



General Certificate of Secondary Education
June 2013

GCSE Science B

SCB1HP

(Specification 4500)

Unit 1: My World

Final

Mark Scheme

Mark schemes are prepared by the Principal Examiner 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 examiners 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 examiner understands and applies it in the same correct way. As preparation for standardisation each examiner 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, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

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 / ; eg 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 candidates 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)

Candidate	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)

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

3.2 Use of chemical symbols / formulae

If a candidate 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 not 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.

4. Quality of Written Communication and levels marking

In Question 4 candidates 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.

Candidates 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.

SCB1HP**Question 1**

Question	Answers	Extra information	Mark
1(a)(i)	the Doppler effect		1
1(a)(ii)	person B the idea that the sound is not moving relative to them	accept they are in the car accept the idea that the car is moving relative to A <u>and</u> C ignore reference to closeness/loudness	1 1
1(a)(iii)	person A the car is <u>moving</u> away from him	ignore reference to loudness or distance	1 1
1(b)(i)	more or less complete vertical line drawn closer to the red end		1
1(b)(ii)	red shift		1
1(b)(iii)	the universe is expanding the universe started at one point	accept a description accept big bang	1 1
Total			9

SCB1HP**Question 2**

Question	Answers	Extra information	Mark
2(a)	respiration		1
2(b)	5 (%)	3060 – (1022 + 1885) or 153 for 1 mark 153 x 100/3060 for 2 Or their 153 x 100/3060 correctly calculated for 2	3
Total			4

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Question 3

Question	Answers	Extra information	Mark
3(a)(i)	3 correct plots		1
	smooth line of best fit		1
3(a)(ii)	between 3 and 4 minutes	allow between 3 and 5 minutes	1
3(a)(iii)	idea that radiation intensity had fallen	eg 'the sun had gone in' ignore human error	1
3(a)(iv)	any one from: <ul style="list-style-type: none"> use a reliable source for the radiation. repeat each test 	accept do all three at the same time	1
3(a)(v)	any two from <ul style="list-style-type: none"> methane is best absorber of radiation oxygen is the worst absorber of radiation absorption is different for different gases results are invalid because of carbon dioxide anomaly 	ignore answers solely referring to temperature.	2
3(b)	advantage: greenhouse gases keep temps on earth stable and warm enough to support life	ignore references to ozone allow without them the Earth would be much colder accept reference to carbon dioxide and photosynthesis	1
	disadvantage if the concentration is too high then the temperature will also be too high	ignore global warming without the context of climate change	1

Question 3 continues on the next page...

SCB1HP**Question 3 continued**

Question	Answers	Extra information	Mark
3(c)(i)	helium ; inflating balloons/refrigerant	not hot air balloons	1
	argon; filling filament lamps /light bulbs/ discharge tubes/ welding	not lamp filaments In both cases accept any correct use	1
3(c)(ii)	any four from: <ul style="list-style-type: none"> • turn the gas into liquid • by cooling/compressing • allow temperature to rise (slowly) (idea of) • each gas has different boiling point • fractional distillation 	allow condense gas	max 4
Total			15

SCB1HP**Question 4**

Question	Answers	Extra information	Mark
4(a)(i)	extremophiles		1
4(a)(ii)	any two from: very cold conditions or example very dry conditions or example very hot conditions or example very salty conditions or example very acidic/alkaline conditions or example	accept any correct suggestion of extreme conditions <u>for microbes</u> .	2

Question 4 continues on the next page...

SCB1HP**Question 4 continued**

Question	Answers	Extra information	Mark
4(b)	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 4, and apply a 'best-fit' approach to the marking.		6
0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)
No relevant content	An outline method is suggested but essential practical details are omitted	The method suggested could be duplicated but has some details missing Eg exactly what readings would be taken to determine mass loss. The suggested method would be difficult to follow	The method suggested is in a logical sequence and includes most of the relevant details so that their procedure could be duplicated successfully. The use of results would be a reasonable attempt at calculation or comparison
examples of the points made in the response Use of apparatus <ul style="list-style-type: none"> • Set up as in diagram • Use of balance and stop clock to gather results Controls <ul style="list-style-type: none"> • Temperature • Air flow • Light Measure and record <ul style="list-style-type: none"> • Leaf area (or same size leaf used) • Mass start and finish/loss • Time start/finish/left for • Calculation OR comparison 			extra information
Total			9

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Question 5

Question	Answers	Extra information	Mark
5(a)	<p>advantages</p> <ul style="list-style-type: none"> it will not wash away because it does not <u>dissolve</u> in water it lasts a long time because it does not fade/change colour in sunlight bright yellow so can easily be seen <p>disadvantages</p> <ul style="list-style-type: none"> could be a hazard to people who make it because it is made from <u>poisonous chemicals</u> chemicals used to make it are soluble so could get into drinking water supplies if excess of either is used the idea that the lead chromate could (wear off and) get into drinking water supplies and poison people 	<p>max 2 for advantages</p> <p>answers must use the information, not just quote it</p> <p>max 2 for disadvantages</p>	4
5(b)(i)	'2' in front of NaNO_3	any other number anywhere negates mark unless '1' or correct multiples	1
5(b)(ii)	5		1
5(b)(iii)	7		1
5(c)(i)	3.23(grams)	<p>else $3.31 + 1.62 = 4.93$ for 1 mark</p> <p>or</p> <p>their $4.93 - 1.7$ correctly calculated for 1 mark</p>	2

Question 5 continues on the next page...

SCB1HP**Question 5 continued**

5(c)(ii)	atoms only rearranged in a chemical reaction or mass is not made or destroyed in a chemical reaction.	allow no mass is lost	1
	so mass of products must equal mass of reactants		1
Total			11

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Question 6

Question	Answers	Extra information	Mark
6	<p>any five from:</p> <ul style="list-style-type: none"> • tusks are controlled by genes • some elephants do not have the gene for tusks • the tusk-less elephant is less likely to get hunted (and killed) • so survives to breed • and pass on the (tusk-less) gene • there will be more tusk-less elephants(in the population) for females to breed with • natural selection 		5
Total			5

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Question 7

Question	Answers	Extra information	Mark
7(a)(i)	gravitropism	accept geotropism	1
7(a)(ii)	auxin (causes the effect) gravity produces an uneven auxin distribution across the stem more auxin found on the lower part of the stem auxin makes (that side of) the stem grow more so the shoot grows upwards	if answer is in terms of phototropism then max 3 1 1 1 1	
7(b)(i)	day length	accept the <u>amount</u> of light accept temperature	1
7(b)(ii)	spring and summer is when there are most insects around	accept: <ul style="list-style-type: none"> • seeds a good way to survive winter • more photosynthesis <u>to provide materials to make flowers / store in seeds</u> ignore growth unqualified	1
Total			7

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