
GCSE

Science A / Biology

BL1FP

Mark scheme

4405 / 4401

June 2016

Version 1.0 Final Mark Scheme

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded
- the Assessment Objectives and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening and underlining

- 2.1** In a list of acceptable answers where more than one mark is available ‘any **two** from’ is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.
- 2.2** A bold **and** is used to indicate that both parts of the answer are required to award the mark.
- 2.3** Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.
- 2.4** Any wording that is underlined is essential for the marking point to be awarded.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that ‘right + wrong = wrong’.

Each error / contradiction negates each correct response. So, if the number of error / contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution?

[1 mark]

Student	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

Example 2: Name two planets in the solar system.

[2 marks]

Student	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, without any working shown.

However, if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column or by each stage of a longer calculation.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward is kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation 'ecf' in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(.....) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Accept / allow

Accept is used to indicate an equivalent answer to that given on the left-hand side of the mark scheme. Allow is used to denote lower-level responses that just gain credit.

3.9 Ignore / Insufficient / Do **not** allow

Ignore or insufficient are used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

Do **not** allow means that this is a wrong answer which, even if the correct answer is given, will still mean that the mark is not awarded.

4. Quality of Written Communication and levels marking

In Question 8 students are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Students will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: Basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: Clear

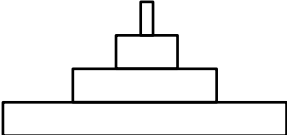
- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: Detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)(i)	2400 cm ³		1	AO2 1.2.2a
1(a)(ii)	1400 (cm ³)	<p>allow 2 marks for ecf of correct answer to [answer given in (a)(i) – 1000]</p> <p>allow 1 mark for 2400 – (600 + 400) or equivalent with no or incorrect answer</p> <p>allow 1 mark for ecf of answer given in (a)(i) – 1000 or equivalent with no or incorrect answer</p>	2	AO2 1.2.2a
1(b)(i)	sweat(ing)	<p>allow evaporation</p> <p>allow perspiration</p>	1	AO1 1.2.2a
1(b)(ii)	<p>any one from:</p> <ul style="list-style-type: none"> • for cooling • to maintain body temperature 		1	AO1 1.2.2a
1(c)(i)	More water was lost through the skin.		1	AO2 1.2.2a
1(c)(ii)	decrease		1	AO2 1.2.2a
Total			7	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)(i)	receptor cells		1	AO1 1.2.1b
2(a)(ii)	eye(s)	accept retina	1	AO1 1.2.1b
2(b)(i)	any one from: <ul style="list-style-type: none"> gender / sex quality of eyesight eg of factor that might affect reaction times 	eg wearing glasses eg alcohol consumption / distractions / tiredness / health / time of day / amount of practice (at this test) do not allow time / age	1	AO3 1.2.1
2(b)(ii)	182	allow 182.0	1	AO2 1.2.1
2(b)(iii)	Any anomalies can be identified.		1	AO3 1.2.1
2(b)(iv)	reaction time (too) long or reactions (too) slow (so) more likely to have / cause an accident	allow reaction time (too) slow allow examples of data quoted or derived from Table1, eg (mean) reaction time for 90 year olds is 162 ms longer than for 75 year olds	1 1	AO3 1.2.1
Total			7	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3(a)	any two from: <ul style="list-style-type: none"> • <i>idea of</i> absorption of light / energy • transfer to chemical energy • provides food / energy for animals / caterpillar • releases oxygen 	allow produce sugars / glucose / starch / carbohydrate / food / biomass	2	AO1 1.5.1a
3(b)			1	AO2 1.5.1b/c
3(c)	15(%)	allow 1 mark for $\frac{3 \times 100}{20}$ with 20 no answer or incorrect answer or allow 1 mark for 0.15	2	AO2 1.5.1c
3(d)(i)	any two from: <ul style="list-style-type: none"> • markings look like eyes / face / mouth of much larger animal • looks fierce / scary / dangerous • to frighten blue tit / bird 	allow it looks like a snake max 1 if reference to camouflage	2	AO2/AO3 1.4.1d/g
3(d)(ii)	any two from: <ul style="list-style-type: none"> • sharp / long / big claws • sharp / hooked beak • large wings or flies quickly • good eyesight 	ignore strong ignore strong / big allow streamlined / aerodynamic ignore powerful wings	2	AO2 1.4.1d/f
Total			9	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4(a)(i)	follicle stimulating hormone / FSH		1	AO1 1.2.2c/d
4(a)(ii)	oestrogen		1	AO1 1.2.2c/d
4(b)(i)	any one from: <ul style="list-style-type: none"> to help them have a baby / get pregnant to stimulate egg production / release / maturation own levels of FSH / LH / hormone (too) low 	ignore to make them fertile allow to increase hormone / FSH / LH levels do not allow to increase oestrogen levels	1	AO1 1.2.2e
4(b)(ii)	through the bloodstream		1	AO1 1.2.2b
4(c)	oestrogen progesterone		1 1	AO1 1.2.2e
Total			6	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)(i)	hand-washing		1	AO1 1.1.2f
5(a)(ii)	small amounts of dead pathogens		1	AO1 1.1.2l
5(a)(iii)	decrease by 60 (%)	allow from 70(%) to 10(%) allow other correct data treatment	1 1	AO2 1.1.2
5(b)(i)	penicillin		1	AO1 1.1.2h
5(b)(ii)	any two from: <ul style="list-style-type: none"> antibiotics only kill bacteria some bacteria are resistant (to antibiotics) (correct) antibiotics not always used deficiency disease(s) not caused by bacteria or cannot be treated by antibiotics inherited disease(s) not caused by bacteria or cannot be treated by antibiotics 'lifestyle' diseases not caused by bacteria or cannot be treated by antibiotics 	allow antibiotics do not kill viruses allow MRSA not killed by antibiotics allow course not completed eg heart disease / cancer if no other mark given allow 1 mark for not all diseases are caused by bacteria or some diseases are caused by viruses	2	AO2 / AO3 1.1.2h/i/j/k 1.1.1a/d
5(c)	bacteria grow faster	allow this is body temp (at which pathogens grow)	1	AO1 1.1.2o
Total			8	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)	three billion		1	AO1 1.8.1a
6(b)	mutation(s) breed / reproduce	in this order only allow pass on their genes	1 1	AO1 1.8.1e/f
Total			3	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7(a)(i)	legal, recreational drugs		1	AO1 1.3.1e
7(a)(ii)	any one from: <ul style="list-style-type: none"> dependence / addiction withdrawal (symptoms) or described 	allow reliance eg headache / sickness / nausea ignore side effects alone	1	AO1 1.3.1h
7(b)(i)	idea of not part of the drug company or it is another company	not biased can be accepted for either part bi or bii, but not both	1	AO2 1.3.1a
7(b)(ii)	idea of so they will not be biased	allow results will be trustworthy	1	AO3 1.3.1a
7(b)(iii)	no / reduced feeling of pleasure from alcohol (so) less likely to drink alcohol	allow brain less sensitive to alcohol	1	AO3 1.3.1
		allow so easier to stop (drinking alcohol)	1	
7(c)(i)	higher % or more boys (than girls) drink beer / lager / cider higher % or more girls (than boys) drink spirits / alcopops / wine	allow boys drink more beer / lager / cider	1	AO2 1.3.1
		allow girls drink more spirits / alcopops / wine	1	
		allow valid descriptions using % figures		
7(c)(ii)	any one from: <ul style="list-style-type: none"> only 100 boys were surveyed only done on 15-year-olds no data on the table about boys that don't drink alcohol data only about UK boys may have lied about alcohol consumption 	allow small sample may not be representative allow not done on all ages allow none of the bars are 100% or highest bar is 88%	1	AO3 1.3.1
Total			9	

Question	Answers		Extra information	Mark	AO / Spec. Ref.
8	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5.			6	AO1 1.1.1a/b/c
0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)		
No relevant content.	At least one component of the diet is given (C) or at least one reason why a component is required (R) or why a healthy diet is needed. (N)	Components of the diet are given (C) and for at least one of these components a reason why the component is required (R) or why a healthy diet is needed. (N)	Most components of the diet are given (C) and different reasons why components are required are given. (R)		
examples of biology points made in the response: <ul style="list-style-type: none">• (C) carbohydrate• (C) protein• (C) fat• (R) (carbohydrate / protein / fat) for energy (release)• (R) (carbohydrate / protein / fat) to build cells / growth / repair• (C) vitamins• (R) (vitamins) for healthy functioning of the body• (N) (balanced diet) contains right balance of different foods to meet needs or avoid malnourishment or avoid under / over weight• (N) (balanced diet) contains right amount of energy to meet needs		extra information: allow other components and needs, eg (C) fibre / roughage; (R) prevent constipation / bowel cancer (C) water; (R) transport / as solvent / part of cytoplasm / produce sweat allow correctly named vitamin (C) with correct reason (R) ignore ref to minerals / ions as a component of the diet and their use in the body			
Total				6	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
9(a)	any one from: <ul style="list-style-type: none"> continuous readings do not need to be there (more likely to be) accurate reduces human error 	allow automatic readings allow greater resolution do not allow valid allow easier to read	1	AO3 1.6.2
9(b)(i)	microorganisms (microorganisms) respire respiration / decay / microorganisms releases carbon dioxide	allow microbes / bacteria / fungi / decomposers for microorganisms, throughout ignore carbon released	1 1 1	AO1 1.6.1a/b / 1.6.2a /1.5.1c
9(b)(ii)	all grass decomposed / decayed / rotted	allow idea that all microorganisms dead (due to accumulation of waste or lack of oxygen) allow lack of / no oxygen (for respiration of microorganisms)	1	AO3 1.6.1b
Total			5	