



**General Certificate of Secondary Education
March 2012**

Science B

SCB2HP

(Specification 4500)

Unit 2: My Family and Home

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 3(a) 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.

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question	answer	extra information	mark
1(a)(i)	burning / combustion		1
1(a)(ii)	fission	allow fusion	1
1(b)	the National Grid	accept National Power Grid allow The Grid / Power Grid	1
1(c)	any three from: <ul style="list-style-type: none"> • disease A has an effect over a greater distance than disease B • disease B has a greater effect at <u>shorter distances</u> than disease A • risk of both diseases is greater in younger people (than in older) • the closer to the cables the higher the risk • the risk reduces faster with increased distance for B • neither disease is increased at 500m 		3
Total			6

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question	answer	extra information	mark
2(a)	copper	accept aluminium	1
	good <u>electrical</u> conductor	accept ductile ignore flexible	1
2(b)	aluminium	accept weather resistant	1
	resistant to corrosion	ignore light / malleable / waterproof do not accept doesn't rust	1
Total			4

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question	answer	extra information	mark
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3(a)			
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.	The method shows little organisation and would not allow a comparison of the two bulbs.	The method shows some structure that could be followed by another person and which could enable a comparison to be made.	There is a method in a clear and logical sequence which could be easily reproduced by another person and would enable a comparison to be made.
examples of science points in the answer: <ul style="list-style-type: none"> • same volume of water • same initial temperature • same stirring technique / stir • same external temperature / stand on same surface / draught exclusion either <ul style="list-style-type: none"> • same length of time for bulbs to be turned on • measure the start temperature and end temperature and calculate temperature rise • calculate temperature rise per second or <ul style="list-style-type: none"> • measure the start temperature • time taken for temperature to rise the same number of degrees • calculate temperature rise 		extra information to say 'repeat for both bulbs' is sufficient for both bulbs reference.	

Question 3 continues on the next page

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Question 3 continued

question	answer	extra information	mark
3(b)(i)	$200 - 194.6 = 5.4$ $5.4 / 200$ $= 0.027$	allow ecf from their 200–194.6 allow 2.7% NB (200–194.6) / 200 gains 2 marks correct answer with or without working gains 3 marks deduct 1 mark if a unit is given	1 1 1
3(b)(ii)	any two from: <ul style="list-style-type: none"> • they are both very inefficient • efficiency increases as power increases • halogen bulbs are more efficient 	allow as the power increases it gives out more light accept halogen bulbs give out more light for the same wattage / power	2
Total			11

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question	answer	extra information	mark
4(a)	any one idea from. <ul style="list-style-type: none"> • (modern method) continuous so more efficient • (modern method) would convert more limestone • less contamination of quicklime in modern method • modern method less labour intensive • method A is easier to stop / start or quicker 		1
4(b)	$\text{CaCO}_3 \longrightarrow \text{CaO} + \text{CO}_2$ CaCO_3 $\text{CaO} + \text{CO}_2$	products in either order deduct 1 mark for formulae on incorrect side, or any attempt at balancing with more than a 1 in front of each formula. formulae must be correct with upper and lower case, and subscripted numerals.	1 1
4(c)(i)	sand sodium carbonate	either order	1 1
4(c)(ii)	clay		1

Question 4 continues on the next page

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Question 4 continued

question	answer	extra information	mark
4(d)	add to cement and mix: <ul style="list-style-type: none"> • sand • (idea of) aggregate / pebbles / stones / crushed rock • water 	ignore gypsum, but apply list principle to other materials if 'heating' suggested then deduct 1 mark	1 1 1
4(e)	$\text{H}^+ (\text{aq}) + \text{OH}^- (\text{aq}) \longrightarrow \text{H}_2\text{O} (\text{l})$ left-hand side right-hand side correct state symbols		1 1 1
Total			12

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question	answer	extra information	mark
5(a)	homeostasis		1
5(b)	negative feedback		1
5(c)	(cells in the) pancreas		1
	produce glucagon	correct spelling needed	1
	glucagon is secreted / put into the bloodstream	else allow 1 mark for glucose put into bloodstream from liver	1
	glucagon converts glycogen to glucose	correct spelling needed else allow 1 mark for the recognition of the conversion of glycogen to glucose	1
	in the liver		1
5(d)	diabetes		1
Total			8

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question	answer	extra information	mark
6	power = potential difference x current (no marks) current = power / potential difference current = 1500 / 120 current = 12.5 amps / A	correct answer with or without working gains 4 marks	1 1 1 1
Total			4

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question	answer	extra information	mark
7(a)(i)	variation		1
7(a)(ii)	difference: flower colour	may be implied by comparative statement	1
	reason: genetics	accept inherited	1
	difference: height		1
	reason: competition for light or tall ones had been shaded	accept environment but do not allow nutrients / water ignore genetics alone read whole response and mark matched difference and reason	1

Question 7 continues on the next page

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Question 7 continued

question	answer	extra information	mark
7(b)	<p>white form of colour gene must have been present in both parents but hidden or masked by the dominant form</p> <p>so white <u>allele</u> is recessive and red dominant</p> <p>parents both G g</p> <p>correct progeny (allow ecf from their parental gametes)</p> <p>identification of the white genotype (gg)</p> $ \begin{array}{c cc} & G & g \\ \hline G & GG & Gg \\ \hline g & Gg & gg \end{array} $	<p>allow only one red (allele or gene) needed to be red</p> <p>these could be shown in the Punnett square</p> <p>correct use of the term 'allele' somewhere in response is essential for 5 marks</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
Total			10

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question	answer	extra information	mark
8	<p>Destruction of rain forest ideas</p> <p>loss of habitat for animals/ indigenous peoples/ effect on biodiversity</p> <p>idea that rainforest is irreplaceable</p> <p>Climatic effects</p> <p>removal of forest reduces CO₂ uptake</p> <p>removal of forest may alter rainfall patterns</p> <p>BUT</p> <p>less CO₂ released from fossil fuels so better for environment or less global warming or biofuels carbon neutral</p> <p>biofuels renewable or fossil fuels non-renewable.</p> <p>fossil fuels have other uses (so need to be conserved)</p> <p>Effect on food supplies</p> <p>increased cost of food</p> <p>reduction of food supply</p> <p>impact on (poorest) people who starve</p> <p>BUT</p> <p>producing biofuels provides more local jobs</p> <p>a conclusion based on both pro and con from above.</p>	<p>2 marks maximum each for any two ideas.</p> <p>At least one positive effect stated for 4 marks</p> <p>ignore oxygen</p> <p>ignore increases CO₂ unless qualified with burning trees/ use of machinery</p> <p>1 mark for reasoned conclusion.</p>	<p>max 4</p> <p>1</p>
Total			5

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