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# **GCSE MARKING SCHEME**

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**SUMMER 2018**

**GCSE (NEW)  
DOUBLE AWARD SCIENCE  
BIOLOGY 1 - UNIT 1  
3430U10-1 and 3430UA0-1**

## **INTRODUCTION**

This marking scheme was used by WJEC for the 2018 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was 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 conference was to ensure that the marking scheme was 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' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

**DOUBLE AWARD SCIENCE  
UNIT 1 BIOLOGY 1**

**MARK SCHEME SUMMER 2018**

**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.

### 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

## FOUNDATION

Question				Marking details	Marks Available						
					AO1	AO2	AO3	Total	Maths	Prac	
1	(a)	(i)		40 NOT 4 cm		1		1	1	1	
		(ii)		40/400 = 0.1 Ecf from (i)		1		1	1	1	
	(b)			vacuole	1			1			
	(c)			mitochondrion/a (1)	1			1			
				<u>cell</u> membrane (1)	1			1			
				photosynthesis (1)	1			1			
				nucleus (1)							
				<b>Question 1 total</b>	<b>5</b>	<b>2</b>	<b>0</b>	<b>7</b>	<b>2</b>	<b>2</b>	

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)			digestion (1) respiration (1) photosynthesis (1) } (either order)	1 1 1			1 1 1		
	(b)	(i)		X		1		1		
			(ii)		6.0 – 7.5		1		1	
		(iii)		Mouth/ salivary glands Reject saliva gland/ cheek	1			1		
				<b>Question 2 total</b>	<b>4</b>	<b>2</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
3	(a)	(i)	{absorbs/ uses/ needs/ takes in} (less) light/ has leaves/ it is green/ produces sugar Reject reference to fungi		1		1		
		(ii)	reference to {sucking/ feeding/ eating} from {barley/plant/ leaves/ crops/ producer/ stem}/ get sugar from crops/ {aphids/ they} are eaten by (ladybirds which are) <u>secondary consumers</u>		1		1		
	(iii)	secondary consumers/ eat {aphids/pests/ insects/ other animals} NOT target pests	1			1			
	(iv)	pesticides {toxic to/kill} <u>harmless organisms</u> (1) ladybirds { <u>target/only eat</u> } {pests/aphids} (1)		1		1			
	(b)	(i)	1.2 = 2 marks 1 mark for calculation if answer incorrect 8.0/100 x 15;		2		2	2	
(ii)		£140.40/ 140.4 = 1 mark <b>Ecf from (i)</b> 1.2 (answer from (i)) x 117.00		1		1	1		
			<b>Question 3 total</b>	<b>1</b>	<b>7</b>	<b>0</b>	<b>8</b>	<b>3</b>	<b>0</b>

Question			Marking details	Marks available																	
				AO1	AO2	AO3	Total	Maths	Prac												
4	(a)	(i)	4.9 = 1 mark 20.9-16.0 =		1		1	1													
		(ii)	(aerobic) respiration Reject anaerobic	1			1														
	(b)	(i)	arrow from alveolus through the lining	1			1														
		(ii)	reference to reduced <u>diffusion</u> (1) NOT stops diffusion  any <b>two</b> from: {thick/ hard} lining to alveolus/ORAs (1) wider gap between alveolus and capillary/ ORAs (1) hardened lining to capillary/ORAs (1) ignore thicker			3	3														
	(c)		<table border="1"> <tbody> <tr> <td>oxygen</td> <td>✓ (1)</td> <td></td> <td></td> </tr> <tr> <td>carbon dioxide</td> <td></td> <td>✓(1)</td> <td></td> </tr> <tr> <td>water</td> <td></td> <td></td> <td>✓ (1)</td> </tr> </tbody> </table>	oxygen	✓ (1)			carbon dioxide		✓(1)		water			✓ (1)	3			3		
oxygen	✓ (1)																				
carbon dioxide		✓(1)																			
water			✓ (1)																		
<b>Question 4 total</b>				<b>5</b>	<b>1</b>	<b>3</b>	<b>9</b>	<b>1</b>	<b>0</b>												



Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)	high blood pressure/ stroke/ {kidney/heart} {damage/ failure/ disease}	1			1		
		(ii)	cancer/emphysema/ heart disease/ Cardio vascular disease/ CVD/ Coronary Heart Disease/ CHD/ stroke/ COPD/ damages cilia	1			1		
	(b)	(i)	<p>1. idea of {quite/ partly/ fairly/ mostly} {successful/ effective}OWTTE (1) because:</p> <p>2. 25% smoked fewer(1)                    } 59% cut down or stopped = 2 marks</p> <p>3. 34% stopped smoking (1)                }</p> <p>MP 2 and 3 can be only both be awarded if 'linked' (stated consecutively)</p> <p>4. However 36% smoked the same <b>and</b> 5% smoked more/ 41% smoked the same or more (1) (stated consecutively)</p>			4	4		
		(ii)	any <b>two (x1)</b> from: different areas/ all parts of Wales different ages male and female different ethnicities			2	2		2
			<b>Question 5 total</b>	<b>2</b>	<b>0</b>	<b>6</b>	<b>8</b>	<b>0</b>	<b>2</b>

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
6	(a)		<p><i>Indicative content</i></p> <ul style="list-style-type: none"> <li>• {rub/ swab/ scrape/ wipe/ swipe} (inside of) <u>cheek</u> (put/ place = neutral)</li> <li>• with the cotton wool bud</li> <li>• put onto slide (can apply to cells or methylene blue)</li> <li>• use of dropper/ drop of/ pipette</li> <li>• methylene (blue)/ stain</li> <li>• lower/ place/ put cover slip</li> <li>• using mounted needle</li> <li>• remove air bubbles</li> </ul> <p><b>5–6 marks</b> Detailed description of the entire investigation <i>There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.</i></p> <p><b>3–4 marks</b> Outline general description of the investigation <i>There is a line of reasoning which is partially coherent, largely relevant, and with some structure.</i></p> <p><b>1–2 marks</b> Simple description <i>There is a basic line of reasoning which is not coherent, largely irrelevant, and with very little structure.</i></p> <p><b>0 marks</b> <i>No attempt made or no response worthy of credit</i></p>		6		6		6
	(b)		<p>clear outline (cell membrane) with nucleus reject double outline/ any plant organelles e.g. vacuole ignore labels/ multiple cells/ shape</p>	1			1		1
			<b>Question 6 total</b>	<b>1</b>	<b>6</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>7</b>

## FOUNDATION/HIGHER

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
7/1	(a)		use <u>x10 objective lens</u> (1) (explanation the magnification) = eyepiece x objective/ owtte(1) NOT 10 x 10 unqualified		2		2		2
	(b)		to bring object into <u>focus</u>		1		1		1
	(c)	(i)	efficient	1					
		(ii)	tissue	1			1		
	(d)		(organs are structures made up of several) <u>tissues</u> performing one or more {functions/ jobs/ roles/ tasks}	1			1		
			<b>Question 7/1 total</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>3</b>

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
8/2	(a)	(i)	10.4 = 2 marks Incorrect answer but correct figures taken from graph = 1 mark 6.3 + 4.1		2		2	2	
		(ii)	1987			1	1		
		(iii)	<ul style="list-style-type: none"> <li>Sewage dumped at the '12 mile' dump site would {drift/wash up on/return} to {<u>land/coast/beaches/ shore</u>} (1) If answer doesn't refer to 12 mile or 106 mile sites then assume answer is referring to <b>106 mile site</b> Reject New York/ New Jersey</li> <li>(Movement of buoys shows that) sewage dumped at the '106 mile' dump site does not return to <u>{land/coast/beaches}</u> (1)</li> </ul>			1 1	2		
	(b)		{Bacteria/microbes/ micro-organisms/ fungi} {feed/decay/consume/ break down} the {sewage/ sludge} (1) NOT waste and {increase in number/ reproduce/ multiply/ grow} (1) bacteria are using the <u>oxygen for respiration</u> (1)	1 1	1		3		
	(c)		<u>heavy</u> metals/ plastics/ oil (products)/ radioactive/ nuclear (waste) NOT named metals alone	1			1		
			<b>Question 8/2 total</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>9</b>	<b>2</b>	<b>0</b>

## HIGHER

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
3			<p>Indicative content:</p> <ul style="list-style-type: none"> <li>• bile emulsifies fat</li> <li>• from large {globules/droplets}/ into small {globules/droplets}</li> <li>• increasing the surface area</li> <li>• bile {increases pH/ neutralises pH/ makes it more alkaline/ makes it less acid/ creates optimum pH}</li> <li>• in the small intestine (must be linked to correct pH/ to lipase)</li> <li>• for lipase</li> <li>• which digests/hydrolyses/breaks down fat (must be linked to lipase)</li> <li>• into fatty acids</li> <li>• and glycerol</li> </ul> <p><b>5-6 marks</b> At least seven points from indicative content</p> <p><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> At least four points from indicative content</p> <p><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>	6			6		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
				<p><b>1-2 marks</b> At least one point from indicative content</p> <p><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>						
				<b>Question 3 total</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)			5			1	1		
	(b)	(i)		28.1/ 28.15/ 28.2 = 2 marks.  If answer is incorrect look for any of the following for 1 mark 95.3 ÷ 3.3856 or 95.3 ÷ 3.39 or 95.3 ÷ 3.4		2		2	2	
		(ii)		Sharon = normal Peter = overweight (ECF allowed here) Both correct for 1 mark			1	1		
	(c)			any <b>two</b> (x1) from Reduce: <ul style="list-style-type: none"> <li>• energy/calorie intake</li> <li>• fat intake/eat less fatty foods</li> <li>• carbohydrate/sugar/starch intake</li> </ul> Do not accept 'cut out ...', 'don't eat ...', 'eat less food' Do not accept answers such as: eat less potatoes, chips, fast food Do not accept reference to exercise.	2			2		
				<b>Question 4 total</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>6</b>	<b>2</b>	<b>0</b>

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)			- 7.9 = 2 marks  If answer is incorrect 1 mark can be awarded for the following <u>-4.8</u> x 100 60.9 7.9 (no minus sign) (-)7.881773 (not to correct number of dp, ignore )		2		2	2	
	(b)	(i)		point correctly plotted <b>and</b> line drawn $\pm$ 1 small square ECF from (a) can be allowed here.		1		1	1	1
		(ii)		14			1	1	1	1
	(c)			A. In egg no 3 the concentration of water outside the egg is greater than inside and water enters the egg. (1) B. by osmosis. (1) award mark if seen once in correct context C. (Cell membrane is a) semi/selectively permeable membrane. (1) only award if correct reference to <u>water</u> movement is given D. In egg 5 the concentration of water inside the egg is greater than outside the egg and water leaves. (1)  In this question an explanation is required and not just a description of the table.	1   1	  1  1		4		
	(d)			0/ 5/ 10 Do not accept figures intermediate between 0 – 10%			1	1		1
				<b>Question 5 total</b>	<b>2</b>	<b>5</b>	<b>2</b>	<b>9</b>	<b>4</b>	<b>3</b>



Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
6	(a)		<ul style="list-style-type: none"> <li>photosynthesis produces {oxygen/ O<sub>2</sub>} /{oxygen/ O<sub>2</sub>} is a bi-product of photosynthesis (1) Not O<sup>2</sup> or o<sup>2</sup> Reject equation on own</li> <li>Therefore if the production of O<sub>2</sub> {increases/decreases}/ if there is {more/less} O<sub>2</sub> (1)</li> <li>(The rate of) photosynthesis is {increasing/decreasing}. (1)</li> </ul> <p>The more oxygen the more photosynthesis = 2 marks This question relates to the 'rate of photosynthesis' and not to whether the plant is photosynthesising or not</p>		3		3		3
	(b)		<p><b>Any 1 from:</b></p> <ul style="list-style-type: none"> <li>Increasing light intensity has no effect on O<sub>2</sub> production/photosynthetic rate</li> <li>Increasing CO<sub>2</sub> concentration has no effect O<sub>2</sub> production/ photosynthetic rate (1)</li> <li>Increasing temperature increases O<sub>2</sub> production/ photosynthetic rate (1)</li> </ul> <p><b>Any 1 from:</b></p> <ul style="list-style-type: none"> <li>Therefore temperature must be the <u>limiting factor</u></li> <li>the temperature is <u>too low</u> to increase O<sub>2</sub> production/ photosynthetic rate (1)</li> </ul>			2	2		2

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
	(c)		<p>CO<sub>2</sub> was the limiting factor (1)</p> <p><b>Any 1 (x1) from:</b></p> <ul style="list-style-type: none"> <li>{Increasing/ change in} temperature has no effect on O<sub>2</sub> production/ photosynthetic rate</li> <li>{Increasing/ change in} light intensity has no effect on O<sub>2</sub> production/photosynthetic rate</li> <li>Only when carbon dioxide concentration increases does the photosynthetic rate increase</li> </ul>			2	2		2
	(d)		To prevent {gases/ air/ oxygen/ carbon dioxide} {entering/leaving}		1		1		1
	(e)		<p><i>Factor</i> – light in the room/ light around the apparatus/ natural light OR temperature outside the container/room temperature (1)</p> <p><i>How factor could be controlled</i> – LIGHT – place in dark/ black out container/make the container light proof/carry out expt in a (light proof) cupboard (1) NOT turning lights off in room/ opening windows to adjust light OR TEMPERATURE – container needs thermostatic control/ OWTTE</p>		1	1	2		2
			<b>Question 6 total</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>10</b>	<b>0</b>	<b>10</b>

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
7	(a)			X tricuspid <u>valve</u> / right {atrio-ventricular/ AV} <u>valve</u> (1) Y pulmonary vein (1)	2			2		
	(b)	(i)		Atria: Accept range from 3.2 to 3.3 Ventricles: 16.0		1		1	1	
		(ii)		(Blood pressure is) <u>lower</u> in right ventricle/ <u>higher</u> in left ventricle (1) (Answer must be comparative ie lower not low; higher not high.) Thicker wall in left ventricle/ thinner wall in right / left ventricle more muscular(1) Because left ventricle pumps blood {around body/ further}/ right ventricle pumps blood {(only) to the lungs/ shorter distance} (1)	3			3		
				<b>Question 7 total</b>	<b>5</b>	<b>1</b>	<b>0</b>	<b>6</b>	<b>1</b>	<b>0</b>

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
8	(a)			Glucose $\longrightarrow$ Lactic Acid + ATP	1			1		
	(b)			Not all the glucose is broken down/not completely broken down (1) Less ATP is produced (1) ORA for aerobic respiration	2			2		
	(c)	(i)		Correct reference to oxygen debt (1) Oxygen required to {break down/ remove} lactic acid (1)		2		2		
		(ii)		<u>More</u> oxygen can get to {cells/ tissues/ muscles/ body/ organs}/ oxygen can get to {cells/ tissues/ muscles/ body/ organs} <u>quicker</u>		1		1		
	(d)			more haemoglobin (1) (So) more oxygen can be carried (by the blood)/ more oxygenated blood / {more/ longer} <u>aerobic</u> respiration (1)		2		2		
				<b>Question 8 total</b>	<b>3</b>	<b>5</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>0</b>

## FOUNDATION TIER

### SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

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

## HIGHER TIER

### SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	3	3	0	6	0	3
2	3	3	3	9	2	0
3	6	0	0	6	0	0
4	2	2	2	6	2	0
5	2	5	2	9	4	3
6	0	5	5	10	0	10
7	5	1	0	6	1	0
8	3	5	0	8	0	0
<b>Target</b>	<b>24</b>	<b>24</b>	<b>12</b>	<b>60</b>	<b>6</b>	<b>9</b>
<b>TOTAL</b>	<b>24</b>	<b>24</b>	<b>12</b>	<b>60</b>	<b>9</b>	<b>16</b>