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General Certificate of Secondary Education
June 2013

GCSE Science B SCB2FP

(Specification 4500)

Unit 2: My Family and Home

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.

Further copies of this Mark Scheme are available from: aqa.org.uk

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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 <u>not</u> allow

Ignore of 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 7 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 1

question	answers	extra information	mark
1 (a)	antacid – 9 stomach acid – 2 water – 7		1 1 1
1 (b)(i)			1
1 (b)(ii)	any **two** from: • wear goggles / safety glasses • wear lab coat • wear gloves • work over a tray	if no other marks gained accept protective clothing for **1** mark	2
Total			**6**

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Question 2

question	answers	extra information	mark
2 (a)	fossil fuel non-renewable		1 1
2 (b)	B →C →E →D →A	all descriptions correct max. **3** marks additional guidance: C correct for **1** mark A correct for **1** mark E and D in correct order anywhere for **1** mark	3
2 (c)	30		1
2 (d)	any **two** from: • renewable • no fuel costs / cheaper to run • does not generate carbon dioxide / sulphur dioxide • does not contribute to the greenhouse effect / acid rain	accept won't run out if no other marks gained allow 'no pollution' for **1** mark	2
Total			**8**

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Question 3

question	answers	extra information	mark
3(a)	genetic environment(al) and genetic	allow genetic and environment(al)	1 1
3(b)(i)	<table><tr><td></td><td></td><td>Mother</td><td></td></tr><tr><td></td><td></td><td>G</td><td>g</td></tr><tr><td rowspan="2">Father</td><td>**G**</td><td>**GG**</td><td>Gg</td></tr><tr><td>g</td><td>**Gg**</td><td>**gg**</td></tr></table>	father's gamete row 1 correct (allow ecf for father's gamete) row 2 correct	1 1 1
3(b)(ii)	25% **or** 1 in 4 **or** 1:3 **or** 0.25	allow ecf from **3 (b)(i)**	1
3(b)(iii)	some embryos will be destroyed healthy embryos could be harmed during the process	 1 mark lost for each additional box ticked 1st and 3rd box ticked only	1 1
Total			**8**

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Question 4

question	answers	extra information	mark
4 (a)	mobile phones / cooking / satellite tv / satellite phone / satellite communication	do **not** accept microwaves unless followed by cooker/oven	1
	remote controls / toaster / oven / grill	accept IR heaters/massagers/mobile phone/thermal imaging cameras/passive IR sensor (PIR)	1
4(b)	longitudinal		1
4(c)(i)	33000		1
4(c)(ii)	sound is out of human hearing range	accept human range is 20-20000Hz allow error carried forward	1
Total			**5**

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Question 5

question	answers	extra information	mark
5 (a)(i)	joules		1
5 (a)(ii)	second		1
5 (b)(i)	LED (TV)	accept 0.1 / 0.1kW ignore any reason given	1
5 (b)(ii)	7.5	allow evidence of 0.30 x 25 for **1** mark	2
5(b)(iii)	90	allow 54 if using 4.5 allow ecf from 5(b)(ii) allow evidence of 7.5 x 12 for **1** mark allow evidence of 4.5x12 for **1** mark if using 4.5 kWh	2
Total			**7**

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Question 6

question	answers	extra information	mark
6 (a)	carbon and hydrogen	do **not** accept C and H	1
6 (b)	$C_{10}H_{22}$		1
6 (c)	any **one** from: • power stations • boilers/heating • vehicle fuels	 accept cooling homes/buildings	1
6 (d)(i)	three points correctly plotted line of best fit correctly plotted	allow correct plotting of two points for **1** mark	2 1
6 (d)(ii)	butane most energy released (per mol) when burning	 allow highest number of carbon atoms	1 1
Total			**8**

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Question 7

<table>
<tr><th>question</th><th colspan="3">answers</th><th>additional guidance</th><th>marks</th></tr>
<tr><td>7</td><td colspan="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.</td><td>6</td></tr>
<tr><td colspan="2">0 marks</td><td>Level 1 (1-2 marks)</td><td>Level 2 (3-4 marks)</td><td>Level 3 (5-6 marks)</td><td></td></tr>
<tr><td colspan="2">No relevant content on controlling blood glucose level.</td><td>One control method described briefly
or
two control methods stated.</td><td>Two control methods described with an attempt at an explanation of at least one.</td><td>All 3 methods of control described with an attempt at an explanation of at least two.</td><td></td></tr>
<tr><td colspan="3">Examples of the points made in the response

Diet
• blood sugar / glucose rises after a meal
• avoid foods that produce / contain lots of sugar
• small regular meals

Exercise
• cells use respiration to get energy from glucose / sugar
• more exercise means more glucose / sugar used up
• so more glucose / sugar removed from blood

Take insulin
• promotes removal of sugar from blood
• by liver / cells
• conversion to glycogen</td><td colspan="2">Extra Information

accept a relevant comment for testing the blood (for glucose)
accept a relevant mention of obesity/overweight</td><td></td></tr>
<tr><td>Total</td><td colspan="3"></td><td>6</td></tr>
</table>

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Question 8

question	answers	extra information	mark
8 (a)(i)	quarrying	accept mining accept dug out of the ground	1
8 (a)(ii)	heated with clay		1 1
8 (b)(i)	composite		1
8 (b)(ii)	steel any **one** from: • flexible • high tensile strength	accept iron accept strong ignore hard	1 1
8 (c)(i)	any **three** from: • same thickness of bar (for repeat readings at a given mass) • clamped in the same place • same length of bar (extending from the table) • masses attached at the same distance from the end / table • same composition / type of concrete		3

Question 8 continues on the next page . . .

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Question 8 continued

question	answers	extra information	mark
8 (c)(ii)	qualitative statement concerning force and thickness quantitative statement to illustrate	allow mass / weight allow width 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
8 (c)(iii)	28.1	accept an answer in the range 27.8 – 28.4	1
Total			**12**

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