



**General Certificate of Secondary Education (GCSE)
November 2012**

Science B

SCB1HP

(Specification 4500)

Unit 1: My World

Final M/S

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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MARK SCHEME

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. Boldening

- 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 boldened. 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	Neptune, Mars, Moon	1
2	Neptune, 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 2 (c) 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.

COMPONENT NUMBER: SCB1HP

COMPONENT NAME: My World

DATE: November 2012

question	answers	extra information	mark
1(a)	mantle core	either order BOTH NEEDED ignore 'inner'/'outer'	1
1(b)(i)	<u>tectonic</u> plates		1
1(b)(ii)	<u>heat from the core</u> (causes) <u>convection currents</u> (in the mantle) which <u>cause the</u> plates (floating on the mantle) to move	any logical order ignore 'lava'/'magma'	1 1 1
1(b)(iii)	July 8th <u>sudden</u> movement <u>upwards</u> or movement <u>upwards</u> of <u>21 metres</u> reference to earthquake displaces the water (to cause the wave)		1 1 1 1
Total			9

COMPONENT NUMBER: SCB1HP

COMPONENT NAME: My World

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question	answers	extra information	mark
2(a)	auxin		1
2(b)	phototropism	'tropism' insufficient 'photo' insufficient	1

Question 2 continues on the next page

COMPONENT NUMBER: SCB1FP

COMPONENT NAME: My World

DATE: November 2012

question	answers	extra information	mark
2(c)	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.		max. 6

0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)
No relevant content	The student's design is brief and incomplete. It would not be possible to follow the design to repeat the experiment.	The student's design is not in a logical sequence and so would be difficult to follow. There are significant omissions in some areas and key factors to control have not been suggested.	The student has produced a design in a logical sequence which could be followed easily and would produce reliable results. At least one of the key variables have been given.

<p>Examples of the points made in the response:</p> <p>apparatus:</p> <ul style="list-style-type: none"> • use different colour filter / window • or different colour of bulb <p>variables:</p> <ul style="list-style-type: none"> • same box • same tray • same age of seedling • in place for same length of time • same nutrients • same amount of water • same temperature <p>key variables:</p> <ul style="list-style-type: none"> • same type of plant • same number of seedlings in each batch • use the same intensity (amount) of light <p>observations:</p> <ul style="list-style-type: none"> • whether seedlings grow towards the light • how much they grow towards each light • do they all 'bend' at the same rate 	<p>Extra information</p> <p>Use <u>the</u> apparatus is enough detail. Changing light colour is the key change requiring different apparatus which would be expected in a level 3 response.</p> <p>Use of the same light intensity, number and age of seedlings and duration of the experiment are key to the investigation and at least some would be expected in a level 3 response.</p> <p>A suggestion in terms of comparing directional growth with different colours would be expected in a top level 3 response.</p>
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Total			8
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DATE: November 2012

question	answers	extra information	mark
3(a)	Figure 1 6.4 Figure 2 6.0 Figure 3 2.8	all three correct for 2 marks allow 1 mark for one correct answer	max. 2
3(b)	50(%)	correct answer with or without working gains 3 marks if answer incorrect, allow $6 - 2.8 = 3.2$ for 1 mark $3.2 \div 6.4 \times 100$ ecf from 3a correctly calculated for 2 marks	3
3(c)	the plant photosynthesises		1
Total			6

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DATE: November 2012

question	answers	extra information	mark
4(a)	best time to harvest at end of first year (however expressed) because:	to gain this mark some attempt at explanation required	1
	in first year 2.5 (mg/100 kg) mg nickel absorbed		1
	in second year only 1.0 (mg/100 kg) more nickel absorbed	accept less nickel absorbed in second year for 1 mark	1
	so better to harvest at end of first year and grow a new crop next year or (idea) of more crops grown over 20 years	There are a number of ways of justifying harvesting after the first year which must be awarded marks.	1
4(b)	any two from: (idea) of less damage to the environment using plants/soil does not have to be removed using machines and lorries. nickel can be obtained economically from low grade ores cheaper than traditional methods <u>because</u> (with a sensible reason) less chance of pollution (by leaching) if nickel removed.	accept less pollution or examples of pollution caused by mining 'environmentally friendly' insufficient	2
4(c)	decomposition/decay	accept rotting	1
	by decomposers / microbes / bacteria / fungi		1
Total			8

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COMPONENT NAME: My World

DATE: November 2012

question	answers	extra information	mark
5(a)	because a beryllium atom should have the same number of electrons as protons		1
	and the diagram has only 2 electrons/ is missing 2 electrons	If no other marks awarded allow 'an atom would have no charge' for 1 mark	1
5(b)	because it has 4 protons	do not accept because it has 4 particles in the nucleus allow because it has 9 particles in the nucleus allow because helium only has two protons	1
5(c)	2+ or +2		1
	because there are 4 protons and only 2 electrons	Allow it has lost 2 electrons. If no other marks awarded allow 'a positive charge' for 1 mark	1
Total			5

COMPONENT NUMBER: SCB1HP

COMPONENT NAME: My World

DATE: November 2012

question	answers	extra information	mark
6(a)	light stops hormone production (in the tip)	allow more hormone made in the dark	1
	light causes the hormone to be moved away from the light side		1
	light destroys / inactivates the hormone		1
		any order	
6(b)	Experiment A: the distribution of (growth) hormone is uniform so stem will grow straight up		1
	Experiment B: shoot grows towards the light because more (growth) hormone on the dark side		1
	which makes the dark side grow/increase in length more.		1
Total			6

COMPONENT NUMBER: SCB1HP

COMPONENT NAME: My World

DATE: November 2012

question	answers	extra information	mark
7(a)	all plots correct smooth curve drawn		1 1
7(b)(i)	2.6	correct answer with or without working gains 2 marks If answer incorrect, allow $z = \text{obs} / \text{emit} - 1$ or $1440 / 400 - 1$ for 1 mark	2
7(b)(ii)	2900	allow ecf for their red shift value or reading from their curve but not from a straight line ignore any units	1
Total			5

COMPONENT NUMBER: SCB1HP

COMPONENT NAME: My World

DATE: November 2012

question	answers	extra information	mark
8(a)	carbohydrate (named) / fat / protein	accept any reasonable organic compound do not accept carbon dioxide	1
	because photosynthesis removes carbon dioxide from air		1
	and puts the radioactive carbon into organic compounds	accept 'because glucose made from radioactive carbon dioxide by photosynthesis' for 2 marks	1
8(b)(i)	Ca(OH) ₂ + CO ₂	either order	1
	CaCO ₃		1
	+ H ₂ O	either order	1
8(b)(ii)	because respiration		1
	of glucose containing radioactive carbon produces radioactive carbon dioxide		1
Total			8

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DATE: November 2012

question	answers	extra information	mark
9	mutation or variation produced some striped hoverflies by natural selection these are less likely to be eaten by birds so survive to breed and pass on their genes.		1 1 1 1 1
Total			5