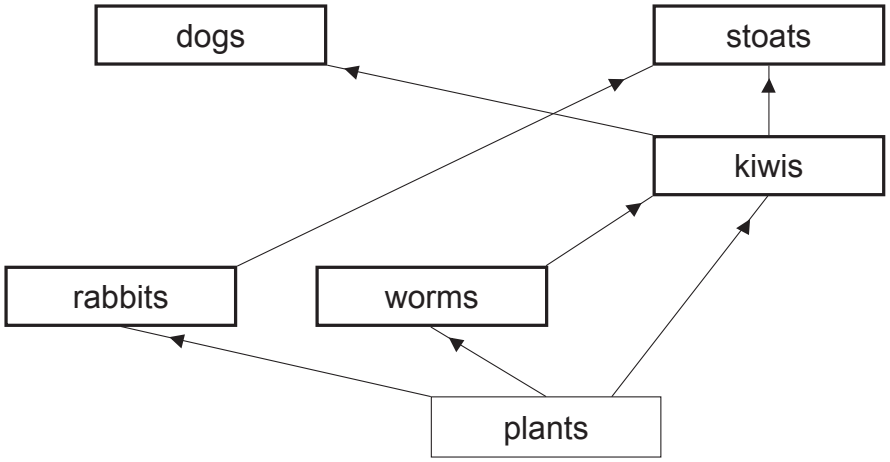
Band C (Basic): Basic reference to scientific terminology. The candidate makes only a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and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

COVID-19 Context

Given the unprecedented circumstances presented by the COVID-19 public health crisis, senior examiners, under the instruction of CCEA awarding organisation, are required to train assistant examiners to apply the mark scheme in case of disrupted learning and lost teaching time. The interpretation and intended application of the mark scheme for this examination series will be communicated through the standardising meeting by the Chief or Principal Examiner and will be monitored through the supervision period. This paragraph will apply to examination series in 2021–2022 only.

AVAILABLE MARKS

1 **(a)**



rabbits and worms; (rabbits on LHS)
kiwis on right hand side;
dogs and stoats at the top; (dogs on LHS)
arrows going up (6 or 7 arrowheads) [4]

(b) **(i)** 70 000/100 000 × 100;
equals 70%;
100 – 70 = 30 [3]

(ii) kill/poison/trap/reduce predators or named, e.g. take more care when you see a road sign/breeding programmes/breed more kiwis [1]

(iii) 70 000;
(0.5/100 × 70 000) = 350;
70 000 – 350 = 69 650; [3] 11

2 **(a)** **insulin** binds to **receptors**;
absorption of glucose into liver;
correct reference to number(s) of glucose molecules/some glucose molecules move in/glucose in blood decreases; [3]

(b) more glucose is converted to glycogen;
more respiration; [2] 5

3 (a) (i)

Statement	True	False	Can't tell
The **mass** of the bags was the same at the start of the investigation.		✓	
The rate of decomposition of the leaf discs is **slowest** in the bag with the small mesh size.	✓		
The rate of decomposition of the leaf discs in the bag with the medium mesh size is faster in the first two months than in the next four months.		✓	
Leaf discs of the same mass from a different plant would decompose faster.			✓

[1] each row (with only one tick in each row) [4]

(ii) more (micro)organisms can get through/more oxygen available [1]

(b) (i) bacteria; fungi;
either order [1] each [2]

(ii) saprophytic/extracellular [1]

AVAILABLE MARKS

8

AVAILABLE MARKS

4 Indicative content

one correct statement is enough for each mark

1. (A plant cell has) a cell wall made of **cellulose**
2. (A plant cell has) chloroplasts
3. (A plant cell has) a nucleus
4. (A plant cell has) a nuclear membrane
5. (A plant cell has) (linear) chromosomes/(a plant cell) does not have a circular chromosome/a plasmid/loops of DNA
6. (A plant cell has) a vacuole
7. (A plant cell has) mitochondria
8. (A plant cell does not have) a flagellum

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. 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] 6

5 (a) (i) dust [1]

(ii) receptors [1]

(b) (i) sensory;
motor [2]

(ii) glands [1] 5

					AVAILABLE MARKS
6	**(a)**	**(i)**	D	[1]	
		(ii)	C; and B; either order	[2]	
		(iii)	lipase/protease	[1]	
	(b)	**(i)**	ES complex correctly drawn in second box; only E drawn in third box	[2]	
		(ii)	substrates combine/join	[1]	7

AVAILABLE MARKS

7 (a) Table 1

Substance or organism	Present (✓) or not present (✗)
yeast	✓
glucose	✓
oxygen	✗
carbon dioxide	✗
alcohol	✗

yeast ✓;
oxygen ✗;
carbon dioxide and alcohol both ✗s; [3]

(b) (i) Table 2

Substance or organism	After four hours		
	Decreases	Stays the same	Increases
yeast			✓
glucose	✓		
oxygen		✓	
carbon dioxide			✓
alcohol			✓

yeast increases;
oxygen stays the same;
carbon dioxide increases;
alcohol increases;
[1] mark each [4]

(ii) glucose is used;
to release energy/respiration [2]

(c) yellow [1] 10

					AVAILABLE MARKS
8	**(a)**	**(i)**	decay/decomposition	[1]	
		(ii)	nitrifying (bacteria)	[1]	
	(b)	**(i)**	active transport/active uptake	[1]	
		(ii)	root hair cell	[1]	
	(c)		denitrifying (bacteria)	[1]	
	(d)	**(i)**	(41 × 9146 equals) 374 986	[1]	
		(ii)	eutrophication	[1]	
		(iii)	do not add fertiliser during the winter/closed season or add less fertiliser/test for soil nutrient content before adding fertiliser/only add the recommended levels of fertiliser/don't add during rain or when frost is forecast/only add when plants are growing/use organic fertiliser/do not apply fertiliser near river/plough fields/drainage of fields	[1]	8
9	**(a)**	**(i)**	begin at same level as plateau on right hand side of graph and continue until 4 am; must cross at 6 am; line increasing;	[3]	
		(ii)	carbon dioxide taken in is same as carbon dioxide given out/no change in carbon dioxide; rate of photosynthesis is same as rate of respiration;	[2]	
	(b)		sun down/sun setting/less light; CO_2 is increasing or comparison: respiration is greater than photosynthesis (need to mention both processes linked as a comparison in 1 sentence)	[3]	
	(c)		less growth/photosynthesis occurs for less time.	[2]	10
				Total	**70**