Version 1.0

General Certificate of Secondary Education
June 2012

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.

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	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 <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 6(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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COMPONENT NAME: My World

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question	answer	extra information	mark
1(a)	all 3 points correctly plotted line of best fit added as a smooth curve	allow ± ½ square	1 1
1(b)(i)	50	accept correct answer using their line of best fit	1
1(b)(ii)	as temperature increases the time taken decreases the decrease in time taken is not linear / proportional	accept takes longer	1 1
1(c)	graph same shape line above previous line (ie takes more time)		1 1
Total			**7**

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question	answer	extra information	mark
2(a)(i)	so the paint cannot be seen by predators		1
2(a)(ii)	341	correct answer with or without working gains **2** marks if answer incorrect, allow $\frac{66 \times 62}{12}$ for **1** mark	2
2(b)	**Y** because it is visible **or** because **X** is camouflaged	no mark ignore hidden	 1
2(c)	there would have been more of **Y** than **X** because **X** would be less well camouflaged than **Y or** because **Y** would be better camouflaged than **X** so fewer **Y** would be eaten **or** so more of **X** would be eaten	 allow reference to **Y** not being seen by predators	1 1 1
Total			**7**

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question	answer	extra information	mark
3(a)	when the motor bike is approaching the frequency is increased	accept pitch for frequency answers must be comparative	1
	and the wavelength is decreased	allow wavelength mark once only	1
	when the motor bike is moving away the frequency is decreased		1
	(and the wavelength is increased) (1)	allow wavelength mark once only	
	the faster the bike the greater the effect	ignore any references to volume	1
3(b)	red shift	accept Doppler (effect) allow red shifted / shifting	1
3(c)	Big Bang		1
Total			**6**

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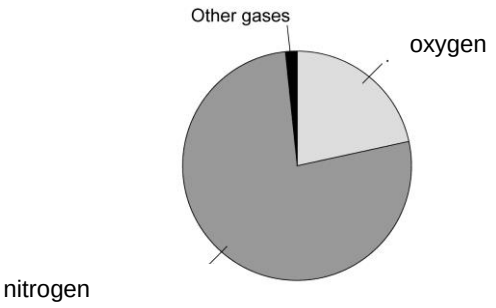
question	answer	extra information	mark
4(a)		**1** mark for each correct label	2
4(b)(i)	Miller and Urey	either way round	1
4(b)(ii)	any **two** from: • methane • hydrogen • ammonia		2
4(c)	$N_2 + 3H_2 \longrightarrow 2NH_3$	reactants correct = **1** mark product correct = **1** mark correctly balanced = **1** mark	max 3

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question	answer	extra information	mark

4(d)

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	There is a superficial account, which is poorly structured and demonstrates significant lack of detail.	The account has one or two omissions in detail and may not be in a logical sequence.	There is a complete account, presented in a logical sequence.

examples of the points made in the response	extra information
• the crust is broken into sections called (tectonic) plates • which float on the mantle • the continents are on the plates • idea of the mantle behaving like a liquid, so • convection currents in the mantle • caused by heat from the core • move the tectonic plates • some idea of very slowly.	

Total			14

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question	answer	extra information	mark
5(a)(i)	= 55%	correct answer with or without working gains **2** marks if answer incorrect, 22 / 40 x 100 gains **1** mark	2
5(a)(ii)	24	correct answer with or without working gains **2** marks if answer incorrect, 12 + 4 = 16 = 40% **or** 16/40 = 40% gains **1** mark	2
5(a)(iii)	producer doesn't move but the consumers do need to move secondary consumer needs more energy in movement because it needs to catch prey		1 1 1
5(b)	protein, carbohydrate, fats	all three correct for **2** marks 1 or 2 correct for **1** mark accept amino acids for protein accept glucose / starch for carbohydrate accept oils for fats accept any other correctly named organic molecule	max 2
Total			**9**

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question	answer	extra information	mark
6(a)	(CO_2 from the atmosphere) dissolved in seawater		1
	(CO_2) was used to form compounds in the shells / skeletons of marine organisms		1
	over millions of years the shells/skeletons were compressed to form limestone rock		1
6(b)	$Fe_2O_3 + 3CO \longrightarrow 2Fe + 3CO_2$		1
	CO		1
	CO_2	accept $2Fe_2O_3 + 3C \longrightarrow 4Fe + 3CO_2$	1
	correct balancing	for **3** marks	
6(c)	the idea that timber is made from trees which remove more carbon dioxide by photosynthesis than timber production makes		1
	the production of concrete, steel and aluminium all need energy which may be transferred from fossil fuels by burning		1
	burning fossil fuels produces carbon dioxide	allow aluminium needs a lot more electricity to be produced so produces more CO_2	1
	aluminium needs the most energy because it is extracted by electrolysis / is the more reactive metal so is responsible for the most carbon dioxide		1
Total			**10**

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question	answer	extra information	mark
7(a)	variation		1
	flight not needed because no predators		1
	less energy needed when not flying		1
	so there is more energy available for reproduction		1
	so flightless gene more likely to be passed on		1
7(b)	any **two** from: • camouflaged from rats **or** better hearing **or** better eyesight • able to run fast or for a long time so can escape from rats • are aggressive so could protect self against attack **or** have claws or sharp beak for defence • nesting in big colonies so rats only eat a small proportion of population	answers must be short-term, pre-existing adaptations do not accept answers that refer to future evolution adaptation must be accompanied by explanation for mark	2
Total			**7**

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