



Rewarding Learning

**General Certificate of Secondary Education
2012–2013**

Science: Single Award

Unit 1 (Biology)

Higher Tier

[GSS12]

MONDAY 25 FEBRUARY 2013

9.30 am–10.45 am

**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) (i) Each point accurate (20 min = 70 bpm; 30 min = 70 bpm) [1] with correct line joining points from end of exercise [1] [2]
- (ii) 35 bpm [1]
- (iii) 50% [1]
- (iv) Any **three** from:
- more/quicker blood (or blood component)
 - provides oxygen/glucose
 - for respiration
 - in muscles
- [3]
- (b) Men have higher cholesterol levels than women [1]
cholesterol levels increase with age (in both sexes) [1] [2]
- (c) Any **two** from:
- reducing stress
 - stopping smoking
 - exercise
 - reducing drinking of alcohol
- [2]
- 2 (a) 3:1/75%:25% [1]

(b) (i) Punnett Square

(gametes;
(offspring based
on gametes;)

	R	
R	RR	Rr
r		rr

[2]

(ii) Offspring genotypes RR Rr rr [1]
(based on Punnett Sq)

Offspring phenotypes Red Red White [1]
(based on genotype)

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		AVAILABLE MARKS
3	(a) Living/biological	[1]
	(b) (i) Decrease in pollution between 1950–2000/decrease in pollution the further away from Belfast [1] less fossil fuels used/more alternative fuels used/Belfast more polluted as has more industry [1]	[2]
	(ii) Any two from: <ul style="list-style-type: none"> ● same number of trees sampled at each point ● same area of each tree sampled ● same place on each tree sampled ● same time of year/season ● same type of trees ● same trees/geographical area 	[2]
		5

4 (a) Indicative content

- modified/weakened/dead microorganisms/pathogens/named microorganism
- (cause) antibody production
- by lymphocytes/white blood cells
- due to antigens present
- (if infected with same microorganism) antigens and antibodies combine/due to complementary shape
- causing clumping/immobilisation
- (long term immunity due to) creation of memory cells/antibody levels remain high/antibodies produced faster
- as antibodies produced by body is active immunity

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe how vaccinations work using five to eight 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 use some appropriate specialist terms to describe how vaccinations work using three to four 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 vaccinations work 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 have made limited use of specialist terms. The form and style are of a limited standard.	1–2
D	Not worthy of credit.	0

[6]

(b) (i) The percentage of children vaccinated has increased [1]

(ii) The vaccination uptake does not reach 100%/not all children are vaccinated [1]

(c) Fleming discovered that some bacterial colonies were contaminated by fungi/mould [1]
the fungi stopped the growth/killed the bacteria [1] [2]AVAILABLE
MARKS

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			AVAILABLE MARKS
5	(a) (i)	190 – 100 [1] 90 = [1]	[2]
	(ii)	People eating more/overweight/obesity/less exercise	[1]
	(b)	Large number of people that have diabetes/cost of treating long term effects/long lasting condition/long term effect explained e.g. cost of treating blindness	[1]
	(c) (i)	Harmful/abnormal consequence of taking drug/medicine	[1]
	(ii)	Gain greater than problem caused due to side effect/no other alternative	[1]
	(iii)	Advantage – Humans not harmed/whole body systems [1] Disadvantage – humans different/will react differently [1]	[2]
			8
6	(a) (i)	(Matching) strand completed [1] Bases correctly match [1]	[2]
	(ii)	Each individual has DNA different to everyone else	[1]
	(b) (i)	Risk of miscarriage [1] is greater than risk of developing cystic fibrosis/only a small chance of developing CF [1]	[2]
	(ii)	Treatment can begin earlier	[1]
	(c)	Any three from: <ul style="list-style-type: none"> ● will not affect damage to digestive system ● will not target/reach all cells ● needs to be continually done to target replacement cells/not permanent/short lived ● harmful condition still passes on to children affected ● side effects of using aerosols/harmful to own DNA 	[3]
	(d)	Patients may not get insurance/if get insurance may be more expensive [1]	[1]
			10

- 7 (a) Dorset mainly light and Manchester mainly dark [1]
appropriate reference to camouflage [1]
link between colour and predation [1] [3]
- (b) Most moths are light variety (in all areas)/darkest moths decrease [1]
in all areas light variety better adapted/darker moths less well
adapted [1] [2]
- (c) (i) Change/adaptation in a species/type of organism/new species
form [1]
over time [1] [2]
- (ii) Contradicts the teaching of the Church/long time scales involved/
complex concept [1]
- 8 (a) **Indicative content**
- conserves fossil fuels
 - renewable
 - uses carbon dioxide
 - in photosynthesis (when growing)
 - to offset carbon dioxide produced/does not add to carbon dioxide levels
 - during combustion of willow

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe the benefits of using willow including five or six 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 use some appropriate specialist terms to describe the benefits of using willow including three or four 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 the benefits of using willow including one or two of the above points. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and have made limited use of specialist terms. The form and style are of a limited standard.	1–2
D	Not worthy of credit.	0

[6]

AVAILABLE
MARKS

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			AVAILABLE MARKS
(b)	Any three from:		
	<ul style="list-style-type: none"> ● non-native ● spreads rapidly ● damages other species/habitats ● more successfully competing for light/nutrients/space/water ● maintain biodiversity 	[3]	9
9	(a) (i)	A – yellow; B – purple; C – red – all correct [2] 1–2 correct [1]	[2]
	(ii)	Produce oxygen for (animal) respiration [1] are producers/provide food for animals [1]	[2]
(b)	Any two from:		
	<ul style="list-style-type: none"> ● close to light ● tightly packed ● rich in chloroplasts/chlorophyll 	[2]	
(c)	<ul style="list-style-type: none"> ● plants grow towards light source [1] Any two from: <ul style="list-style-type: none"> ● more light ● more photosynthesis ● more growth ● reference to hormones [2] 	[3]	9
Total			75