



# **GCSE MARKING SCHEME**

**SCIENCE B**

**SUMMER 2014**

## **INTRODUCTION**

The marking schemes which follow were those used by WJEC for the Summer 2014 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 1 - Foundation Tier	1
Unit 1 - Higher Tier	5
Unit 2 - Foundation Tier	10
Unit 2 - Higher Tier	13

**GCSE SCIENCE B**  
**UNIT 1 FOUNDATION TIER (4781/01)**  
**SUMMER 2014 MARK SCHEME**

Question	Marking detail	Mark												
<b>1</b> (a) (i)  (ii)  (iii)  (b) (i)  (ii)	Natural selection	1												
	Genes	1												
	Well suited to the environment	1												
	The variety / range (of life) (1) in the world / habitat / ecosystem (1)	2												
	Richer in tropics / rainforest / equator (1) because of greater resources / more favourable living conditions (1) (accept converse). <i>The second point can be awarded for coherently and correctly linking the conclusion.</i>	2												
<b>2</b>	<p>1 mark for each correct answer  <i>Correct words (bold text) to complete statement are shown in the table below.</i></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Intensive farming method</th> <th style="text-align: center;">Reason for use</th> <th style="text-align: center;">Disadvantage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Herbicide spray</td> <td style="text-align: center;">plants</td> <td style="text-align: center;">biodiversity</td> </tr> <tr> <td style="text-align: center;">Fertiliser spray</td> <td style="text-align: center;">nutrients</td> <td style="text-align: center;">rivers</td> </tr> <tr> <td style="text-align: center;">'Battery' farming</td> <td style="text-align: center;">output</td> <td style="text-align: center;">indoors</td> </tr> </tbody> </table>	Intensive farming method	Reason for use	Disadvantage	Herbicide spray	plants	biodiversity	Fertiliser spray	nutrients	rivers	'Battery' farming	output	indoors	6
Intensive farming method	Reason for use	Disadvantage												
Herbicide spray	plants	biodiversity												
Fertiliser spray	nutrients	rivers												
'Battery' farming	output	indoors												
<b>3</b> (a)  (b) (i)  (ii)	Sunlight	1												
	The shrimps (intake mercury) as they feed / eat algae.	1												
	As bigger animals eat smaller animals/polar bears eat a lot (1) bioaccumulation / the concentration level of mercury increases / to toxic levels. (1) <i>The second point can be awarded for coherently and correctly linking the conclusion.</i>	2												
<b>4</b> (i)  (ii)  (iii)  (iv)  (v)	Gamma rays Microwaves	2												
	From visible to radio waves graphs are identical / maximum wavelength of radio waves the same / at longer UV wavelength, the graphs are similar / they both go down to 10 cm / both have a maximum in the visible region.	1												
	No X-rays in the theoretical graph / 'kink' (in UV region) / starts at a longer wavelength (1)	1												
	Longest wavelength = 10 cm	1												
	Subs (1) answer = 3 000 000 000Hz (1)	2												

Question	Marking detail	Mark												
<b>5</b> (a)	Labels down: crater – volcano – ice cap <i>All correct (2); 1 correct (1)</i>	2												
(b) (i)	Lava / molten rock / magma	1												
(ii)	Must be a molten core / hot / liquid core	1												
(iii)	Volcano formed at their <u>boundaries</u> / where they meet / moving over each other	1												
(c) (i)	Craters caused by meteors / asteroids	1												
(ii)	More meteors got through atmosphere / don't burn up	1												
(d) (i)	Temperatures must be low	1												
(ii)	Global warming (1) because carbon dioxide is a greenhouse gas / carbon dioxide traps heat (1) <i>The second point can be awarded for coherently and correctly linking the conclusion.</i>	2												
<b>6</b> (a)	Because new trees are planted / more trees are grown (1) to replace those cut down (1) <i>The second point can be awarded for coherently and correctly</i>	2												
(b) (i)	Carbon dioxide / CO <sub>2</sub>	1												
(ii)	Carbon dioxide / CO <sub>2</sub>	1												
(iii)	Carbon emissions caused by burning are balanced by carbon intake by photosynthesis	1												
(c) (i)	400 MW	1												
(ii)	subs 400/500 [1] (allow ecf from bi) ans = 80%	2												
<b>7</b>	1 mark for each correct answer (bold text)	4												
	<table border="1"> <thead> <tr> <th>Action</th> <th>Is it reduce, reuse or recycle?</th> </tr> </thead> <tbody> <tr> <td><i>Place glass bottles in bottle bank</i></td> <td><i>recycle</i></td> </tr> <tr> <td>Make compost from left over fruit and vegetable peelings</td> <td>recycle</td> </tr> <tr> <td>Buy food with less packaging</td> <td>reduce</td> </tr> <tr> <td>Buy 'bags for life'</td> <td>re-use</td> </tr> <tr> <td>Don't buy more than you need</td> <td>reduce</td> </tr> </tbody> </table>	Action	Is it reduce, reuse or recycle?	<i>Place glass bottles in bottle bank</i>	<i>recycle</i>	Make compost from left over fruit and vegetable peelings	recycle	Buy food with less packaging	reduce	Buy 'bags for life'	re-use	Don't buy more than you need	reduce	
Action	Is it reduce, reuse or recycle?													
<i>Place glass bottles in bottle bank</i>	<i>recycle</i>													
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Buy food with less packaging	reduce													
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Question	Marking detail	Mark
<p><b>8</b> (a) (i)</p>	<p>C-B-A All correct 2; 1 correct 1</p>	<p>2</p>
<p>(ii)</p>	<p>Indicative content:</p> <ul style="list-style-type: none"> <li>• The loft saves 1200 J/s and double-glazing saves 800 J/s.</li> <li>• The cavity wall insulation saves 1000 J/s</li> <li>• The loft insulation is also the cheapest to install.</li> <li>• Therefore installing loft insulation would save the householder most money and the payback time would be shortest.</li> <li>• However, double-glazing saves least energy and costs significantly more than other methods so the payback time would be the longest.</li> </ul> <p><b>5-6 marks</b> 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 inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p><b>3-4 marks</b> The candidate constructs 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><b>1-2 marks</b> 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><b>0 marks</b> The candidate does not make any attempt or give a relevant answer worthy of credit.</p>	<p>6</p>

Question	Marking detail	Mark
(b) (i) I.	The larger the air gaps the lower the (rate of) energy loss.	1
	II. (After 20mm), not much increase in saving	1
(ii)	Reading from graph of 50 (W/m <sup>2</sup> ) (1) 50 x 24 (1) = 1 200 W (correct answer only - 1 200 W (2))	2
(c) (i) I.	Foam insulation	1
	II. Largest R value	1
(ii)	Total R value = 6	1
(d) (i)	Scale (at least half y axis) (1) plots (2) suitable best fit line (1)	4
(ii)	Value from their graph (e.g. 148 +/-2) (1)	1
(e)	Convert 2000 W to 2 KW (1) units used = 2 x 24 = 48 (1) cost = 48 (allow ecf) x 14 = 672 (1) matching unit (1) (either 672p or £6.72). (NOT £6.72p)	4

**GCSE SCIENCE B**  
**UNIT 1 - HIGHER TIER (4781/02)**  
**SUMMER 2014 MARK SCHEME**

Question	Marking detail	Mark
1 (a) (i)	C-B-A All correct 2; correct 1	2
(ii)	<p>Indicative content:</p> <ul style="list-style-type: none"> <li>• The loft insulation saves 1200 J/s and double-glazing saves 800 J/s.</li> <li>• The cavity wall insulation saves 1000 J/s.</li> <li>• The loft insulation is also the cheapest to install.</li> <li>• Therefore installing loft installation would save the householder most money and the payback time would be shortest.</li> <li>• However, double-glazing saves least energy and costs significantly more than the other methods so the payback time would be the longest.</li> </ul> <p><b>5-6 marks</b> The candidate constructs an article, 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 inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p><b>3-4 marks</b> The candidate constructs 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><b>1-2 marks</b> 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><b>0 marks</b> The candidate does not make any attempt or give a relevant answer worthy of credit.</p>	6

Question	Marking detail	Mark
(b) (i) III.	The larger the air gaps the lower the (rate of) energy loss.	1
	IV. (After 20mm), not much increase in saving	1
(ii)	Reading from graph of 50 (W/m <sup>2</sup> ) (1) 50 x 24 (1) = 1 200 W (correct answer only - 1 200 W (2))	2
(c) (i) III.	Foam insulation	1
	IV. Largest R value	1
(ii)	Total R value = 6	1
(d) (i)	Scale (at least half y axis) (1) plots (2) suitable best fit line (1)	4
(ii)	Value from their graph (e.g. 148 +/-2) (1)	1
(e)	Convert 2000 W to 2 KW (1) units used = 2 x 24 = 48 (1) cost = 48 (allow ecf) x 14 = 672 (1) matching unit (1) (either 672p or £6.72). (NOT £6.72p)	4



Question	Marking detail	Mark
2 (a)	<p>Indicative content:</p> <ul style="list-style-type: none"> <li>• Organisms that are best adapted to their environment are those that are most likely to survive.</li> <li>• The better-adapted organisms will reproduce at a greater rate than the less well-adapted organisms.</li> <li>• Organisms with the most favourable genetic adaptations out-compete other organisms in a population.</li> <li>• Natural selection is dependent on the existence of mutations in the genes.</li> <li>• Natural selection taking place over the course of many generations can change the characteristics of the original population of organisms.</li> </ul> <p><b>5-6 marks</b> The candidate constructs an articulate, integrated account correctly linking relevant points such as those in the indicative content, which allows shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p><b>3-4 marks</b> The candidate constructs 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><b>1-2 marks</b> 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><b>0 marks</b> The candidate does not make any attempt or give a relevant answer worthy of credit.</p>	6
(b) (i)	The variety / range of life (1) in the world / habitat / ecosystem / area (1)	2
(b) (ii)	Richer in tropics / rain forest / equator (1) because of greater resources / more favourable living conditions (1) (accept converse).	2
	<i>The second point can be awarded for coherently and correctly linking the conclusion.</i>	

Question	Marking detail	Mark												
3	<p>6 x 1 marks</p> <table border="1"> <thead> <tr> <th>Intensive farming method</th> <th>Action</th> <th>Disadvantages</th> </tr> </thead> <tbody> <tr> <td>Fertiliser spray</td> <td>Add nutrients to the soil</td> <td>Eutrophication / causes dense plant growth in rivers</td> </tr> <tr> <td>Pesticide spray</td> <td>Remove animals that feed on the crop</td> <td>Reduces biodiversity/poison helpful organisms.</td> </tr> <tr> <td>'Battery' farming</td> <td>Increased product</td> <td>Lower quality product/ethical concerns / keep animals indoors</td> </tr> </tbody> </table>	Intensive farming method	Action	Disadvantages	Fertiliser spray	Add nutrients to the soil	Eutrophication / causes dense plant growth in rivers	Pesticide spray	Remove animals that feed on the crop	Reduces biodiversity/poison helpful organisms.	'Battery' farming	Increased product	Lower quality product/ethical concerns / keep animals indoors	6
Intensive farming method	Action	Disadvantages												
Fertiliser spray	Add nutrients to the soil	Eutrophication / causes dense plant growth in rivers												
Pesticide spray	Remove animals that feed on the crop	Reduces biodiversity/poison helpful organisms.												
'Battery' farming	Increased product	Lower quality product/ethical concerns / keep animals indoors												
4	<p>(i) Craters caused by meteors (1) large numbers of craters / meteors got through atmosphere / lack of erosion (1) so atmosphere must be 'thin' (1) <i>The third mark can be awarded for coherently and correctly linking to three points.</i></p> <p>(ii) Must be a molten core (1) (possible) tectonic plates (1) for volcano to be formed at their boundaries (1) Accept similar structure to earth for 1 mark.</p> <p>(iii) Temperatures must be low (1) so no 'global' warming (1) so lack of greenhouse gases / low concentrations (1) <i>The third mark can be awarded for coherently and correctly linking the three points.</i></p>	3 3 3												
5	<p>(i) Mining / Industry (Not: from ships)</p> <p>(ii) The shrimps take in mercury as they feed. (1) Concentration is low (1) As bigger animals eat many smaller animals / bioaccumulation / the concentration level of mercury increases to toxic levels. (1) <i>The third point can be awarded for coherently and correctly linking the conclusion.</i></p>	1 3												

Question	Marking detail	Mark
6 (i)	Any <b>three</b> from: <ul style="list-style-type: none"> <li>• from visible to radio waves graphs are identical</li> <li>• maximum wavelength of radio waves the same</li> <li>• at longest U-V wavelength the graphs are similar</li> <li>• no X-rays in the theoretical graph</li> <li>• they both go down to 10 cm</li> <li>• both have a maximum in the visible region.</li> </ul>	3
	(ii) Longest wavelength = 10 cm converted to 0.1m (1) subs / manipulate (1) Answer = $3 \times 10^9$ / 3000 000 000) Hz (1) Allow ecf for incorrect wavelength	3
7 (a) (i)	They will never run out (1) because new trees are planted to replace those cut down (1) <i>The second point can be awarded for coherently and correctly linking the conclusion.</i>	2
	(ii) Carbon emissions caused by <u>burning</u> [1] are balanced by carbon intake by <u>photosynthesis</u> [1] (CO <sub>2</sub> given out = same as taken in (1) only) <i>The second point can be awarded for coherently and correctly linking the conclusion.</i>	2
(b) (i)	500 x 0.8 answer = 400 MW Substitution (1) manipulation (1) answer (1)	3
	(ii) 180 MW [1] (allow ecf from bi, their answer - 220)	1
	(iii) If water is piped over large distances it will cool too much	1
(c)	Demand fluctuates / if demand increases / if a power station breaks down [1] other power stations can be brought on line to avoid power cuts [1] <i>The second point can be awarded for coherently and correctly linking the conclusion.</i>	2

**GCSE SCIENCE B**  
**UNIT 2 - FOUNDATION TIER (4782/01)**  
**SUMMER 2014 MARK SCHEME**

Question	Marking detail	Mark										
1. (a)	S, Metal	2										
	(b) Any group 1 metal – Li/Na etc (Not: li, na)	1										
	(c) (i) <b>X</b> is a metal <b>Y</b> is a non-metal	1										
	(ii) X metal high melting point/high density/electrical conductor (1) (Not: X mp =1538) Y non-metal low melting point/low density/non-conductor electricity/ poor heat conductor (1)	2										
2. (a)	(i) Sugars, saturates	2										
	(ii) 5g x 4 (1)= 20g (1)	2										
	(b) (i) Any <b>two</b> of: less calories, sugar, fat, saturates	2										
	(ii) 2 x 150 = 300 kcal	1										
	(iii) 300/15 (1) = 20 minutes (1) (Allow ecf)	2										
3. (a)	(i) 46 or 23 pairs	1										
	(ii) Nucleus	1										
	(iii) DNA or gene/allele	1										
	(b) (i)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">B</td> <td style="text-align: center;">b</td> </tr> <tr> <td style="text-align: center;">B</td> <td style="text-align: center;"><b>BB</b></td> <td style="text-align: center;"><b>Bb</b></td> </tr> <tr> <td style="text-align: center;">b</td> <td style="text-align: center;"><b>Bb</b></td> <td style="text-align: center;"><b>bb</b></td> </tr> </table>		B	b	B	<b>BB</b>	<b>Bb</b>	b	<b>Bb</b>	<b>bb</b>	1
			B	b								
		B	<b>BB</b>	<b>Bb</b>								
		b	<b>Bb</b>	<b>bb</b>								
	(ii) bb	1										
(iii) 25%	1											
(c) (i) IVF/ adoption/genetic screen of gametes/embryo	1											

Question	Marking detail	Mark															
4. (a)	(i) addictive (ii) high blood pressure (iii) lungs (iv) oxygen	4															
(b) (i)	120	1															
(ii)	13 x 120(1) = 1 560(1) (Allow ecf from b(i))	2															
(c)	Any two of: Smoking ban in public places, ban advertisement, ban sponsorship, warning messages on packaging , tax , advertising dangers of smoking, raising age to buy cigarettes (Not: e-cigarettes)	2															
5. (a)	Magnesium chloride/ hydrogen	2															
(b) (i)	Complete all points correctly (half square tolerance) (2) two points correct (1) join points with line correctly (1)	3															
(ii)	54 cm <sup>3</sup>	1															
(iii)	<b>Repeat</b> the expt.	1															
(iv)	pH gets closer to 7 / rises/ gets closer to neutral (1) since the acid is used up/ neutralised (1) <i>Two marks can be awarded if points are correctly and coherently connected</i>	2															
(v)	Volume = 72 cm <sup>3</sup> /does not increase (1) All Mg/substrates used up/reaction stops (1)	2															
(c)	Temperature / conc of HCl / mass of iron pieces/ any other suitable/ same surface area. (Not: same amount of acid/iron)	2															
6. (a)	1 mark each correct answer <table border="1"> <thead> <tr> <th>Raw material</th> <th>Chemical name</th> <th>Purpose</th> </tr> </thead> <tbody> <tr> <td>limestone</td> <td>calcium carbonate</td> <td>Removes impurities which forms the waste called slag</td> </tr> <tr> <td>hot air</td> <td>oxygen</td> <td>Allows the coke to burn</td> </tr> <tr> <td>coke</td> <td>carbon</td> <td><b>Burns to produce carbon dioxide and carbon monoxide (1)</b></td> </tr> <tr> <td>haematite</td> <td><b>Iron oxide (1)</b></td> <td><b>The ore that contains iron (1)</b></td> </tr> </tbody> </table>	Raw material	Chemical name	Purpose	limestone	calcium carbonate	Removes impurities which forms the waste called slag	hot air	oxygen	Allows the coke to burn	coke	carbon	<b>Burns to produce carbon dioxide and carbon monoxide (1)</b>	haematite	<b>Iron oxide (1)</b>	<b>The ore that contains iron (1)</b>	3
Raw material	Chemical name	Purpose															
limestone	calcium carbonate	Removes impurities which forms the waste called slag															
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coke	carbon	<b>Burns to produce carbon dioxide and carbon monoxide (1)</b>															
haematite	<b>Iron oxide (1)</b>	<b>The ore that contains iron (1)</b>															
(b)	£8 (1) £163 (allow ecf from table) (1)	2															
(c)	More reactive than iron (1) would not be reduced by carbon (1).	2															

Question	Marking detail	Mark
7. (a)	<p>Candidates must give argued response.</p> <p>The claim made by Welsh government is valid because use has dropped (1) since the graph shows the number of bags used as gone down from 5 to 1 million/significantly (1) but already dropping before the charge was introduced. (1)</p> <p><b>OR</b></p> <p>The claim made by Welsh government is not valid because use dropped before charges were introduced (1) Since October use has only dropped by (about) half a million (1) which is about 30% (1)</p> <p><i>The points must be coherently as correctly connected for three marks.</i></p>	3
(b)	<p><b>Indicative content</b></p> <ul style="list-style-type: none"> <li>• less resources/oil used</li> <li>• improved sustainability</li> <li>• saves money</li> <li>• effect on - world's oceans / marine life</li> <li>• effect on land fill/ toxic gases released by burning</li> </ul> <p><b>Marking Bands</b></p> <p><b>5-6 marks</b> 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 inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p><b>3-4 marks</b> The candidate constructs 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><b>1-2 marks</b> 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><b>0 marks</b> The candidate does not make any attempt or give a relevant answer worthy of credit.</p>	6QWC

**GCSE SCIENCE B**  
**UNIT 2 - HIGHER TIER (4782/02)**  
**SUMMER 2014 MARK SCHEME**

Question	Marking detail	Mark
1. (a)	Magnesium chloride, hydrogen	2
(b) (i)	Complete all points (2) two points correct (1) (half square tolerance) join points with line correctly (1)	3
(ii)	54 cm <sup>3</sup>	1
(iii)	<b>Repeat</b> the expt.	1
(iv)	pH gets closer to 7 / rises/ gets closer to neutral (1) since the acid is used up/ neutralised (1) <i>Two marks can be awarded if points are correctly and coherently corrected.</i>	2
(v)	72cm <sup>3</sup> (1) reaction is complete/all the substrates used up (named e.g. Mg or acid) reaction stops (1)	2
(c)	Any two of: Temperature / conc of HCl / size of iron pieces/ any other suitable. (Not: same amount of acid/iron)	2
2. (a)	Iron oxide / burns to produce CO <sub>2</sub> and CO / the ore that contains iron.	3
(b)	105.88 80 165.10 (allow ecf)	3
(c)	Aluminium higher in the reactivity series (more reactive) and therefore cannot be reduced by carbon. <i>Two marks can be awarded if points are correctly corrected.</i>	2





Question	Marking detail	Mark																				
<p>4. (a)</p> <p>(b) (i)</p> <p>(ii)</p> <p>(c)</p>	<p><b>Any three of:</b> multiple images, 3D images, images of soft tissue, non-invasive, image formed from different angles</p> <div style="text-align: center;"> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td></td> <td style="text-align: center;">(1)</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">H</td> <td style="border: none;"> </td> <td style="text-align: center;">h</td> </tr> <tr> <td style="text-align: center;">(1)</td> <td style="text-align: center;">h</td> <td style="border: none;"> </td> <td style="text-align: center;">hh</td> </tr> <tr> <td></td> <td style="text-align: center;">Hh</td> <td style="border: none;"> </td> <td style="text-align: center;">hh</td> </tr> <tr> <td></td> <td style="text-align: center;">Hh</td> <td style="border: none;"> </td> <td style="text-align: center;">hh</td> </tr> </table> </div> <p>Any suitable letters accepted</p> <p>50%</p> <p>Father passes on gene for Huntington (1) so could use sperm from donor/or consider adoption/genetic screening (1). <i>Two points need to be correctly and coherently corrected.</i></p>			(1)			H		h	(1)	h		hh		Hh		hh		Hh		hh	<p>3</p> <p>3</p> <p>1</p> <p>2</p>
		(1)																				
	H		h																			
(1)	h		hh																			
	Hh		hh																			
	Hh		hh																			
<p>5 (a)</p> <p>(b) (i)</p> <p>(ii)</p> <p>(c)</p>	<p><math>100 \times (172000 - 73000) / 172000</math> (1) = 57.57% (57.6%) (Accept: 55.5%) (1)</p> <p>Pupils have told the truth</p> <p>Chemically test the pupils (test for raised CO levels in breath)/ blood test</p> <p>Any three from:</p> <ul style="list-style-type: none"> <li>• shows smoking in boys and girls has dropped from 2001 (1)</li> <li>• continues to drop since 2007 (1)</li> <li>• drop in numbers greater in girls since 2007 than boys (1)</li> <li>• fall in smoking was bigger before ban (1)</li> <li>• difficult to say if ban has made difference since figures already falling (1)</li> </ul>	<p>2</p> <p>1</p> <p>1</p> <p>3</p>																				

Question	Marking detail	Mark
6 (a)	<p><b>Indicative content</b></p> <ul style="list-style-type: none"> <li>• radio-isotope added to drug (ETDA)</li> <li>• injected into patient</li> <li>• iodine absorbed by thyroid gland</li> <li>• patient positioned under the gamma camera</li> <li>• gamma camera detects gamma radiation</li> <li>• computer forms an image</li> </ul> <p><b>Marking bands</b></p> <p><b>5-6 marks</b> 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 inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p><b>3 – 4 marks</b> The candidate constructs 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><b>1 – 2 marks</b> 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><b>0 marks</b> The candidate does not make any attempt or give a relevant answer worthy of credit.</p>	6QWC
(b) (i)	Time taken for $\frac{1}{2}$ (1) the radioactive particles/ mass of radioactive isotope/count rate/activity/nuclei to decay (1)	2
(ii)	5 half-lives (1) $\frac{1}{32}$ or 0.03125 (1)	2
(iii)	Half-life long enough for formation of an image (1) but not too long to do any harm (1) or (other isotopes half-life too short or too long) <i>Two points need to be correct and coherently corrected.</i>	2
(iv)	Repeated exposure to ionising radiation, from camera (1) can damage DNA/cause cancer (1) <i>Two points need to be correct and coherently corrected.</i>	2



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