



Rewarding Learning

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

Science: Single Award

Unit 1 (Biology)

Higher Tier

[GSS12]

WEDNESDAY 24 FEBRUARY 2016, 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.

			AVAILABLE MARKS
1	(a)	(i) Wind and wave do not produce carbon dioxide/do not contribute to global warming [1] however, the cost of producing electricity is far greater from wind and wave than coal and gas/people not prepared to pay extra cost [1] [2]	
		(ii) Melting polar ice caps/increasing sea levels/climate change [1]	
	(b)	(i) Slurry being spread on sloping land/too close to lake [1] It is raining (so slurry is going to be washed off land) [1] [2]	
		(ii) Fewer bacteria so less oxygen being used up [1]	
		(iii) Number of species of fish increases [1]	7
2	(a)	As number of seeds per pot increases average mass of each plant decreases [1]	
		competition/for light/space/water [1] [2]	
	(b)	(i) Any three from: <ul style="list-style-type: none"> • add different numbers of seeds in each pot [1] • leave for a period of time that is specified [1] • weigh plant in each pot [1] • calculate average mass of each plant in the pot [1] [3] 	
		(ii) Any two from: <ul style="list-style-type: none"> • use the same size of pot • use the same volume/type of compost • give each pot equal amount of water • same amount of light • same temperature • grow for same length of time • same type of seeds [2] 	7
3	(a)	(i) Gametes correct [1] offspring correct [1] [2]	
		(ii) bb circled [1]	
		(iii) 3 [1]	
	(b) Both alleles the same [1]		
	(c) Dominant allele is expressed/characteristic shows if heterozygous [1] recessive allele is masked by dominant allele/characteristic only shows if homozygous [1] [2]	7	

4 Indicative content

- continuous
- (continuous variation) is a gradual change in a characteristic across a population
- discontinuous
- (discontinuous variation) occurs when all individuals can be clearly divided into two or more groups
- height (continuous)
- tongue rolling (discontinuous)

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe variation using all 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 variation 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 variation using one, two or three of the points above. However, these are not presented 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]

6

- 5 (a) (i) $1864 - 1596 = 268$
 $268/1596$ [1]
 $\times 100 = 16.8$ [1] [2]
- (ii) Legislation/special programmes/education/stop poaching/nature reserves [1]
- (iii) Endangered [1]
- (b) (i) Primary – as it eats plants/producers [1]
 secondary – as it eats pikas which have already eaten plants [1] [2]
- (ii) Makes its own food from sunlight energy [1]

7

			AVAILABLE MARKS		
6	(a)	Only one parent plant is involved [1] all offspring are identical [1]	[2]	6	
	(b)	(i)	Advantage – faster growth/good features will always be passed on [1] Disadvantage – if one gets a disease they all get it [1]		[2]
		(ii)	Any two from: <ul style="list-style-type: none"> • large fruit • high yield • colour of fruit • texture • taste 		[2]
7	(a)	(i)	8 am – Yellow [1] 2 pm – Purple [1]	[2]	
		(ii)	Temperature can be controlled/water can be controlled	[1]	
	(b)	(i)	More plants for food/produce oxygen [1] Oxygen needed for respiration of animals/active animals require a lot of oxygen [1]	[2]	
		(ii)	Photosynthesis	[1]	
	(c)	(i)	Has genes transferred from snapdragon (one organism to another)	[1]	
		(ii)	Any two from: <ul style="list-style-type: none"> • could cause ‘superweeds’ • can be more expensive • can cause allergies 	[2]	9
8	(a)	Adenine pairs with thymine and Guanine with Cytosine (both parts needed)	[1]	6	
	(b)	Any three from: <ul style="list-style-type: none"> • sequence of three bases codes for one amino acid • one strand/side of DNA is used as the coding strand • base triplet • amino acids join together to form proteins 	[3]		
		(c)	Worked out overall shape of DNA [1] used X-ray diffraction (crystallography) [1]		[2]

- 9 (a)** Any **three** from:
- level is low during menstruation
 - oestrogen level rises to a peak at day 14
 - to cause the release of an ovum
 - causing uterus lining to build up
- [3]
- (b)** Progesterone [1]
to build up and maintain the thick uterine lining/development of placenta and other structures associated with pregnancy [1]
- [2]
- (c)** Contraceptive pill
- [1]
- (d)** Increases from 10 years old to a peak at 12 years old [1]
decreases after this and levels off [1]
- [2]
- (e)** Nervous
- [1]

**AVAILABLE
MARKS**

9

- 10 (a) Sterilised broth (was placed in two flasks) [1]
 one with a swan neck and one with a broken neck [1]
 broth in flask with broken neck became contaminated/broth in flask with
 swan neck stayed fresh [1] [3]
- (b) Rubella is a virus [1]
 antibiotics only treat bacterial infections [1] [2]
- (c) **Indicative content**
- skin provides a covering to stop microorganisms getting in
 - mucous membranes trap microorganisms
 - blood clotting prevents microorganisms getting in through cuts
 - antibodies are produced
 - lock on to antigens
 - as they are complementary in shape
 - clump microorganisms together
 - phagocytes
 - engulf and digest microorganisms

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe and explain how the body defends itself against microorganisms using seven to nine 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 and explain how the body defends itself against microorganisms using four to six 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 explain how the body defends itself against microorganisms using one to three of the points above. However, these are not presented 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

11

75