



# **GCSE MARKING SCHEME**

**SCIENCE B**

**JANUARY 2012**

## **INTRODUCTION**

The marking schemes which follow were those used by WJEC for the January 2012 examination in GCSE SCIENCE B. They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

	<b>Page</b>
Unit 2 – Foundation Tier	1
Unit 2 – Higher Tier	5

## UNIT 2

### FOUNDATION TIER

Question	Answers/Explanatory Notes	Mark												
1.	<p>(a) (i) 1 mark each correct response.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Element</th> <th style="text-align: center;">Symbol</th> <th style="text-align: center;">Metal/Non Metal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">sodium</td> <td style="text-align: center;">Na</td> <td style="text-align: center;"><b>metal</b></td> </tr> <tr> <td style="text-align: center;">carbon</td> <td style="text-align: center;"><b>C (NOT:c)</b></td> <td style="text-align: center;">non-metal</td> </tr> <tr> <td style="text-align: center;"><b>zinc</b></td> <td style="text-align: center;">Zn</td> <td style="text-align: center;">metal</td> </tr> </tbody> </table> <p>(b) Element <b>X</b> and element <b>Z</b> <b>(Both X and Z must be stated for mark)</b></p>	Element	Symbol	Metal/Non Metal	sodium	Na	<b>metal</b>	carbon	<b>C (NOT:c)</b>	non-metal	<b>zinc</b>	Zn	metal	<p><b>3</b></p> <p><b>1</b></p>
Element	Symbol	Metal/Non Metal												
sodium	Na	<b>metal</b>												
carbon	<b>C (NOT:c)</b>	non-metal												
<b>zinc</b>	Zn	metal												
2.	<p>(a) Bronchitis – 2 (Smoking) (1) Liver disease – 3 (Alcohol) (1) Obesity – 1 (Fatty foods) (1)</p> <p>(b) (i) High blood pressure (1)</p> <p>(ii) Muscle cramps (1)</p>	<p><b>3</b></p> <p><b>1</b></p> <p><b>1</b></p>												
3.	<p>All four correct 3 marks; three correct 2 marks; two correct 1 mark; one correct 0 marks.</p> <p>Order (top to bottom): Hydrochloric acid, vinegar, baking soda, ammonia</p>	<p><b>3</b></p>												
4.	<p>(a) nucleus (1), chromosomes (1), genes (1)</p> <p>(b) (i) 46/23 pairs (1)</p> <p>(ii) Skin cell: Chromosomes are in pairs/ 23 pairs/there are 46 chromosomes (1)</p> <p>Sperm cell: Only 23 chromosomes/not found in pairs (1)</p> <p>(iii) Female XX chromosome instead of Male XY</p> <p>(c) Mutation</p>	<p><b>3</b></p> <p><b>1</b></p> <p><b>2</b></p> <p><b>1</b></p> <p><b>1</b></p>												

Question	Answers/Explanatory Notes	Mark
5.	<p>(a) (i)&amp;(ii) iron ore, limestone</p> <p>(b) (i) carbon + <b>oxygen</b> → carbon monoxide <i>Do <b>not</b> accept air in place of oxygen</i></p> <p>(ii) iron oxide / Fe<sub>2</sub>O<sub>3</sub></p> <p>(c) Minimum Temp = 1535°C (1) Below 1535°C iron is a solid (which cannot be easily separate from coke). (1) Alternative response. above 1535°C iron is liquid, (which flows to bottom of furnace/easily separated). (1) Not just: 1535 is melting point</p>	<p><b>2</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>2</b></p>
6.	<p>(a) → potassium chloride (1) + water (1)</p> <p>(b) Green</p> <p>(c) (i) One mark can be awarded for making a valid point <i>'Yellow colour means the pH is 5 – 6' (1)</i> The second mark can only be awarded if the candidate coherently and correctly links the conclusion to the point above. <i>'therefore (salt) solution not neutral' (1)</i></p> <p>(ii) To find the neutralisation point.</p> <p>(iii) Otherwise indicator will be mixed with salt/to produce pure salt</p> <p>(iv) Evaporation</p> <p>(d) Any two of: wear safety glasses, wear lab coat, wear gloves</p>	<p><b>2</b></p> <p><b>1</b></p> <p><b>2</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>2</b></p>

Question	Answers/Explanatory Notes	Mark															
7.	<p>(a) X-rays 2D but CT 3D / X-ray one image / CT large number of processed images</p> <p>(b) Destroys DNA/increased risk of cancer/radiation sickness</p> <p>(c) (i)</p> <table border="1"> <tr> <td></td> <td>(1)</td> <td></td> </tr> <tr> <td></td> <td>d</td> <td>d</td> </tr> <tr> <td>(1)</td> <td>(1) Dd</td> <td>Dd</td> </tr> <tr> <td>D</td> <td></td> <td></td> </tr> <tr> <td>d</td> <td>dd</td> <td>dd</td> </tr> </table> <p>Use ecf to mark grid</p> <p>(ii) .....<b>50%</b> -Answer must be based upon Punnett square.</p> <p>(iii) Indicate high risk of baby suffering from disease (1) Perform genetic screening of developing embryo/ consider medical options if positive/ use donor eggs / IVF/use sperm bank/adopt. (1)</p>		(1)			d	d	(1)	(1) Dd	Dd	D			d	dd	dd	<p>1</p> <p>1</p> <p>3</p> <p>1</p> <p>2</p>
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	d	d															
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d	dd	dd															
8.	<p>(a) More affluent (money), able to buy a balanced/healthy diet.</p> <p>(b) (i) 3410 Correct workings but wrong answer, (1)</p> <p>(ii) All obese people are registered by the GP/have a GP</p> <p>(iii) Survey the populations (in the different regions)</p>	<p>2</p> <p>2</p> <p>1</p> <p>1</p>															
9.	<p>(a) Polymerisation</p> <p>(b) Ethene molecules are small/polythene molecules are long/large</p> <p>(c) Any two from - cheap/inexpensive/water proof/flexible/strong</p>	<p>1</p> <p>1</p> <p>2</p>															

Question	Answers/Explanatory Notes	Mark
(d)	<p><b>Indicative content</b></p> <ul style="list-style-type: none"> <li>• Use less resources to make bags</li> <li>• Effect on – world’s oceans/marine life</li> <li>• Effect on land fill</li> <li>• Non-biodegradable</li> <li>• Reuse/recycle</li> </ul> <p>5 – 6 marks     The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusion or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3 – 4 marks     The candidate construct an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1 – 2 marks     The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks         The candidate does not make any attempt or give a relevant answer worthy of credit.</p>	<p><b>6</b> <b>(QWC)</b></p> <p><b>6</b></p>

## UNIT 2

### HIGHER TIER

Question	Answers/Explanatory Notes	Mark															
1. (a)	X-rays 2D CT 3D (1) X-ray one image CT large number of processed images (1)	<b>2</b>															
(b)	Destroys DNA/increased risk of cancer/radiation sickness	<b>1</b>															
(c) (i)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%; text-align: center;">(1)</td> <td style="width: 33%;"></td> </tr> <tr> <td></td> <td style="text-align: center;">d</td> <td style="text-align: center;">d</td> </tr> <tr> <td style="text-align: center;">(1)</td> <td style="text-align: center;">(1) Dd</td> <td style="text-align: center;">Dd</td> </tr> <tr> <td style="text-align: center;">D</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">d</td> <td style="text-align: center;">dd</td> <td style="text-align: center;">dd</td> </tr> </table>		(1)			d	d	(1)	(1) Dd	Dd	D			d	dd	dd	<b>3</b>
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(ii)	....50....% -Answer must be based upon Punnett square(1)																
(iii)	Indicate high risk of baby suffering from disease (1) Perform genetic screening of developing embryo/ consider medical options if positive/ use donor eggs and IVF/use sperm bank/adopt. (1)	<b>2</b>															
2. (a)	More affluent (money), able to buy a balanced/healthy diet	<b>2</b>															
(b) (i)	3410 Correct workings but wrong answer (1)	<b>2</b>															
(ii)	All obese people are registered the GP/have a GP	<b>1</b>															
(iii)	Survey the populations (in the different regions)	<b>1</b>															

Question	Answers/Explanatory Notes	Mark
3. (a)	Polymerisation	1
(b)	Ethene molecules are small/polythene molecules are long/large	1
(c)	Any two from – cheap; inexpensive; water proof; flexible; strong.	2
(d)	<p>Indicative content</p> <ul style="list-style-type: none"> <li>• Use less resources to make bags</li> <li>• Effect on – world’s oceans/marine life</li> <li>• Effect on land fill</li> <li>• Non-biodegradable</li> <li>• Reuse/recycle</li> </ul> <p>5 – 6 marks      The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusion or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3 – 4 marks      The candidate construct an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1 – 2 marks      The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks            The candidate does not make any attempt or give a relevant answer worthy of credit.</p>	<p><b>6(QWC)</b></p> <p><b>6</b></p>



Question	Answers/Explanatory Notes	Mark
4. (a) (i)	Neutralisation (accept acid-base reaction)	1
	(ii) Missing Numbers 2, 1 respectively	2
(b)	Calcium carbonate + hydrochloric acid → calcium chloride + carbon dioxide + water  Reactants correct (1) Products following an arrow (1)	2
(c) (i)	Use pH meter	1
	(ii) One mark can be awarded for making a valid point:  Tablet B is most effective since pH is raised most by these tablets  The second mark can only be awarded if the candidate coherently and correctly links the two points together.	2
5. (a)	Children/foetus will be exposed to radiation. (1) Young children (and foetus) are (more) sensitive to radiation/DNA more easily changed/damaged (than older people) (1)	2
(b) (i)	Radioisotope injected/inviter/insider the body (1) to treat cancer (1)	2
(ii)	Time taken for $\frac{1}{2}$ (1) the number of radioactive nuclei to decay (1) The second mark can only be awarded if the candidate coherently and correctly links the two parts together.	2
(iii)	Fraction = 1/16 correct workings only – 1mark	2
(c)	One mark for making valid point: DNA of cancerous cells damaged (1) so causing them to die/reproduce more slowly (1) Second point can only be awarded if two points coherently and correctly linked	2

Question	Answers/Explanatory Notes	Mark
6. (a)	Total fats AMBER/MEDIUM (1) Salt RED/High (1)	2
(b)	Allows fair comparison	1
(c)	100 x 427/2580 (1) 16.6% (Accept 16, 16.5, 16.55, 17%)	2
(d)	<p><b>Indicative content</b></p> <ul style="list-style-type: none"> <li>• Reduce fat/saturated fat/reduce animal fat/use vegetable fat</li> <li>• Decreasing fat in diet (helps) reduce weight gain/obesity</li> <li>• Decreasing fat also reduces chance of cardiovascular disease/chance of heart attack/stroke.</li> <li>• Reduce salt (amber)</li> <li>• Too much salt increase chance of high blood pressure/stroke/heart attack</li> </ul> <p>5 – 6 marks      The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusion or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3 – 4 marks      The candidate construct an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1 – 2 marks      The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks            The candidate does not make any attempt or give a relevant answer worthy of credit.</p>	6 (QWC)

Question	Answers/Explanatory Notes	Mark
7. (a)	$\text{CO}_2 + \text{C} \rightarrow 2\text{CO}$ 1 mark correct formula used 1 mark correct balancing	<b>2</b>
(b)	1 mark for a valid point: Removes oxygen (1) reducing iron ore/iron oxide to iron (1)	
(c)	Two points must be coherently linked to obtain 2 marks  Any two of: cost of labour, transport, lower cost of imports	<b>2</b>



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