



**General Certificate of Secondary Education  
June 2013**

**GCSE Science B**

**SCB2HP**

**(Specification 4500)**

**Unit 2: My Family and Home**

**Final**

**Mark Scheme**

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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.

## SCB2HP

## Question 1

question	answers	extra information	mark
1 (a)(i)	quarrying	accept mining accept dug out of the ground	1
1 (a)(ii)	heated with clay		1 1
1 (b)(i)	composite		1
1 (b)(ii)	steel any <b>one</b> from: <ul style="list-style-type: none"> <li>• flexible</li> <li>• high tensile strength</li> </ul>	accept iron  accept strong ignore hard	1 1
1 (c)(i)	any <b>three</b> from: <ul style="list-style-type: none"> <li>• same thickness of bar (for <u>repeat</u> readings at a given mass)</li> <li>• clamped in the same place</li> <li>• same length of bar (extending from the table)</li> <li>• masses attached at the same distance from the end / table</li> <li>• same composition / type of concrete</li> </ul>		3

Question 1 continues on the next page . . .

## SCB2HP

## Question 1 continued . . .

question	answers	extra information	mark
1(c) (ii)	qualitative statement concerning force and thickness	allow mass / weight allow width	1
	quantitative statement to illustrate	do not accept bigger accept the greater the thickness of the bar the more the force (needed to break it) (1) doubling the thickness of the concrete doubles the weight (needed to break it) (2) use of results to show doubling the thickness doubles the force (needed to break it) (2) for every 1 cm increase in thickness there is a 4.7 kg increase in the mass (needed to break it) (2)  accept an answer in the range 4.4 – 5.0 kg	1
1 (c)(iii)	28.1	accept an answer in the range 27.8 – 28.4	1
<b>Total</b>			<b>12</b>

## SCB2HP

## Question 2

question	answers	extra information	mark
2 (a)(i)	<ul style="list-style-type: none"> <li>• correct genes for mother (Gg)</li> <li>• correct genes for father (Gg)</li> <li>• genetic diagram filled in correctly</li> <li>• circle around gg</li> </ul>	<p>1 mark for each correct marking point</p> <p>Allow ecf if genes for mother and/or father incorrect.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>
2 (a)(ii)	correct probability 1 in 4	<p>accept 25%, <math>\frac{1}{4}</math>, 0.25</p> <p>mark according to <u>their</u> punnet square.</p>	1
2 (b)	<p>any <b>two</b> from:</p> <ul style="list-style-type: none"> <li>• Sickle Cell Anaemia</li> <li>• Haemophilia</li> <li>• Polydactyly</li> </ul>	<p>accept</p> <p>Huntingdon's</p> <p>any other correct inherited disorder.</p>	2
<b>Total</b>			<b>7</b>



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## Question 3

question	answers	extra information	mark
3 (a)(i)	a compound containing hydrogen and carbon ONLY  or made of carbon and hydrogen	do <b>not</b> accept any other chemical named	1
3 (a)(ii)	left-hand side	each point worth <b>1</b> mark	1
	<ul style="list-style-type: none"> <li>• O<sub>2</sub></li> </ul> right-hand side	do <b>not</b> accept O	1
	<ul style="list-style-type: none"> <li>• CO<sub>2</sub></li> <li>• H<sub>2</sub>O</li> </ul> balancing	both needed for <b>1</b> mark	1
<ul style="list-style-type: none"> <li>• 5O<sub>2</sub></li> <li>• 3CO<sub>2</sub></li> <li>• 4H<sub>2</sub>O</li> </ul>			
3 (b)(i)	£6.40	Allow £6.4 or 640p  Do not allow 640 with no/incorrect units	1
3 (b)(ii)	180 x 1.33 (or 4/3; 100/75)	allow	1
	240 / 16	180 / 16 or evidence of 11.25 / 0.75	1
	15	11.25 x 100/75; or 11.25 x 4/3	1
		15  Allow 8.4MJ for <b>2</b> marks or evidence of 135 for 1 mark.	
<b>Total</b>			<b>8</b>

**SCB2HP**
**Question 4**

Question No.	Answers	Additional Guidance	Marks
4	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.		6
<b>0 marks</b>	<b>Level 1 (1-2 marks)</b>	<b>Level 2 (3-4 marks)</b>	<b>Level 3 (5-6 marks)</b>
No relevant content on controlling blood glucose level.	One control method described briefly or two control methods stated.	Two control methods described with an attempt at an explanation of at least one.	All 3 methods of control described with an attempt at an explanation of at least two.
<b>Examples of the points made in the response</b>  Diet <ul style="list-style-type: none"> <li>• blood sugar / glucose rises after a meal</li> <li>• avoid foods that produce / contain lots of sugar</li> <li>• small regular meals</li> </ul> Exercise <ul style="list-style-type: none"> <li>• cells use respiration to get energy from glucose / sugar</li> <li>• more exercise means more glucose / sugar used up</li> <li>• so more glucose / sugar removed from blood</li> </ul> Take insulin <ul style="list-style-type: none"> <li>• promotes removal of sugar from blood</li> <li>• by liver / cells</li> <li>• conversion to glycogen</li> </ul>		<b>Extra Information</b>  accept a relevant comment for testing the blood (for glucose)  accept a relevant mention of obesity/overweight	
<b>Total</b>			<b>6</b>

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## Question 5

question	answers	extra information	mark
5 (a) (i)	Ultraviolet	accept UV	1
5 (a) (ii)	any <b>one</b> from: <ul style="list-style-type: none"> <li>• sun burn</li> <li>• skin cancer</li> </ul>	do not allow cancer.	1
5 (b) (i)	<ul style="list-style-type: none"> <li>• radiotherapy</li> <li>• sterilising equipment</li> </ul>	accept gamma knife <b>or</b> tracers gamma rays kill (cancer) cells do not accept to treat cancer unqualified	1
5 (b) (ii)	<ul style="list-style-type: none"> <li>• causes cell damage/mutation</li> <li>• they can damage the body</li> </ul>	accept can cause cancer, cell death, radiation sickness/burns, harmful do <b>not</b> accept causes death dangerous is insufficient.	1
5 (c)	as the wavelength increases the frequency decreases as the wavelength increases the energy of the wave goes down	accept the converse for each statement	1 1

Question 5 continues on the next page . . .

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## Question 5 continued . . .

question	answers	extra information	mark
5 (d)	$2.5 \times 10^9$ Hz gains <b>4</b> marks	$2.5 \times 10^9$ gains <b>3</b> marks  frequency = velocity / wavelength <b>or</b> frequency = $3 \times 10^8 / 12$ <b>or</b> frequency = $3 \times 10^8 / 0.12$ for <b>1</b> mark  $2.5 \times 10^7$ for <b>2</b> marks  Hz gains <b>1</b> mark	max. 4
<b>Total</b>			<b>10</b>

**SCB2HP**
**Question 6**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>6 (a)</b>	combustion	accept burning	1
	fission	do not accept fusion or radiation	1
<b>6 (b)</b>	water is heated to produce steam		1
	steam turns a turbine		1
	the turbine turns a generator (producing electricity)		1
<b>6 (c)</b>	<ul style="list-style-type: none"> <li>• radioactive material could get into drinking water</li> <li>• geological movement could expose the waste material</li> </ul>	do not accept comes up through the ground without explanation	1
<b>6 (d)</b>	any <b>three</b> from: <ul style="list-style-type: none"> <li>• look up record for people with cancer</li> <li>• look for clusters of patients near cables</li> <li>• for each person record how far away from the cables they live / work</li> <li>• do a scatter graph</li> <li>• look to see whether the incidence of cancer increases as the distance from the cable decreases</li> </ul>	accept the idea of comparing two groups of people close to and far from overhead power cables for <b>1 mark</b> .  accept comparing the two groups (close and far) to see whether those living closer get more cancers for <b>1 mark</b> .	3
<b>Total</b>			<b>9</b>

## SCB2HP

## Question 7

question	answers	extra information	mark
7 (a)	left-hand side (both needed)		1
	<ul style="list-style-type: none"> <li>• H<sup>+</sup></li> <li>• OH<sup>-</sup></li> </ul> right-hand side <ul style="list-style-type: none"> <li>• H<sub>2</sub>O</li> </ul>		1
7 (b) (i)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• different ingredients</li> <li>• different concentrations (of antacid)</li> <li>• different surface area (of antacid)</li> <li>• <b>A</b> is a stronger alkali</li> <li>• there is greater mass of the same alkali in <b>A</b></li> <li>• <b>A</b> is solid / tablet <b>or</b> the alkali is dissolved in the new antacid</li> </ul>	conclusions based on the graph are insufficient. Reasons for the differences required.	2
7 (b) (ii)	<ul style="list-style-type: none"> <li>• stomach contents will be more acidic with the new antacid than with Brand <b>A</b></li> <li>• new antacid works faster</li> <li>• (a dose of) new antacid does not neutralise as much acid as <b>A</b></li> <li>• new is better because it works faster</li> <li>• the idea that some acid is needed as it helps digestion in the stomach</li> </ul> Conclusion drawn	accept the converse when talking about Brand <b>A</b> .	3
			1
<b>Total</b>			<b>8</b>

UMS Conversion Calculator [www.aqa.org.uk/umsconversion](http://www.aqa.org.uk/umsconversion)