



Rewarding Learning

**General Certificate of Secondary Education
2013–2014**

Double Award Science: Biology

Unit B1

Higher Tier

[GSD12]

WEDNESDAY 13 NOVEMBER 2013, AFTERNOON

**MARK
SCHEME**

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

		AVAILABLE MARKS
1	(a) No starch present/iodine does not test for protein/only tests for starch/	[1]
	(b) Starch is completely broken down in tube A/no starch in A; 30 °C is correct temperature for amylase to function; Starch is <i>not</i> broken down/remains in tube C/incompletely broken down; Amylase denatured/destroyed/shape damaged in tube C	[4]
	(c) Lock and key	[1]
2	(a) (i) Leaf placed in <i>boiling</i> water; to kill leaf/stop reactions/stop photosynthesis	[2]
	(ii) Remove chlorophyll/decolourise leaf	[1]
	(iii) Plant had been in light/had photosynthesised	[1]
	(b) (i) oxygen/O ₂	[1]
	(ii) Any two from: <ul style="list-style-type: none"> • Light no longer limits the rate of photosynthesis; • some other factor limiting e.g. carbon dioxide or temperature now limits the rate 	[2]
	(iii) Repeat measurements (at each light intensity)	[1]
	(iv) Equilibrate/acclimatise/adjust to the light intensity/allow bubbles to be produced at steady rate/adapt to light/conditions	[1]
	(c) Any two from: <ul style="list-style-type: none"> • carbon dioxide limits photosynthesis • carbon dioxide leaks in at windows/door edges/more carbon dioxide so more photosynthesis at the edge • more light 	[2]
		6
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3 Indicative content

- Q • Place quadrats (in the grassland)
- S • Randomly/use coordinates or two tape measures set at right angles
- I • Identify the plant species
- K • Use key/plant identification book
- C • Count the number of plant *species* in quadrat
- R • Record/write down results (in the field)
- A • Divide total number of species in all quadrats by number of quadrats
- RQ • Repeat several times

Response	Mark
Candidates must use appropriate specialist terms throughout using at least five of the above points to describe how they would carry out this grassland survey. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5–6]
Candidates must use some appropriate specialist terms throughout using three or four of the above points to describe how they would carry out the grassland survey. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3–4]
Candidates describe how the grassland survey is carried out using one or two of the above points. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1–2]
Response not worthy of credit	[0]

[6]

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AVAILABLE
MARKS

- 4 (a) (i) Eight [1]
- (ii) 2 trends from – no species near city centre;
 – steady increase in number of species;
 – plateau;
 1 data – no species up to 3 km
 – 1 species at 4–5 km;
 – Max 13 species recorded;
 – Increase between 5–10 km
 – No increase between 10–12 km [3]
- (b) 50 [1]
- (c) Shrubby lichens;
 Explanation: are found where sulfur dioxide levels are low/are present far from city centre/after 7–8 km from city centre [2]
- (d) Crusty [1]
- (e) (i) Less coal being burned/less burning of fossil fuels
 scrubbers/filters remove sulfur/desulfurisation
 use of renewable sources/electric cars [1]
- (ii) Some sulfur dioxide remains there/it takes these types some time to recolonise the city centres/they are very small in size and are not seen/recorded/sulfur dioxide levels still too high in city centres [1]
- (f) Any two from:
 • Algae cannot photosynthesise
 • No glucose/starch made
 • No substrate for respiration [2]
- (g) To know if *targets* for reduction are being met/to control level to that below where human health is affected/can plan for a reduction [1]
- (h) Shows effect over time/less equipment needed/low cost method [1]

AVAILABLE
MARKS

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		AVAILABLE MARKS
5 (a)	Small intestine/ileum	[1]
(b)	Any three from: <ul style="list-style-type: none">• Finger-like shape/large surface area/microvilli/• Single layer of cells in wall/thin walls/wall one cell thick/short diffusion distance• Capillary network/good blood supply• Lacteal• Continually moving• Permeable	[3]
(c)	Any two from: <ul style="list-style-type: none">• Acts in the <i>liver</i>• Converts glucose to <i>glycogen</i>• <i>Increased respiration</i> of glucose	[2]
(d)	Glucose; Lactic acid/lactate	[2]
		8

- 6 (a) (i) Any three from:
- more oxygen;
 - Used for respiration/energy release;
 - to move minerals/nitrates against conc. gradient
- [3]
- (ii) Any two from:
- FYM has slow release of nutrients
 - Nutrients less likely to be leached/less likely to cause eutrophication
 - Improved drainage
 - Costs less/waste product from livestock
- [2]
- (b) (i) A – nitrification
C – eating/ingestion/feeding/consumption
- [2]
- (ii) Increase in denitrification (process B)
converts nitrate to nitrogen gas;
or less nitrification; less ammonia to nitrates;
or less nitrogen-fixation; less N₂ to nitrates/ammonia
- [2]
- (c) **Indicative content**
- G • Nitrates cause excess growth of aquatic plants/algae/algal blooms
- D • These plants/algae eventually die
- DC • Plants/algae are decomposed
- B • By bacteria/microbes/fungi
- O • Bacteria use up oxygen
- A • So fish and invertebrates die
- S • Biodiversity decreases/fewer species

Response	Mark
Candidates must use appropriate specialist terms throughout using at least five of the above points to describe how nitrate impacts on the biodiversity of a lake. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5–6]
Candidates must use some appropriate specialist terms throughout using three or four of the above points to describe how nitrate impacts on the biodiversity of a lake. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3–4]
Candidates describe how nitrate affects biodiversity in a lake using one or two of the above points. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1–2]
Response not worthy of credit	[0]

[6]

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7 (a) All the living organisms/community; Together with the non-living (abiotic) environment;	[2]	AVAILABLE MARKS
(b) Any two from: <ul style="list-style-type: none"> • Some light is reflected • Some light passes straight through cell • No chloroplasts in the vacuole/few chloroplasts/spaces between chloroplasts 	[2]	
(c) (i) Decomposers/bacteria/fungi	[1]	
(ii) $3500 - 300 = 3200$; $3200/3500; \times 100 = 91.4\% = 91\%$	[3]	
(iii) Any two from: <ul style="list-style-type: none"> • (Energy loss) as heat/from respiration • (Energy loss) as faeces/urine/waste/excretion/egestion • (Energy loss) in movement • Not all is eaten e.g. bones/hair • Reproduction 	[2]	10
Total		70