



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

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**Science: Single Award**

Unit 1 (Biology)

Higher Tier

**[GSS12]**

**TUESDAY 15 MAY 2018, AFTERNOON**

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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.

			AVAILABLE MARKS		
1	(a)	Respiration	[1]	8	
	(b)	There is more CO <sub>2</sub> going into atmosphere than coming out [1] more combustion than photosynthesis/thicker combustion arrow than photosynthesis arrow [1]	[2]		
	(c)	(i)	The warming of the planet		[1]
		(ii)	Melting polar ice caps/rising sea levels/more extreme weather		[1]
	(d)	(i)	Photosynthesis		[1]
(ii)		Rise in oxygen levels [1] fall in carbon dioxide levels [1]	[2]		
2	(a)	The range of species living in an area	[1]	7	
	(b)	The number of bees has decreased from 1968 to 2008	[1]		
	(c)	The number of wild flowers has decreased [1] which means the bees have less food/nectar [1]			[2]
		(d)	A line sloping upwards from 1968 to 2008 (does not need to be a straight line)		[1]
	(e)	Plant more (nectar rich) flowers [1] do not use insecticides [1]	[2]		
3	(a)	(i)	Left in the dark for 24 hours	[1]	6
		(ii)	To remove/use any stored starch	[1]	
	(b)	(iii) Any <b>two</b> from:			
		<ul style="list-style-type: none"> <li>• same type of plant</li> <li>• same length of time</li> <li>• same temperature</li> </ul>		[2]	
		(b)	B changes blue-black [1] starch made/photosynthesis occurred [1]	[2]	

**4 Indicative content**

- measure a fixed amount of water into the test-tube
- measure temperature of the water at the start
- measure a fixed amount of pasta using the balance
- hold it in the flame until it starts to burn
- hold the burning pasta under the test tube of water
- record the temperature of the water when the pasta stops burning
- calculate the increase
- repeat with the potato
- the food with the greatest temperature increase has the most energy

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe and explain the stages in comparing the energy content of the two foods using <b>7 or more points</b> , 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 comparing the energy content of the two foods using <b>4, 5 or 6 points</b> , 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 how to compare the energy content of the two foods using <b>1, 2 or 3 points</b> , 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

**5 (a)** Mother

[1]

**(b)**

[1]

**(c)** Gametes both tt [1]  
offspring [1]

[2]

4

AVAILABLE  
MARKS

			AVAILABLE MARKS
<b>6</b>	<b>(a)</b> Fibre	[1]	
	<b>(b)</b> Strengthen the heart muscle [1] increase the output of each pump [1] heart beats less often/less wear and tear [1]	[3]	
	<b>(c) (i)</b> $\frac{70}{70}$ [1] 100% [1]	[2]	
	<b>(ii)</b> 16.5 minutes	[1]	
	<b>(iii)</b> Joe [1] because his heart rate increased the least/resting heart rate is lowest [2]	[2]	9
<b>7</b>	<b>(a)</b> Chemical (messenger) [1] travels in the blood/to a target organ [1]	[2]	
	<b>(b)</b> Converts glucose to glycogen [1] stored in the liver [1] lowers blood glucose levels [1]	[3]	
	<b>(c) (i)</b> Blood glucose will increase	[1]	
	<b>(ii)</b> Tania took correct amount of insulin/took insulin at the right time/Jenna did not take the correct amount of insulin [1] Jenna ate more carbohydrates/glucose than Tania [1]	[2]	8

			AVAILABLE MARKS
<b>8</b>	<b>(a)</b> Any <b>two</b> from:	• Don't spread fertilisers when its wet or windy	
		• Don't spray fertilisers too close to the water	
		• Don't spread fertilisers on sloping ground	
		• Other appropriate response	[2]
	<b>(b)</b> Bacteria cause the plants to decay [1] the decay bacteria use up the oxygen (in the river/lake) [1] (eventually the water has no oxygen) so all animals die [1]	[3]	
<b>(c)</b>	<b>(i)</b> The number of seriously polluted rivers decreased over time/ in 30 years	[1]	
	<b>(ii)</b> 5 correct points [2] 4 correct [1] straight line drawn point to point [1]	[3]	
	<b>(iii)</b> Effective – number of serious polluted samples have decreased [1] Not effective – number of unpolluted samples have decreased/moderately polluted have increased [1] correct reference from table for either argument (compare data before 1991 and after 1991) [1]	[3]	
		12	
<b>9</b>	<b>(a)</b>	<b>(i)</b> A change [1] in the genes/chromosomes [1]	[2]
		<b>(ii)</b> U.V. light [1] causes a mutation in the skin cells [1]	[2]
	<b>(b)</b>	<b>(i)</b> More succulents survive [1] more succulents reproduce/produce seeds [1] succulents pass on their genes [1]	[3]
		<b>(ii)</b> Theory of Evolution [1] Charles Darwin [1]	[2]
			9

**10 Indicative content**

- Bases ATCG
- On the coding strand/on one strand
- 3 bases/base triplet
- Code for an amino acid
- Amino acids join to form a protein
- Different sequence of bases form different amino acids
- Different sequence of amino acids form different proteins

<b>Band</b>	<b>Response</b>	<b>Mark</b>
A	Candidates must use appropriate specialist terms throughout to describe how DNA codes for many different proteins using <b>6 or more</b> of the points above, 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 how DNA codes for many different proteins using <b>4 or 5</b> of the points above, 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 how DNA codes for many different proteins using <b>1, 2 or 3</b> of the points above, however these are not in a logical sequence. They use limited spelling, punctuation and grammar. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

**Total**

**AVAILABLE MARKS**

6

**75**