



Rewarding Learning

General Certificate of Secondary Education

**Single Award Science:
Biology**

Unit 1

Higher Tier

[GSA12]

Assessment

**MARK
SCHEME**

General Marking Instructions

Introduction

Mark schemes are intended to ensure that the GCSE examinations are marked consistently and fairly. The mark schemes provide markers with an indication of the nature and range of candidates' responses likely to be worthy of credit. They also set out the criteria which they should apply in allocating marks to candidates' responses.

Assessment objectives

Below are the assessment objectives for GCSE Single Award Science

Candidates must:

- AO1** Demonstrate knowledge and understanding of scientific ideas, scientific techniques and procedures;
- AO2** Apply knowledge, skills and understanding of scientific ideas, scientific enquiry, techniques and procedures; and
- AO3** Analyse information and ideas to interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 16-year-old which is the age at which the majority of candidates sit their GCSE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 16-year-old GCSE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Marking Calculations

In marking answers involving calculations, examiners should apply the 'own figure rule' so that candidates are not penalised more than once for a computational error.

Types of mark schemes

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

General marking guidance for GCSE SA Science – Biology

1. Alternative responses

- A solidus (/) used in mark schemes indicates alternative answers. Where a solidus may be confused with part of the answer (for example as a division sign or as part of units) “or” may be used to show alternatives.

Example: What is meant by the term discontinuous variation? [1]

MS: Discrete groups/no in-between values [1]

- Either answer as a response would be acceptable. If both are given this is accepted.

2. Brackets in a response

- Normal parentheses used in a response means that a term is **not required** for the response to be marked correct.

Example: Use this information to compare the energy requirements for males and females.[1]

MS: Energy requirements for males (of all ages) are higher than females [1]

- The phrase ‘of all ages’ is not required to gain credit for this response.

3. Bolding in a response

- If part of a mark scheme response is in **bold** this is an essential word or phrase needed to gain credit for the response.

Example: (b) Explain fully why a doctor would prescribe antibiotics for Sarah but not for Katie. [1]

MS: Antibiotics **only** destroy bacteria [1]

4. Marking of spelling

- Where candidates give an incorrectly spelt response, credit can be given if the word is recognisable phonetically and cannot be confused with another word.

Example: Name the part of the cell where photosynthesis takes place. [1]

MS: Chloroplast [1]

Response	Candidate Response	Marks awarded	Notes
1	chloroplast	1	Correct response
2	chloroplasm	0	Incorrect response – may be confused with cytoplasm
3	chlorplast	1	Correct response – phonetic spelling
4	cytoplast	0	Incorrect response – may be confused with cytoplasm

5. Marking of lists

- Where candidates give extra responses, additional correct responses can be ignored.
- Additional neutral responses can also be ignored. A neutral response is one which does not have a bearing on the question but is not incorrect.
- Additional incorrect responses **cancel out** a correct response to the marking point to which they pertain.

Example: Name one disease caused by tar. [1]

MS: Lung cancer/emphysema/bronchitis. [1]

Response	Candidate Response	Marks awarded	Notes
1	cancer	0	incorrect answer – too vague
2	lung cancer and bronchitis	1	both correct responses
3	emphysema (lung disease)	1	lung disease is a neutral answer
4	lung and stomach cancer	0	stomach cancer is not a correct answer

6. Marking of responses – ‘Choose from’

- Where candidates choose extra responses from a list of prompts, additional responses cannot be ignored.
- Additional incorrect responses **cancel out** a correct response to the marking point to which they pertain.

Example: Circle two parts found only in plant cells.

cytoplasm : cell wall : nucleus : chloroplast [2]

MS: cell wall and chloroplast [2]

Response	Candidate Response	Marks awarded	Notes
1	cytoplasm and cell wall	1	cell wall is correct response
2	cytoplasm and cell wall and nucleus	0	both cytoplasm and nucleus are incorrect

7. Marking values where a range is given

- Where a numerical range is given, correct responses are any value in the range, the range itself or any other range given which falls within the MS range.

Example: Suggest a value for the daily energy requirement of active females aged 11–20. [1]

MS: Any value in the range 2400–3499 kcal

Response	Candidate Response	Marks awarded	Notes
1	2400	1	A single value within the accepted range
2	2567	1	A single value within the accepted range
3	3400	1	A single value within the accepted range
4	2400–3499	1	The accepted range
5	2500–2600	1	A range given within the accepted range
6	2300–2500	0	Range given outside the accepted range
7	2200–3600	0	Range given outside the accepted range
8	2300	0	A single value not within the accepted range

8. QWC

- Quality of written communication is marked using indicative content and a banded mark scheme.
- The initial marking is for the indicative content. The number of indicative content marks places a candidate in a specific band. The overall marks awarded should be in that band based on the standard of the written communication.
- A typical banded grid from a mark scheme is shown below:

Band	Response	Mark
A	Candidates must use appropriate specialist terms including a minimum of 7 points of indicative content. 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 including a minimum of 5 points of indicative content. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates provide a brief and partial response including a minimum of 2 points of indicative content. They use limited spelling, punctuation and grammar and they have made little use of specialist terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

- A candidate who provides 5 indicative content points is placed in band B and can be awarded 3 or 4 overall marks out of 6 for their response.
- Responses would only be given the lower mark in the band if there were multiple spelling, punctuation and grammar errors.

9. Marking calculations

- Any errors a candidate makes in a single calculation or between parts of a multipart calculation may be carried forward to calculate the final answer, thus giving partial credit for the calculation method. ECF may be used to indicate where an error is carried forward.
- Full marks can be awarded for a correct numerical answer to any calculation even if no working out is shown.
- Units are required where they are not provided at the end of an answer line.

10. Colours and colour changes

- The colours and colour changes are given in the mark schemes. Shades (such as light and dark) are ignored except where they are clearly part of the mark scheme.
- Incorrect colours with the correct colour will lose the mark as this is an example of listing.

11. Marking diagrams

- Diagrams of apparatus are expected to be two-dimensional cross-sectional diagrams of the apparatus where appropriate.
- The marks awarded for an apparatus diagram are usually based on 1 mark being awarded to each label of a recognisable piece of apparatus in an assembled diagram.
- **No labels = no marks.**
- In some diagrams a combination of pieces of apparatus are worth 1 mark such as a gauze on a tripod with a Bunsen burner/heat. All must be recognisable in a diagram of assembled apparatus and labelled correctly for the combined mark to be awarded.

1 (a) Photosynthesis	[1]	AVAILABLE MARKS
(b) (i) Any two from: - destroys all habitats - destroys animals - removes all plants (not just the trees) - burning (trees) releases carbon dioxide - fires spread to other areas	[2]	6
(ii) Clears quickly /farmers can move in quickly	[1]	
(c) Increase biodiversity (or explained biodiversity) [1] protect habitats/(rare) species [1]	[2]	
2 (a) (i) As age increases RHR increases and then decreases [1] decrease begins/increase stops at age 45/RHR 67.6/67.7 [1] (To gain [2] reference must be made to the trend and the data i.e. age 45/RHR 67.6/67.7)	[2]	8
(ii) Men have a lower RHR than women at every age /men always have a lower RHR than women/men's RHR peaks at age 50 but women peak at age 45/men's RHR peaks at 64.9/65 but women's RHR peaks at 67.6/67.7	[1]	
(iii) Carried out on 4 million people /large number of people 'repeated' on it's own is not accepted, there must be reference to 4 million/large number	[1]	
(b) 64 – 62.2 [1] = 1.8 [1] (e.c.f. allowed for correct subtraction of values read from graph) [2] marks for the correct answer without working out	[2]	
(c) (HR) increases [1] to pump more oxygen/ more glucose (to the cells) [1] Do not accept to pump more blood without reference to oxygen or glucose	[2]	
3 (a) (Alexander) Fleming	[1]	7
(b) Antibiotics only destroy bacteria/cannot destroy a virus [1] <u>TB</u> is caused by bacteria but the <u>flu</u> is not [1] (For the second marking point either both named diseases should be referenced or both girls)	[2]	
(c) (i) Testing on living cells [1] in the laboratory [1]	[2]	
(ii) Any two from: - To see if it works on humans; - To check for side effects; - To check the dosage needed.	[2]	

		AVAILABLE MARKS									
4	(a) Any two from: • non native/introduced by man • spreads/reproduces rapidly • out-competes native species [2] (b) Brought in by boats/on the bottom of boats [1] (c) Wash the underneath of boats/scrape underneath of boats/remove zebra mussels from boat [1]	4									
5	(a) <table><tr><td>cells</td><td>tissues</td><td>organs</td><td>organ systems</td></tr></table> All responses required for [1] mark [1] (b) Any two from: • transfer of viruses or diseases from other animals • formation of tumours • development of unwanted cell types [2] (c) The stem cells can develop into most other types of cell; [1] each stem cell divides every 30 minutes [1] [2]	cells	tissues	organs	organ systems	5					
cells	tissues	organs	organ systems								
6	(a) (i) All gametes correct [1] All offspring correct [1] (no e.c.f.) <table><tr><td></td><td>B</td><td>b</td></tr><tr><td>b</td><td>Bb</td><td>bb</td></tr><tr><td>b</td><td>Bb</td><td>bb</td></tr></table> [2] (ii) 50% of 24 [1] 12 kittens [1] [2] marks for the correct answer without working out e.c.f. from (i) for incorrect gametes but correctly crossed. (no marks awarded for (i) but marks can be awarded for (ii)). e.g. BB crossed with bb gives 0 kittens (i) = [0] but (ii) = [2] [2] (b) (i) Circle and square [1] both shaded [1] independent marks – candidates can gain the mark for shading without correct shapes [2] (ii) Both grandparents are heterozygous/are carriers accept correct example of heterozygous genotype; e.g. Bb but not a statement that they have letters of different sizes or one upper and one lower case letter [1]		B	b	b	Bb	bb	b	Bb	bb	7
	B	b									
b	Bb	bb									
b	Bb	bb									

			AVAILABLE MARKS
7	(a) (i)	All 4 bars correct [2] 3 bars [1] if no gap between each species bars/if bars are different widths/ gaps different widths [-1]	8
		[2]	
	(ii)	Brimstone	
		[1]	
	(iii)	Same/equal sized areas/fields	
8	(b)	Number will decrease/go down/get less/fall/reduce [1] fewer plants/flowers [1] (accept 'less' etc for fewer) less nectar/food for the butterflies to feed on [1]	7
		[3]	
	(c)	Non-living (factor) (Do not accept examples of abiotic factors without the term 'non-living')	
		[1]	
	(a)	Remains of living organisms preserved [1] for millions of years [1]	
	(b) (i)	(Charles) Darwin	
		[1]	
	(ii)	Any three from: • variation among phenotypes in a population • competition for resources • better adapted (individuals are more likely to) survive • to reproduce/breed/produce offspring • pass on their genes/characteristics	
		[3]	
	(c)	No living examples left/none of the species are left/all of a species has died out [1]	
		[1]	

9 (a) Indicative Content

- oestrogen levels are low during days 1–5
- allows menstruation to occur
- rises after day 5
- causing the uterus lining to build up/thicken
- (rises) to peak at (or just before) day 14
- it causes ovulation/which is the release of an ovum/egg
- progesterone
- **maintains** the lining of the uterus

Band	Response	Mark
A	Candidates must use appropriate specialist terms to describe the control of the menstrual cycle using six or more of the above 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 to describe the control of the menstrual cycle using four or five 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 must describe the control of the menstrual cycle using one, two or three points. 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]

(b) The pill/the contraceptive pill/**hormonal** implant

Do not accept 'pill', 'a pill' or 'implant'

[1]

(c) The nervous system/nerve impulse/electrical impulse/through nerves

[1]

Total

AVAILABLE
MARKS

8

60