



**General Certificate of Secondary Education (GCSE-level)  
November 2011**

**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](http://aqa.org.uk)

Copyright © 2011 AQA and its licensors. All rights reserved.

**Copyright**

AQA retains the copyright on all its publications. However, registered schools / colleges for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to schools / colleges to photocopy any material that is acknowledged to a third party even for internal use within the schools / colleges

Set and published by the Assessment and Qualifications Alliance.

## 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. 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 lines 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 students 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)

Student	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Student	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, as shown in the column 'answers', 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;

### 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.

**COMPONENT NUMBER: SCB1HP**

**COMPONENT NAME: My World**

**SERIES: November 2011**

question	answer	extra information	mark
1(a)	$(200/1000) \times 100$ or $1000 - (750 + 50)$ = 20%	correct answer with or without working gains <b>2</b> marks	1 1
1(b)	any <b>three</b> from: <ul style="list-style-type: none"> <li>• correct reference to respiration</li> <li>• some of the energy is used to maintain body temperature <b>or</b> lost as heat</li> <li>• some of the energy is used in movement</li> <li>• some of the energy is lost in excretion <b>or</b> in waste <u>products</u></li> </ul>	eg some of the energy is lost as a result of respiration  ignore lost as waste	3
1(c)	pyramid in correct order, with correct labels  each box to scale  sensible scale and reasonable use of graph paper	best scales: 4 = 1 small square 8 = 1 small square	1  1 1
<b>Total</b>			<b>8</b>

**COMPONENT NUMBER: SCB1HP**

**COMPONENT NAME: My World**

**SERIES: November 2011**

question	answer	extra information	mark
<b>2(a)</b>	(as the source moves away) the wavelength (that the observer measures) increases and the frequency decreases	ignore further apart / stretches accept wave(length) gets longer	1
	<b>or</b>  (as the source moves towards) the wavelength decreases (1) and the frequency increases (1)	ignore louder / quieter / deeper accept pitch for frequency if clearly reference to sound  ignore closer together / squashes	1
<b>2(b)</b>	light (from the distant stars) is shifted <b>or</b> moved into the red spectrum <b>or</b> red shifted <b>or</b> black lines are shifted / moved to the right / red	accept the observed wavelength of the dark line from the distant stars has increased	1
	this means that the stars are moving away (from Earth) / apart from Earth	accept reference to 'the further away the faster the movement' <b>or</b> 'the further the red shift the faster the movement' <b>or</b> the bigger the red shift the faster the movement'	1
<b>Total</b>			<b>4</b>

**COMPONENT NUMBER: SCB1HP**

**COMPONENT NAME: My World**

**SERIES: November 2011**

question	answer	extra information	mark
3(a)(i)	respiration	apply list principle	1
3(a)(ii)	combustion / burning	apply list principle	1
3(a)(iii)	decomposers	accept bacteria / fungi / microbes / microorganisms / mould / detritivores eg worms  ignore insects  allow maggots	1
3(b)	warm	do <b>not</b> allow hot	1
	moist / damp	ignore heat	1
	aerobic / aerated	ignore wet accept (plenty of) oxygen / air ignore any explanations ignore light / dark	1
3(c)	any <b>three</b> from: <ul style="list-style-type: none"> <li>• no information on levels before 1950</li> <li>• (60 years) is not long enough to monitor changes</li> <li>• the scale on the y axis makes the level appear to change considerably more</li> <li>• the graph shows data from only one location on the planet</li> <li>• there is nothing to show temperature rise matches / follows rise in CO<sub>2</sub></li> <li>• not valid because Hawaii has volcanoes <u>which produce CO<sub>2</sub></u></li> </ul>		3
<b>Total</b>			<b>9</b>

**COMPONENT NUMBER: SCB1HP**

**COMPONENT NAME: My World**

**SERIES: November 2011**

question	answer	extra information	mark
----------	--------	-------------------	------

<b>4(a)</b>			
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 2, and apply a 'best-fit' approach to the marking.			
<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.	At least one feature with a reason <b>or</b> two features described.	There may be reference to both animals with at least two features with reasons described <b>or</b> at least one feature described with a scientific explanation.	There must be reference to both animals and at least two features described together with a scientific explanation.
<b>examples of areas addressed in the response</b>		<b>extra information</b>	
<ul style="list-style-type: none"> <li>• Ear size, surface area and heat loss</li> <li>• Body size, surface area to volume ratio and heat loss</li> <li>• Body size, fat, insulation and heat loss</li> <li>• Fur thickness, insulation and heat loss</li> <li>• Fur colour, camouflage and predation</li> </ul>		responses should be correctly linked to features from the images and data	

**Question 4 continues on the next page ...**



**COMPONENT NUMBER: SCB1HP**

**COMPONENT NAME: My World**

**SERIES: November 2011**

question	answer	extra information	mark
4(b)	<p>as island covered with forest, food on the island is mainly insects and not much grass seed</p> <p>variation produces a range of beak types</p> <p>the birds with more slender beaks / Finch B can get more food (insects),</p> <p>therefore they are more likely to survive and breed / mate / reproduce</p> <p>this means the genes for slender beaks / Finch B are passed on</p>	<p>accept mutation produces slender beaks <b>or</b> Finch B</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
<b>Total</b>			<b>11</b>

**COMPONENT NUMBER: SCB1HP**

**COMPONENT NAME: My World**

**SERIES: November 2011**

question	answer	extra information	mark
<b>5(a)</b>	contents will go yellow		1
	this is because respiration releases carbon dioxide	allow breathes out / produces / releases CO <sub>2</sub>	1
<b>5(b)</b>	contents will go purple		1
	this is because <u>photosynthesis</u> removes carbon dioxide	ignore produces oxygen	1
<b>5(c)</b>	contents will go yellow		1
	because the plant is respiring so carbon dioxide increases	ignore any references to oxygen	1
	but there is no light for <u>photosynthesis</u> so carbon dioxide not removed	do not allow suggestion that the plant <b>starts</b> to respire	1
<b>Total</b>			<b>7</b>

**COMPONENT NUMBER: SCB1HP**

**COMPONENT NAME: My World**

**SERIES: November 2011**

question	answer	extra information	mark
6(a)	the more carbon atoms, the higher the boiling point	accept converse	1
6(b)(i)	y axis drawn and labelled correctly	+ or – ½ square ignore any line drawn beyond the points plotted	1
	correct plotting		1
	smooth curve through all points		1
6(b)(ii)	the more carbons the higher the viscosity		1
	the relationship is not directly proportional <b>or</b> is non-linear		1
6(b)(iii)	because it is a gas		1
<b>Total</b>			<b>7</b>

---

**COMPONENT NUMBER: SCB1HP**

**COMPONENT NAME: My World**

**SERIES: November 2011**

question	answer	extra information	mark
7(a)	$2\text{Pb} + \text{CO}_2$	2 must be subscript in $\text{CO}_2$ either order	1
7(b)	left-hand side <b>3</b> (CO)		1
	right-hand side <b>2</b> (Fe), <b>3</b> ( $\text{CO}_2$ )		1
7(c)	26 protons		1
	30 neutrons		1
<b>Total</b>			<b>5</b>

## COMPONENT NUMBER: SCB1HP

### COMPONENT NAME: My World

SERIES: November 2011

question	answer	extra information	mark
<b>8(a)</b>	carbon dioxide has decreased	either order	1
	oxygen has increased	ignore reasons and quoted values	1
<b>8(b)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• methane</li> <li>• hydrogen</li> <li>• ammonia</li> <li>• water vapour</li> </ul>		2
<b>8(c)(i)</b>	fractional distillation	distillation alone is not sufficient	1
<b>8(c)(ii)</b>	helium – balloons	accept welding / cryogenics / diving gas	1
	argon – <u>filament</u> lamps / bulbs <b>or</b> electrical discharge tubes	accept lasers / welding / cutting / in double glazing / idea of inert packaging atmosphere	1
<b>8(d)</b>	ammonia		1
	manufacturing fertilisers	accept used in hair dye / cleaning products / refrigerant / making nitric acid	1
<b>Total</b>			<b>9</b>

The UMS conversion calculator can be found on the following web link:

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