GCSE

Science B

SCB1HP

Unit 1- My World

Mark scheme

4500

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Version: 1.1 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.

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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 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

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 / ; e.g. allow smooth / free movement.

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 are 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 is 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 4 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 and Spec Ref
1 (a)(i)	classification		1	**AO1** 3.3.2.1.2
1 (a)(ii)	kingdoms	not 'animal kingdoms'	1	**AO1** 3.3.2.1.1
1 (b)(i)	because both are called Equus	accept both in same genus allow they have the same first name	1	**AO2** 3.3.2.1.3
1 (b)(ii)	it is the same for all languages	allow the idea that all scientists know what the name means whereas common names vary with language allow you can see **how** closely related they are	1	**AO2** 3.3.2.1.3
1 (c)	any **3** from: • A and D have wings **and** B and C do not have wings • A and D have 6 legs **and** B and C do not • A and D have stripes **and** B and C do not have stripes • the idea that A and D have a 'waist' **and** B and C do not have a 'waist' • A and D have antennae **and** B and C do not have antennae	either order there must be at least one comparison for 3 marks any three without comparison for max. 2 marks any one feature without comparison for 1 mark	3	**AO3** 3.3.2.1.2
Total			**7**	

Question	Answers	Extra information	Mark	AO and Spec Ref
2 (a)(i)	X rays ultra violet / UV **far** infrared / IR	all 3 for 2 marks list principle applies and all five given gains neither of these marks allow 1 mark for two correct allow 1 mark if A, B, and E are given instead of names	2	**AO3** 3.3.1.1.2
2(a)(ii)	(because) (the graph shows that) they do not reach the surface of the Earth (because) they are absorbed by the atmosphere	allow graph is at zero	1 1	**AO3** 3.3.1.1.2
2 (b)	radio (waves)	ignore F	1	**AO3** 3.3.1.1.2
2 (c)	any **two** from: • easy to get to for repairs / upgrade • easier to get to it to use it / more people can get to it to use it • less costly	allow "easy to get to" for 1 mark accept bigger telescopes accept the converse for space based telescopes	2	**AO2** 3.3.1.1.1,2
Total			**7**	

Question	Answers	Extra information	Mark	AO and Spec Ref
3 (a)	any **two** from: • hotter • more / lots of volcanoes • no water / oceans	 ignore hot allow very hot / not solid / molten accept higher temperature ignore liquid allow lack of water do not allow less water ignore atmosphere	2	**AO1** 3.3.1.2.1,6, 7
3 (b)(i)	volcanic activity / volcanoes	ignore any named gases	1	**AO1** 3.3.1.2.7
3 (b)(ii)	(little or) no oxygen more carbon dioxide	ignore less oxygen allow more hydrogen / ammonia / methane / greenhouse gases ignore water vapour and nitrogen	1 1	**AO1** 3.3.1.2.8
3 (b)(iii)	more oxygen **or** less carbon dioxide	ignore any processes	1	**AO1** 3.3.1.2.9
Total			**6**	

Question	Answer	Extra information	Mark	AO and Spec Ref
4			**6**	**AO1** 3.3.2.3.1,2,3,4,5

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 2.

0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)
No relevant content	at least one process **or** at least one way carbon is obtained **or** at least one way carbon is returned to the atmosphere is given	at least one process is identified **and** is correctly linked to the way in which it obtains carbon for the organism or returns carbon to the atmosphere	Processes are identified **and** they are correctly linked to a description of how the process obtains carbon for the organism or returns carbon to the atmosphere. At least two of animals, plants and decomposers should be described

examples of the points made in the response

- carbon dioxide
- from the air
- plants get their carbon by photosynthesis
- make organic compounds
- carbohydrates proteins fats
- animals get their carbon by feeding on plants or other animals
- decomposers get their carbon by breaking down dead plants and animals
- respiration
- returns carbon dioxide to the atmosphere

extra information

information from a well annotated diagram can be considered

Total			6

Question	Answers	Extra information	Mark	AO and Spec Ref
5 (a)	any **six** from: • nucleus (at the centre) • containing protons • and neutrons • (surrounded by) • electrons • in shells (orbitals / layers / energy levels) • electrons and protons are equal in number • 2,8,8	either order penalise incorrect charge once the idea of if only a diagram is given it must be fully annotated to gain the marks.	6	**AO1** 3.3.1.3.2
5 (b)	an atom is the smallest particle of an element an ion is an atom that has lost or gained (one or more) electrons a molecule is (two or more) atoms (chemically) bonded / held together	ignore 'an atom is a particle with equal numbers of electrons and protons' ignore an ion is a charged particle allow an ion is a particle with different numbers of electrons and protons	1 1 1	**AO1** 3.3.1.3.3
5 (c)	an element contains only one (type of) atom a compound contains (two or more) <u>different types</u>(stated or implied by an example eg CO_2) of atoms chemically combined / bonded / joined the idea that the components of a mixture, atoms or molecules are not (chemically) combined	allow element**<u>s</u>** chemically combined accept the components are not in definite proportions in a mixture accept components can be separated by physical means	1 1 1	**AO1** 3.3.1.3.1
Total			**12**	

Question	Answer	Extra information	Mark	AO and Spec Ref
6 (a)(i)	24 gains 3 marks	any fraction of a snail given e.g. 24.04 max 2 61 x 41 **or** 2501 for 1 mark $\frac{61 \times 41}{104}$ **or** $\frac{2501}{104}$ for 2 marks their $\frac{2501}{104}$ correctly calculated **and** rounded down to whole number for 2 marks	3	**AO2** 3.3.2.2
6 (a)(ii)	weigh the five snails calculate an average mass multiply by population size / 104		1 1 1	**AO2** 3.3.2.2
6 (b)(i)	first row one square second row seven squares third row twenty three squares pyramid the correct way up **and** centred **and** labelled	all 3 correct for 2 marks 1 or 2 correct for 1 mark centred with each other	2 1	**AO2** 3.3.2.2.12
6 (b)(ii)	recognition that the bird would need 1000 grams of snails but as there are only 700 grams it must be eating something else recognition that the snails would need 7000 grams of cabbage but as there are only 2300 grams they must be eating something else	to gain full marks there must be some use of number to justify the answer if no other marks allow 1 for the suggestion that there are not enough snails for the bird **or** there are not enough cabbages for the snails	1 1 1 1	**AO3** 3.3.2.2.6
Total			**13**	

Question	Answers	Extra information	Mark	AO and Spec Ref
7(a)(i)	**$CaCO_3$** + **2** HCl ⟶ $CaCl_2$ + **H_20** + **CO_2**	all correct for 3 marks else $CaCO_3$ for 1 mark H_2O + CO_2 for 1 mark 2 in front of **HCl and no other numbers added to equation** for 1 mark	3	**AO1** and **AO2** 3.3.1.4.2
7(a)(ii)	Examples of possible methods **either** • use (balance to weigh) x amount of calcium carbonate into a beaker • (use measuring cylinder/burette to) add volume y of one limescale remover to the calcium carbonate • until it has all 'dissolved' • record the volume used, repeat for the other two removers (and compare) **or** • use measuring cylinder/burette to measure volume y of one remover into a beaker • use balance to weigh some calcium carbonate and add it slowly to the cleaner • until no more 'dissolves' • record the mass used, repeat the experiment (and compare)	ignore other details like control measures, safety measures, stirring x / y = set / same amounts accept any alternative method which would produce a valid result.	4	

Question 7 continues on the next page …

Question 7 continued …

7aii continued	**or** • put known mass of calcium carbonate in beaker • add known volume of one limescale remover • after set time remove (unreacted) calcium carbonate • weigh calcium carbonate and repeat for other limescale removers (and compare). **or** • put known mass of calcium carbonate • and known mass of one limescale remover into a beaker on a balance • at the same time and record the mass • after set time record mass loss and repeat for other limescale removers (and compare).			
7(a)(iii)	calculate how many grams of calcium carbonate is 'dissolved' by 1 cm^3 of limescale remover either cost per cm^3 ÷ mass of calcium carbonate 'dissolved' by 1cm^3. lowest value best or mass of calcium carbonate 'dissolved' by 1cm^3 ÷ cost per cm^3 highest value best	accept any method which would enable a cost to be calculated	1 1	**AO2** 3.3.1.4.3
Total			**9**	