



**General Certificate of Secondary Education
2018–2019**

**Double Award Science
Biology**

Unit B1

Higher Tier

[GDW12]

TUESDAY 14 MAY 2019, AFTERNOON

**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

Adaptation

Part of the leaf

Layer with **no cells** that is transparent to allow light through

Palisade mesophyll

Area that allows diffusion of gases throughout the leaf

Spongy mesophyll

Layer with tightly packed cells containing the most chloroplasts for **maximum** photosynthesis

Intercellular air space

Layer with cells that carry out some photosynthesis and have a large surface for gas exchange

Waxy cuticle

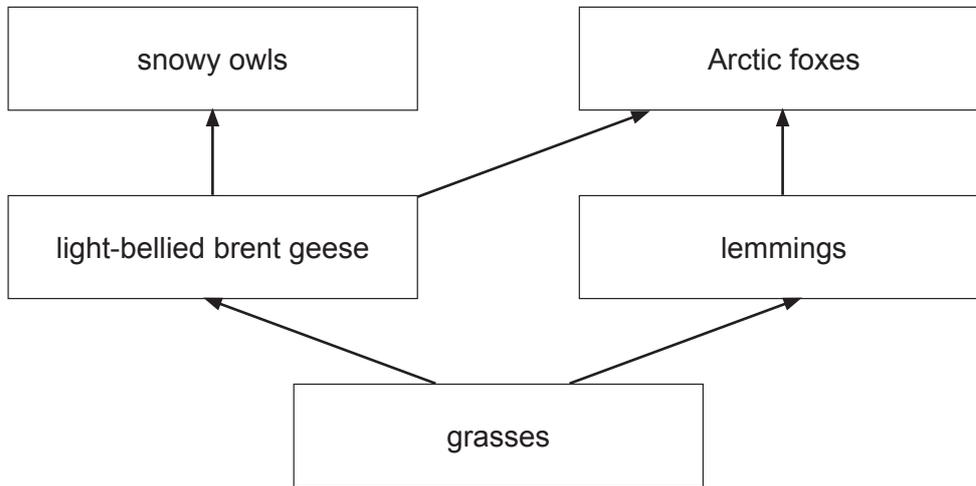
3/4 correct = [3] marks
 2 correct = [2] marks
 1 correct = [1] mark

[3]

AVAILABLE MARKS

3

2 (a)



- grasses in bottom box;
- lemmings (middle level);
- owls and Arctic foxes; on top level (either box)
- two arrows (one at each trophic level)

[4]

(b) Any **two** from:

- lack of grass/lack of food
- disease
- predation (by foxes/owls)/numbers of foxes/owls
- competition for food (grass)/mates

[2]

(c) decrease in geese;
because foxes will eat more geese
or increase in geese;
more grass/food for geese

[2]

(d) $22500 \div 75 \times 100$;
= 30000

[2]

10

3 (a) contains amylase/carbohydrase;
breaks down starch/turns starch into glucose or sugar/no starch present

[2]

(b) enzyme/amylase not optimum pH in acid/enzyme does not work/enzyme denatured/enzyme could not react/shape of active site is changed;
starch not broken down/starch is present

[2]

(c) Any **three** from:

- boiling denatures the enzyme/amylase;
- enzyme/amylase does not fit with the enzyme/active site of enzyme;
- no successful collisions with the starch/no E-S complexes formed;
- lock and key model
- active site changed/shape of enzyme changed

[3]

(d) (i) contains amylase/carbohydrase

[1]

(ii) starch broken down;
to glucose/sugar

[2]

10

4 (a) Indicative content

- osmoregulation;

Then any **four** from:

Gained:

- take in food/drink;
- respiration;

Lost:

- sweat/perspiration;
- breathing/exhaling/evaporation from the lungs;
- urine production/urination/excretion/faeces/defecation;

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) ADH;

kidney reabsorbs more water (into blood);

reduces the volume of urine production/concentrated urine produced [2]

8

5 (a) tip [1]

(b) (i) arrow coming towards A from the left-hand side [1]

(ii) **more** auxin on the shaded side/20 more auxin on the shaded side/
auxin moves to the shaded side [1]

(c) cell longer;
all parts copied correctly [2]

(d) (i) shoot bent towards the light/to left-hand side [1]

(ii) cells become longer/elongated on the shaded side/differential cell
elongation. [1]

7

			AVAILABLE MARKS	
6	(a)	liver	[1]	
	(b)	exercise/activity/eat less sugary foods/less carbohydrates/more complex carbohydrates	[1]	
	(c)	8 – 5.4 (mmolL ⁻¹); 2.6 (mmolL ⁻¹)	[2]	
	(d)	(i) Any two from: <ul style="list-style-type: none"> • glucose falls below normal/5 mmol; • then increases/goes back up; • after 90 minutes/after 4 mmol/4 to 5.6 mmol/after 90 to 140 minutes 	[2]	
		(ii) Any two from: convert glycogen to glucose/breaks down glycogen to glucose; decreases respiration/less or slower respiration; decreases the uptake of glucose in the liver	[2]	8
7	(a)	(i) Any three from: <ul style="list-style-type: none"> • more root nodules; • (more) nitrogen-fixing bacteria; • convert nitrogen into nitrates (must have correct bacteria to get this mark); • (more) proteins/amino acids 	[3]	
		(ii) sugar/glucose/carbohydrate	[1]	
	(b)	(i) lack of competition/no competition for space/nitrates/water	[1]	
		(ii) saprophytic	[1]	
		(iii) nitrifying bacteria; (turn ammonia) into nitrates	[2]	
8	(a)	increases/algae grow/algal bloom/low to high algae; due to increase in nitrates/nitrates caused growth/nitrates low to high	[2]	
	(b)	Description: increased and decreased; Any two from: <ul style="list-style-type: none"> • (increase bacteria) more decomposition of algae; • (decrease bacteria) less algae therefore less decomposition; • bacteria breakdown/decompose/decay algae/plants 	[3]	
	(c)	Description: biodiversity decreases/less biodiversity Explanation: Any two from: <ul style="list-style-type: none"> • the bacteria use up the oxygen; • in respiration; • the fish and animals suffocate/not enough oxygen 	[3]	
	(d)	eutrophication	[1]	

- 9 (a) Photosynthesis occurs;
only plants/no fish present/fish in A + C;
more photosynthesis than respiration (on its own) [2]
- (b) more fish/4 fish/(need this for second mark);
(more) respiration/respiration/more respiration than photosynthesis
- (c) red;
no change in carbon dioxide/normal atmospheric carbon dioxide/
no respiration and no photosynthesis/CO₂ not added or taken away

[3]

[2]

[2]

Total

AVAILABLE
MARKS

7

70