

**UNIT 2: (Double Award) CHEMISTRY 1  
HIGHER TIER****MARK SCHEME****GENERAL INSTRUCTIONS**Recording of marks

Examiners must mark in red ink.

One tick must equate to one mark (apart from the questions where a level of response mark scheme is applied).

Question totals should be written in the box at the end of the question.

Question totals should be entered onto the grid on the front cover and these should be added to give the script total for each candidate.

Marking rules

All work should be seen to have been marked.

Marking schemes will indicate when explicit working is deemed to be a necessary part of a correct answer.

Crossed out responses not replaced should be marked.

Credit will be given for correct and relevant alternative responses which are not recorded in the mark scheme.

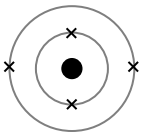
Extended response question

A level of response mark scheme is used. Before applying the mark scheme please read through the whole answer from start to finish. Firstly, decide which level descriptor matches best with the candidate's response: remember that you should be considering the overall quality of the response. Then decide which mark to award within the level. Award the higher mark in the level if there is a good match with both the content statements and the communication statements.

Marking abbreviations

The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.

cao = correct answer only  
ecf = error carried forward  
bod = benefit of doubt

Question			Marking details				Marks Available			
							AO1	AO2	AO3	Total
1	(a)	(i)		Number of protons 19 Number of neutrons 20 Number of electrons 19  All three correct (2) Any two correct (1)		2		2		
		(ii)	I	Beryllium / Be	1			1		
			II	Sulfur / S		1		1	1	
		(iii)				1		1		
	(b)	(i)		3		1		1		
		(ii)		K <sub>2</sub> CO <sub>3</sub>		1		1		
	(c)			Similarity – both have 5 protons (1) Difference – one has 5 neutrons, the other has 6 (1)  Accept same number of protons and different number of neutrons for (1) Do not accept reference to electrons, atomic number or mass number	1	1		2	1	
				<b>Question 1 total</b>	<b>2</b>	<b>7</b>	<b>0</b>	<b>9</b>	<b>2</b>	<b>0</b>

## GCSE SCIENCE (Double Award) Sample Assessment Materials 108

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)			Both increase as temperature increases (1) NaCl very slightly and CuSO <sub>4</sub> significantly (1)  Any two of following (1) Solubilities the same at 52°C NaCl more soluble than CuSO <sub>4</sub> below 52°C NaCl less soluble than CuSO <sub>4</sub> above 52°C			1 1	3	3	
	(b)			56 – 29 read from graph (1) Error carried forward  $\frac{27}{2} = 13.5$ (1)  Award (2) for correct answer only			2	2	2	2
	(c)			Water freezes at 0°C and boils at 100°C – <b>both</b> needed Accept these are the freezing point and boiling point of water	1			1		1
				<b>Question 2 total</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>6</b>	<b>5</b>	<b>3</b>

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
3	(a)	(i)	Must compare with lithium <b>and</b> potassium e.g. Moves about more quickly than lithium but less quickly than potassium / more bubbles than lithium but fewer than potassium	1			1		1
		(ii)	Formulae – NaOH and H <sub>2</sub> (1) both needed  Balancing i.e. 2NaOH (1)  Both formulae must be correct to award balancing mark		2		2	1	
	(b)	(i)	0.02	1			1	1	
		(ii)	0.01		1		1	1	
		(iii)	0.62 (2)  If answer incorrect award (1) for $0.01 \times M_r$		2		2	2	
			<b>Question 3 total</b>	<b>2</b>	<b>5</b>	<b>0</b>	<b>7</b>	<b>5</b>	<b>1</b>

## GCSE SCIENCE (Double Award) Sample Assessment Materials 110

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)			Graph <b>B</b> (1)			1			
				Higher temperature therefore faster reaction (1)		1				
				Faster reaction shown by steeper curve / final volume of gas being reached in less time (1)			1			
				Same mass used therefore same final volume of gas (1)			1	4		4
	(b)			Graph <b>D</b> (1)			1			
				Twice the number of magnesium particles present therefore twice the volume of gas formed (1)			1	2	1	2
				<b>Question 4 total</b>	<b>0</b>	<b>1</b>	<b>5</b>	<b>6</b>	<b>1</b>	<b>6</b>

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
5				<p>Step 1 Use of soap solution to identify distilled water, needs <b>fair testing</b> element for both marks Add 1 cm<sup>3</sup> soap solution to 5 cm<sup>3</sup> of each of samples A, B and C (1) Shake for 1 minute/shake for the same time (1) [Accept add soap to each water sample and shake for (1)]</p> <p>Distilled water most froth (1)</p> <p>Step 2 Boil unidentified samples and repeat step 1 (1)</p> <p>Temporary hard water lathers after boiling; permanent hard water still does not lather after boiling (1)</p> <p>Credit alternative methods – up to (3) for method/fair test and up to (2) for conclusions</p>	5	0	0	5	0	5
				<b>Question 5 total</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>5</b>

## GCSE SCIENCE (Double Award) Sample Assessment Materials 112

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
6	(a)	(i)	<p>Must state that evidence partially supports the argument in order to gain any credit</p> <p>Solar activity and temperature change correlate up to 1980 (1)</p> <p>But temperature increases as solar activity decreases after 1980 (1)</p>			2	2	2	
		(ii)	<p>Increase over each 50 year period given i.e. 0.0004, 0.0006, 0.0009, 0.0013 and 0.0058 (1)</p> <p>Greater increase in carbon dioxide levels over every 50 year period (1)</p>			2	2	2	
	(b)		<p>Allows the amount of carbon dioxide in the atmosphere at the time that the ice formed to be measured (1)</p> <p>Provides data which pre-dates that which was measured at the time / goes back much further in time (1)</p>	1	1		2		
			<b>Question 6 total</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>6</b>	<b>4</b>	<b>0</b>



Question			Marking details	Marks Available						
				AO1	AO2	AO3	Total	Maths	Prac	
7	(a)		All 4 points plotted corrected (2) [Credit (1) for 2 or 3 correct points]  Straight line drawn through (0,0) and reasonable effort at best fit (1)		2					
	(b)	(i)	Correct value read from graph – approximately 0.24 (1) Tolerance $\pm 0.005$	1			1	1		
		(ii)	$\frac{1}{63.5} : \frac{0.24}{16}$ (1)  0.0157 : 0.015 $\rightarrow$ 1:1  CuO (1)  No error carried forward possible		2		2	2		
	(c)		Any two of following for up to (2) each  Heated until mass remained constant (1) all oxygen removed (1)  Weighed in the reaction tube (1) no oxide lost in transfer (1)  Used 2 decimal place balance (1) minimise error when very small masses are measured (1)	4			4			4
			<b>Question 7 total</b>	<b>5</b>	<b>4</b>	<b>1</b>	<b>10</b>	<b>6</b>		<b>4</b>

## GCSE SCIENCE (Double Award) Sample Assessment Materials 114

Question		Marking details	Marks Available					
			AO1	AO2	AO3	Total	Maths	Prac
8	(a)	<p><b>Indicative content</b></p> <p>Potassium and fluorine will react most violently; Group 1 more reactive down group and Group 7 less reactive down group; bottom of Group 1 and top of Group 7 are most reactive            Electronic structures – K (2,8,8,1) and F (2,7)            Outer electron to be lost is further from nucleus in K than it is in Li and Na therefore less strongly held / more easily lost            Outer shell is closer to nucleus in F than it is in Cl and Br therefore electron is more strongly attracted / more easily gained</p> <p><b>5–6 marks:</b> Correct elements selected, trend in reactivity clearly explained in terms of ease of electron loss/gain and how that is related to distance from the nucleus  <i>There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</i></p> <p><b>3–4 marks:</b> Correct elements selected, good attempt at explanation of trend in terms of electron loss/gain  <i>There is a line of reasoning which is partially coherent, largely relevant, supported by some evidence and with some structure. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</i></p> <p><b>1–2 marks:</b> Correct elements selected, correct electronic structures  <i>There is a basic line of reasoning which is not coherent, largely irrelevant, supported by limited evidence and with very little structure. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</i></p> <p><b>0 marks:</b> No attempt made or no response worthy of credit.</p>	6			6		1

Question			Marking details	Marks Available													
				AO1	AO2	AO3	Total	Maths	Prac								
8	(b)	(i)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Ion</th> <th>Observation</th> </tr> </thead> <tbody> <tr> <td>chloride</td> <td>white precipitate</td> </tr> <tr> <td>bromide</td> <td>cream / off-white precipitate</td> </tr> <tr> <td>iodide</td> <td>yellow precipitate</td> </tr> </tbody> </table> <p>Must include precipitate All three correct (2) Any two correct (1)</p>	Ion	Observation	chloride	white precipitate	bromide	cream / off-white precipitate	iodide	yellow precipitate	2			2		2
		Ion	Observation														
chloride	white precipitate																
bromide	cream / off-white precipitate																
iodide	yellow precipitate																
		(ii)	$2\text{AgNO}_3 + \text{CaCl}_2 \rightarrow 2\text{AgCl} + \text{Ca}(\text{NO}_3)_2$ (3)  If equation not correct award (1) for each of following $\text{CaCl}_2$ on reactant side $\text{AgCl}$ and $\text{Ca}(\text{NO}_3)_2$ on product side Award (1) for ionic equation – $\text{Ag}^+ + \text{Cl}^- \rightarrow \text{AgCl}$		3			1									
			<b>Question 8 total</b>	<b>8</b>	<b>3</b>	<b>0</b>	<b>11</b>	<b>1</b>	<b>3</b>								

**HIGHER TIER****SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES**

<b>Question</b>	<b>AO1</b>	<b>AO2</b>	<b>AO3</b>	<b>TOTAL MARK</b>	<b>MATHS</b>	<b>PRAC</b>
<b>1</b>	<b>2</b>	<b>7</b>	<b>0</b>	<b>9</b>	<b>2</b>	<b>0</b>
<b>2</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>6</b>	<b>5</b>	<b>3</b>
<b>3</b>	<b>2</b>	<b>5</b>	<b>0</b>	<b>7</b>	<b>5</b>	<b>1</b>
<b>4</b>	<b>0</b>	<b>1</b>	<b>5</b>	<b>6</b>	<b>1</b>	<b>6</b>
<b>5</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>5</b>
<b>6</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>6</b>	<b>4</b>	<b>0</b>
<b>7</b>	<b>5</b>	<b>4</b>	<b>1</b>	<b>10</b>	<b>6</b>	<b>4</b>
<b>8</b>	<b>8</b>	<b>3</b>	<b>0</b>	<b>11</b>	<b>1</b>	<b>3</b>
<b>TOTAL</b>	<b>24</b>	<b>24</b>	<b>12</b>	<b>60</b>	<b>24</b>	<b>22</b>