



*Rewarding Learning*

**General Certificate of Secondary Education  
2015–2016**

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**Double Award Science: Biology**

Unit B1

Higher Tier

**[GSD12]**

**WEDNESDAY 11 NOVEMBER 2015, MORNING**

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**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.

1 (a)

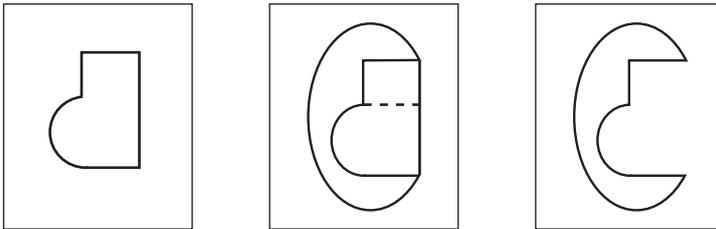
Enzyme	Substrate	Product
amylase		
	protein	amino acids
	lipid/fat/oil	

[4]

(b) temperature/pH/concentration (any two)

[2]

(c)



[1] mark each diagram

[3]

(d) villi; folds; long; microvilli any three [1] mark each

[3]

12

2 (a) predators/lions/disease/lack of food

[1]

(b) protection/so lions can't get near babies

[1]

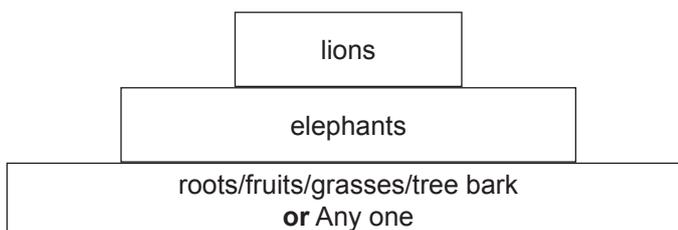
(c) reliability/confirm findings/compare findings

[1]

(d) (i) roots/fruits/grasses/tree bark → elephants → lions  
[1] for arrows

[2]

(ii)



[1] mark shape with 3 levels; [1] mark correct organisms

[2]

(e) (i) decrease in population/extinct/die out

[1]

(ii) 6% from graph;  
 $350 \times 6/100 = 21$  thousand  
 **$350 + 21 = 371$  thousand**

[3]

(iii) no account of deaths/still being hunted/death rate increasing

[1]

12

## 3 (a) Indicative content

- blue to clear/blue to pink/blue to colourless
  - same concentration of DCPIP
  - same volume of DCPIP/amount of DCPIP
  - drops of same volume
  - same amount of shaking or mixing
  - same temperature
  - fruit juice Y
  - fewest drops (of fruit juice) needed to change colour
- } max. 3 marks for variables  
 $V_1 V_2 V_3$

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 1 or 2 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) 10 and 20:  
0.5

[2]

8

## 4 (a) carbon dioxide

[1]

- (b) (i) graph  
[1] mark axes correct way around – y axis = vol and x axis = time and labelled  
[1] mark for scales  
[1] mark for 6 points plotted correctly  
[1] mark line graph

[4]

- (ii) 30 – 40 minutes

[1]

- (iii) volume stays the same/doesn't rise/stays at 20 cm<sup>3</sup>;  
no (anaerobic) respiration takes place/no carbon dioxide produced

[2]

## (c) lactic acid/lactate

[1]

9

		AVAILABLE MARKS									
5	(a) (i) presence of covering/covering; thick fibre/increase thickness/thicker fibre	[2]									
	(ii) 80	[1]									
	(b) (i) brain and spinal cord (need both)	[1]									
	(ii) coordination/control; between receptors and effectors/muscles	[2]									
6	(a) (i) bacteria increase (C to D); algae died; <b>bacteria</b> decompose algae/breakdown algae; bacteria decrease (D to E); less algae left/nothing to decompose; bacteria decrease (C to E) maximum [2] marks for descriptions	[5]									
	(ii) fish suffocate/no oxygen for fish/they can't respire; <b>bacteria</b> use up the oxygen	[2]									
	(b) (i)										
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Indicator species</th> <th style="width: 33%;">Time A</th> <th style="width: 33%;">Time D</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Mayfly nymph</td> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td style="text-align: center;">Bloodworm</td> <td></td> <td style="text-align: center;">✓</td> </tr> </tbody> </table>	Indicator species	Time A	Time D	Mayfly nymph	✓		Bloodworm		✓	
Indicator species	Time A	Time D									
Mayfly nymph	✓										
Bloodworm		✓									
	Both for [1] mark	[1]									
	(ii) Any <b>two</b> from: <ul style="list-style-type: none"> <li>• less light/less photosynthesis/less sunlight</li> <li>• colder/frozen/lower temperature</li> <li>• more dilution/more rain</li> </ul>	[2]									
7	(a) experiment 1 – straight up; experiment 2 – all bends to right; bigger for both expt 1 & 2; experiment 3 – straight with same size	[4]									
	(b) no auxin (produced); no (cell) elongation	[2]									
		6									

## 8 (a) 6 points

- nitrate increase from 0–3 months/nitrate levels high at 3 months
- initially decay **bacteria** break down the material from burning/  
decomposer bacteria (must have bacteria/fungi)
- produce ammonia (linked to trees or decomposing bacteria)
- nitrifying bacteria/nitrification;
- turn ammonia into nitrates
- nitrates fixing bacteria turn nitrogen gas into nitrates
  
- nitrates then decrease from 3 to 20 months/nitrates go from 200 to 50
- nitrate levels have decreased by harvesting/at harvest
- crops take up nitrates/nitrates stay in crop
- each successive crop takes up less nitrates/nitrate reduced by a  
smaller amount each time
- crops use nitrates to make proteins [6]

(b) not enough nitrates left in soil/each successive crop growing less well/  
nitrate too low [1]

**Total**

AVAILABLE  
MARKS

7

**70**