



**General Certificate of Secondary Education  
2017–2018**

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**Science: Single Award**

Unit 1 (Biology)

Higher Tier

**[GSS12]**

**WEDNESDAY 7 NOVEMBER 2018, 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) Increasing levels of CO<sub>2</sub> in the atmosphere [1]  
forms a barrier in atmosphere/forms a greenhouse layer [1]  
more heat trapped/more heat reflected back to Earth [1] [3]
- (b) More fossil fuels/petrol/diesel burned [1]  
deforestation [1] [2]
- (c) (i) Non-living factors [1]
- (ii) If size of ice field is decreasing then global warming is increasing [1]

- 2 (a) Recessive trait only shows if there are 2 copies of the recessive alleles/  
does not show if there is one dominant and one recessive allele [1]

(b) (i)

	A	
	AA	Aa
a	Aa	aa

[1] mark for gametes  
[1] mark for offspring [2]

- (ii) aa (2 small letters) [1]
- (iii) 75%/3:1/ $\frac{3}{4}$  [1]

- 3 (a) (i) It outcompetes other (native) species/it was brought from another  
country/reproduces rapidly/not native. [1]
- (ii) Extinction is the loss of all members of that species/none of the  
species are left alive [1]
- (b) (i) Poison kills foxes but leaves the native animals alive [1]
- (ii) Dingos may kill farm animals such as lambs and calves [1]  
fences exclude foxes without harming farm animals [1] [2]

AVAILABLE MARKS
7
5
5

- 4 (a) Water [1]  
carbon dioxide [1]  
oxygen [1] [3]
- (b) Produces oxygen/food [1]
- (c) **Indicative content**
- place leaf in boiling water
  - remove and place it in a test tube of ethanol
  - heat the ethanol
  - in a water bath/in boiling water
  - rinse the leaf in warm water to soften the leaf
  - (place leaf on a white tile) and cover with iodine
  - leaf will change blue/black if starch is present/if photosynthesis has occurred

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe and explain the stages of the investigation using <b>6 or 7</b> points, in a logical sequence. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Candidates must use appropriate specialist terms throughout to describe and explain the stages in the investigation using <b>4 or 5</b> points, in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates describe and explain the investigation using <b>1, 2 or 3</b> points, however these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and the form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

10

AVAILABLE  
MARKS

			AVAILABLE MARKS			
5	(a)	(i) Phagocyte	[1]	11		
		(ii) Microorganisms are surrounded/engulfed [1] and then digested [1]	[2]			
	(b)	Active immunity means the body produces its own antibodies [1] passive immunity means antibodies come from another source/injected [1]	[2]			
		(c)	(i) To prevent contamination		[1]	
	(ii) A [1] killed the most bacteria/largest clear area around the disc [1]		[2]			
	(iii) As a control		[1]			
	(d)	(i) Many patients in close proximity/open wounds/weak immune systems	[1]			
		(ii) Improved hand washing facilities/antiseptic gels/better hygiene/isolation wards	[1]			
	6	(a)	Any <b>two</b> from:			6
			<ul style="list-style-type: none"> <li>• Close to the top of the leaf</li> <li>• Tightly packed together</li> <li>• Contain lots of chloroplasts</li> </ul>		[2]	
(b)		(i) The rate of respiration is the same as the rate of photosynthesis [1] the CO <sub>2</sub> used is equal to the CO <sub>2</sub> produced/No overall change in CO <sub>2</sub> levels [1]	[2]			
		(ii) Purple	[1]			
		(iii) Prevent gas moving in/out of the test tube	[1]			

			AVAILABLE MARKS	
7	(a)	Any <b>two</b> from: <ul style="list-style-type: none"> <li>• high blood glucose levels</li> <li>• glucose in urine</li> <li>• lethargy/extreme tiredness</li> <li>• (extreme) thirst</li> </ul>	[2]	10
	(b)	Lowers blood glucose levels [1] converts glucose to glycogen [1] which is stored in the liver [1]	[3]	
	(c)	Any <b>two</b> from: <ul style="list-style-type: none"> <li>• more obesity</li> <li>• high sugar diet</li> <li>• less exercise/less active</li> </ul>	[2]	
	(d) (i)	No increase in percentage of people (with diabetes) with long term effects between 40 and 160 [1] sharp increase in percentage of people with long term effects from 160–200 arbitrary units of blood sugar [1]	[2]	
	(ii)	Damage to eyesight/kidney failure/heart disease/strokes	[1]	
8	(a)	The range/number of [1] <b>different</b> varieties of living things in an area [1]	[2]	8
	(b) (i)	Number of each species counted in 1 m <sup>2</sup> in each site	[1]	
	(ii)	Site 1 as it has more species present [1]/ Site 1 has 5 species, Site 2 has 3 species	[1]	
	(iii)	$18 \div 40 \times 100$ [1] 45% [1]	[2]	
	(c)	Any <b>two</b> from: <ul style="list-style-type: none"> <li>• Nature reserves</li> <li>• No pesticides</li> <li>• Organic farming</li> <li>• Maintain hedgerows</li> </ul>	[2]	

- 9 (a) (Alexander) Fleming [1]
- (b) (i) To see if the drug works [1]
- (ii) Different species so results not reliable [1]
- (iii) Clinical trials [1]  
to look for side effects/decide on dosage  
in a complete organ system [1] [2]
- (c) (i) The transfer of genes/DNA from one species to another [1]
- (ii) Disease resistant/pest resistant/higher yield/quality [1]

AVAILABLE  
MARKS

7

10 Indicative Content:

- gradual change in a species
- by a process of natural selection
- variation among individuals (phenotypes)
- better adapted individual survive long enough to breed
- least adapted die
- this is known as survival of the fittest
- evolution can lead to changes within one species or the formation of a new species
- some may not accept theory because changes are too gradual/take too long/against religious views.

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe and explain the theory of evolution using <b>6 or more</b> points, in a logical sequence. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Candidates must use appropriate specialist terms throughout to describe and explain the theory of evolution using <b>4 or 5</b> points, in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates describe and explain the theory of evolution using <b>1, 2 or 3</b> points, however these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and the form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

6

**Total**

**75**