



Rewarding Learning

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

Science: Single Award

Unit 1 (Biology)

Higher Tier

[GSS12]

WEDNESDAY 11 NOVEMBER 2015, MORNING

**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) Double helix [1]
(ii) Genes [1]
(b) (i) RR [1] Rr [1] [2]

(ii) red flowered plant

		r
white flowered plant	r	rr
	Rr	rr

1 mark for each set of parental gametes [2]
1 mark for offspring [1] [3]

- (c) Continuous [1]
no discrete groups/difficulty in allocating to group [1] [2]

AVAILABLE MARKS
9

2 Indicative content

- blood glucose levels increase
- as insulin no longer produced/insulin ceases to function
- glucose not converted to glycogen
- symptom – increased glucose in urine/thirst/need to visit toilet more often/ coma (if treatment delayed)/tiredness
- long term effect – eye damage/heart disease/strokes/kidney damage/limb damage
- increase mainly due to increase in Type 2
- due to obesity/increase in fat or carbohydrate intake/reduced exercise

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe and explain the effect of diabetes on humans using five to seven 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 and explain the effect of diabetes on humans using 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 and/or explain the effect of diabetes on humans 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	Response not worthy of credit.	[0]

- 3 (a) Shading in central T zone and bottom and top of leaf [1]
- (b) (i) Moving the lamp position/dimmer switch [1]
- (ii) To make sure the temperature can be kept constant [1]
- (iii) Number of oxygen bubbles increases with increasing light intensity [1]
 difference is greater between medium and high (compared to low and medium light intensities) [1]
 with increasing light more photosynthesis [1] [3]
- (iv) Number of bubbles increases as temperature increases [1]
- (c) Cells tightly packed together / near top of leaf [1]
 more cells/chloroplasts for photosynthesis/more light for photosynthesis [1] [2]

AVAILABLE
MARKS

6

9

			AVAILABLE MARKS
4	(a)	(i) 70 bpm [1]	6
		(ii) 100% [1]	
		(iii) Kerry [1] heart rises less during exercise/returns to normal quicker [1] [2]	
	(b) Involves long periods in hospital/ill and so off work [1] usually parents/fathers so no one to earn money/look after young children/ other appropriate answer [1] [2]		
5	(a)	Percentage of adults who drink alcohol decreases with age [1] more men than women drink alcohol (in all age groups) [1] [2]	5
		(b) (i) Drinking a large quantity of alcohol on a particular occasion [1]	
	(ii) Peer pressure/inexperienced drinker (e.g. don't know warning signs) [1]		
	(iii) Many people cannot afford to buy a lot of drink at one time so less likely to binge drink [1]		
6	(a)	(i) Any two from: • expensive equipment • highly trained scientists needed • trial and error nature of process [2]	10
		(ii) Avoids testing on humans at this stage [1] testing on whole body systems/living organisms [1] [2]	
		(iii) Testing on volunteers/patients [1] testing effectiveness of drugs/side effects/dosage required [1] [2]	
	(b)	(i) The transfer of DNA/genes from one species to another [1]	
		(ii) Any two from: • more yield/high quality foods • disease resistant • pest (insect) resistant • greater habitat range [2]	
		(iii) Lack of understanding/allergies/'super-weeds' [1]	

- 7 (a) (i) Oestrogen [1]
(ii) The lining is repaired/builds up [1]
(iii) Vagina – cervix – uterus – oviduct (all correct = 2)
Any two in correct order [1] [2]
(b) Both oestrogen and progesterone [1]
fall to a low level [1] [2]
- 8 (a) Everyone’s sequence of bases is different [1]
(b) Three bases (in sequence on the coding strand) code for one amino acid [1]
(c)

Scientist(s)	Discovery
Chargaff	
	Used X-ray diffraction to show overall shape of DNA
	Used modelling to work out double helix shape/ that bases link A-T and C-G

- [3] 5
- 9 (a) (i) Native to Britain and Ireland [1]
(ii) Can reproduce both sexually and asexually [1]
(iii) Decreases biodiversity [1]
(b) Any **three** from:
• plants die and decay
• decay caused by bacteria/fungi
• protein converted into ammonia
• nitrification/nitrifying bacteria converts the ammonia to nitrate [3] 6
- 10 (a) Sample both the island and the mainland [1]
count the number of both winged and wingless insect species found [1]
convert to percentages [1] [3]
(b) (i) Evolution [1]
(ii) Charles Darwin [1]
(c) High oxygen levels [1]
for the high rates of respiration required (when in flight) [1] [2] 7

AVAILABLE
MARKS

6

5

6

7

11 Indicative content

- number of deaths increased between 2002–2008
- number of deaths fell between 2008–2012
- increase as MRSA antibiotic resistant
- due to mutations
- in bacterial DNA / chromosomes
- improvement in death rate due to increased hygiene in hospitals
- other improvement strategy (e.g. isolation wards, more controlled use of antibiotics)

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe and explain the rise and fall of MRSA deaths using six or seven 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 and explain the rise and fall of MRSA deaths using four or five 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 and/or explain the rise and fall of MRSA deaths using one to three 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	Response not worthy of credit.	[0]

[6]

Total

AVAILABLE MARKS

6

75