

New
Specification



General Certificate of Secondary Education
2018–2019

**Double Award Science
Biology**

Unit B1

Higher Tier

[GDW12]

WEDNESDAY 7 NOVEMBER 2018, 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.

		AVAILABLE MARKS
1	(a) Leatherback turtles numbers decrease	[1]
	(b) (i) Line extrapolated from 2015–2016 trend to 2021 or 2020 on x-axis straight line, must go to x-axis	[1]
	(ii) 2021/2022	[1]
	(c) Eutrophication/water pollution/hunting or taking eggs/breaking eggs/human activity described Caught in fishing nets/poaching/beach tourism/plastic litter/straws/jet skis/killed by humans	[1]
	(d) Temperature/water quality/beach erosion/pH/too windy to reach the beach/flooding of nests/flooding washes eggs away	[1]
	(e) Any two from: • food • territory/land/space/beaches/sand/place to lay eggs/spots on the beaches • mates/partners	[2]
2	(a) (i) Iodine (solution); Blue-Black	[2]
	(ii) Benedict's; Brick red	[2]
	(b) (i) Glucose content rises/increases	[1]
	(ii) Any two from: The starch is broken down; to glucose; by amylase	[2]
	(c) Any three from: Low temperature	
	• Enzymes have low activity do not work well at low temperature or at 4°C or at less than optimum temperature or at room temperature or low rate of reaction;	converse for higher temperature
	• Enzymes have less kinetic energy at low temperature or at 4°C or at room temperature or at less than optimum temperature;	converse for higher temperature
	• There are less collisions/fewer collisions/less ES complexes at low temperature or 4°C or room temperature or at less than optimum temperature;	converse for higher temperature
	• Starch/insoluble molecules will be broken down slower at low temperature or 4°C or room temperature or at less than optimum temperature;	converse for higher temperature
		7

- Less glucose/less product formed/product formed slower at low temperature or 4°C or room temperature or at less than optimum temperature; converse for higher temperature
 - Lock and key mentioned. [3] 10
- 3 (a)** Plant (nectar) → Honeybees → Asian hornet [1] mark for arrows, [1] mark for organisms [2]
- (b) (i)** $6000 \times 50 = 300\,000$ honeybees [1]
- (ii)** $60\,000 \times 10 = 600\,000$ honeybees;
 $600\,000/300\,000 = 2$ days
 2 days = [2] mark provided 300 000 above in **(i)**
 20 days = [2] of 30 000 in pt **(i)** ECF [2]
- (c)** Stop them spreading to other areas/stop them killing bees/stop bees becoming extinct [1] 6

4 Indicative content

Type 1 and type 2;
 Insulin not produced in type 1;
 Less insulin produced in type 2
 insulin not working/described
 Insulin injections for type 1;
 Type 2 controlled by diet/balanced diet;
 Exercise/activity or named activity;
 Insulin injections later for Type 2.

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout using at least 5 of the above points to describe the differences between the two types of diabetes. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Candidates must use some appropriate specialist terms using 3 or 4 of the above points to describe the differences between the two types of diabetes. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates must use 1 or 2 of the above points to describe the differences between the two types of diabetes. They use limited spelling, punctuation and grammar and little use of specialist terms.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

6

		AVAILABLE MARKS
5	(a) Pin/needle/nail	[1]
	(b) A – association/relay/connector/intermediate B – motor	[2]
	(c) Arrow down on association neurone (A) or beside A	[1]
	(d) Muscle	[1]
	(e) Brain	[1]
		6
6	(a) Light/light intensity/low light intensity	[1]
	(b) Carbon dioxide	[1]
	(c) Initial gradient same as other lines; Levels off below A	[2]
		4
7	(a) A: decay/decomposition/death B: nitrification C: nitrogen fixation	[3]
	(b) Explain: Any three from: <ul style="list-style-type: none"> • less nitrogen fixation; less nitrogen gas to nitrate • less nitrification; less ammonia to nitrate • more denitrification; more nitrate to nitrogen gas • N-fixing are aerobic; nitrifying bacteria are aerobic; • denitrifying bacteria are anaerobic 	[3]
	(c) Description: decreases	[1]
	Explain: Any two from: <ul style="list-style-type: none"> • less respiration/less energy • active uptake/active transport; less nitrates taken up against concentration gradient/less nitrate taken up from low to high conc. 	[2]
	(d) (i) Bacteria/fungi	[1]
	(ii) Description: less;	[1]
	plants die; due to shading/nitrate depletion	
	or animals die; due to suffocation/or lack of O ₂ because bacteria have used up oxygen organisms die/aquatic life dies	
	[1]	[2]
		13

		AVAILABLE MARKS
8	(a) Osmoregulation	[1]
	(b) (i) $\frac{1.35}{180} \times 100 = 0.75\%$	[2]
	(ii) Reabsorbed; into blood/lost in sweating or breathing;	[2]
	(c) (i) ADH/antidiuretic hormone	[1]
	(ii) Increases water reabsorption/more H ₂ O (re)absorbed	[1]
	(d) (i) Auxin	[1]
	(ii) Tip	[1]
	(iii) Auxin moves to the shaded side/away from light/more auxin on dark side; more cell elongation	[2]
9	(a) A = Dark/no light; C = Bright light/strong light	[2]
	(b) More photosynthesis than respiration; less carbon dioxide;	[2]
	(c) (i) B	[1]
	(ii) Rate of photosynthesis equals rate of respiration; no change in CO ₂ level;	[2]
Total		70
		11
		7