GCSE

Science B

SCB1FP

Mark scheme

4500

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Version: 1.0 Final

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	Neptune, Mars, Moon	1
2	Neptune, 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 e.c.f. 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 Ignore / Insufficient / Do <u>not</u> 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.

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.

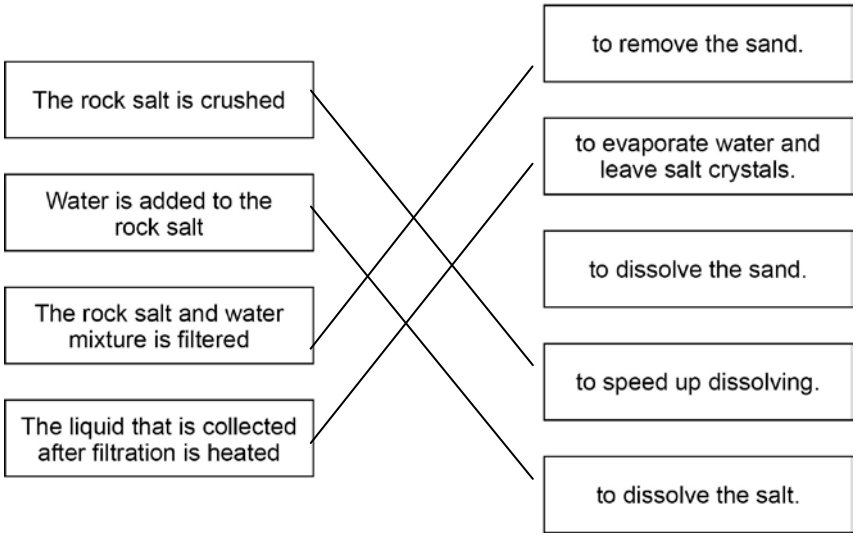
Level 2: clear

- 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.

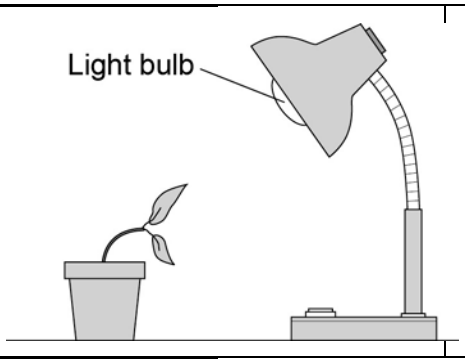
Level 3: detailed

- 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 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)	mining or quarrying	accept digging	1	AO1 3.3.1.3.5
1(b)	 more than one line **from** a stage cancels that mark		4	AO1 3.3.1.3.7
1(c)	gold and sulfur ringed	more than two ringed lose one mark for each extra ring.	2	AO1 3.3.1.3.6
Total			**7**	

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)(i)	phototropism		1	AO1 3.3.2.1.9
2(a)(ii)	gravitropism		1	AO1 3.3.2.1.9
2(a)(iii)	auxin		1	AO1 3.3.2.1.10
2(b)(i)			1	AO1 3.3.2.1.9
2(b)(ii)	any **three** from: • only use same (type of) seed/seedling/plant • only use same wattage bulb • keep light bulbs at the same distance from plant or filter • use a clear filter to provide a comparison	accept same size/strength of bulb but ignore voltage must convey the idea of comparison	3	AO3 3.3.2.1.9
Total			**7**	

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3(a)(i)	any suitable green plant any suitable herbivore any suitable carnivore	 in this order accept any suitable omnivore for this mark answers supplied must be sensible. Ignore exotic species	1 1 1	AO2 3.3.2.2.5
3(a)(ii)	(sun)light chemical heat	in this order chemical potential energy (cpe) accept thermal / chemical/kinetic	1 1 1	AO1 3.3.2.2.1,2,3
3(b)(i) **clip**	9(J)		1	AO2 3.3.2.2.6
3(b)(ii) **clip**	90(%)	allow ecf	1	AO2 3.3.2.2.7
3(c)(i)	any **one** from: • some food is not digested • some food is lost as faeces	 Allow lost as waste/ excreted	1	AO1 3.3.2.2.8a
3(c)(ii)	respiration	ignore 'aerobic' and 'anaerobic'.	1	AO1 3.3.2.2.8b
Total			**10**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4(a)(i)	100 days to 300 days	numbers are inclusive	1	AO3 3.3.1.1
4(a)(ii)	Mercury is closer to the sun	accept the converse	1	AO3 3.3.1.1.
4(a)(iii)	Venus has an atmosphere but Mercury does not	allow Mercury does not have an atmosphere (but Venus does)	1	AO3 3.3.1.2.11
4(b)(i)	the crust the mantle convection currents the Earth's core	in this order	1 1 1 1	AO1 3.3.1.2.3,4
4(b)(ii)	any **two** from: • earthquakes • volcanic eruptions • tsunami/tidal waves	in any order allow volcanoes	2	AO1 3.3.1.2.5
Total			**9**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)(i)	any **two** from: C, F, G	either order list rule applies for incorrect third answer	2	AO2 3.3.1.3
5(a)(ii)	A E	either order list rule applies for incorrect third answer	1 1	AO2 3.3.1.3
5(a)(iii)	(yes) because there are more statements in favour. **or** (no) because earthquakes/ pollution of drinking water are not acceptable	this may be expressed in a number of ways accept the idea that it neither supports or does not support as there are both for and against statements	1	AO3 3.3.1.3
5(b)(i)	CH_4		1	AO2 3.3.1.3
5(b)(ii)	methane + oxygen ⟶ carbon dioxide + water	reactants either order products either order accept symbols if correct	1	AO2 3.3.1.4.2
Total			**7**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)	any **four** from: • carbon dioxide dissolves in water • carbon dioxide used by animals to make shells / skeletons / calcium carbonate • animals died leaving shells / skeletons • shells / skeletons (fall to sea bed and) converted into limestone • over a long time period	thousands or millions of years accept 'over time'	4	AO1 3.3.2.3.7a
6(b)(i)	(most) corals can only live in warm temperatures between 22°C and 30°C/above 22°C	either order accept the converse allow because it's warm(er) allow the idea that temperature falls (rapidly) after 30 degrees (latitude)	1 1	AO2 3.3.2.3.7b
6(b)(ii)	not enough light / less light (below 50 metres) for algae to produce food / photosynthesise	do not accept no light	1 1	AO3 3.3.2.3.7b
Total			**8**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7(a)	tick in row 4 **only**	extra ticks negate mark allow any indication of the last box	1	AO1 3.3.1.3.8
7(b)(i)	heat the crude oil turns it into vapour / gas	boil the crude oil gains **2 marks**	1 1	AO1 3.3.1.3.8
7(b)(ii)	they have different boiling points	allow the idea of a falling temperature **up** the column	1	AO1 3.3.1.3.8
7(b)(iii)	the lower the number of carbon atoms the further up it travels	accept the converse allow the shorter the chain/molecule the further up it travels	1	AO2 3.3.1.3.8
7(b)(iv)	any **one** from: • ethane • propane • butane		1	AO2 3.3.1.3.8
Total			**6**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
8			6	AO1 AO2 AO3 3.3.2.2.9,10

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 and apply a 'best-fit' approach to the marking.

0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)
No relevant content	At least one factor is given	At least one factor is given **and** is correctly **linked** to a feature or reason	At least two factors are given which are each correctly linked to a feature and at least one factor or feature is also correctly linked to a reason.

examples of the points made in the response	extra information
features; added soil carpet wire mesh loose packing	
factors needed; microbes warmth air / oxygen moisture	
reasons; microbes cause decomposition microbes grow / work best in warmth microbes grow / work best with oxygen / air microbes grow / work best when it is moist	Accept decomposers / bacteria/ fungi for microbes but **not viruses**. If microbes not given accept reference to detritivores or examples

Total			6