GCSE MARKING SCHEME

SUMMER 2023

GCSE
DOUBLE AWARD SCIENCE
BIOLOGY 1 - UNIT 1
3430U10-1 AND 3430UA0-1

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INTRODUCTION

This marking scheme was used by WJEC for the 2023 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.

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DOUBLE AWARD SCIENCE

UNIT 1 BIOLOGY 1

SUMMER 2023 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.

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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

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
1	(a)			Sun(light) /solar	1			1		
	(b)	(i)		6		1		1		
		(ii)		1.5 Ecf from (i)		1		1		
		(iii)	I	**Any one (x1) from** reference to {part/half} squares (1) not counting the sides of the leaf (1) only counting the middle of the leaf (1)			1	1		2
			II	**Any one (x1) from** Count/ include/ use} {mostly/ half} (covered) (1) use (grid with) smaller squares (1)			1	1		
		(iv)	I	0.6		1		1	1	
			II	<u>Supported</u>			1	1		
	(c)			To get more light (1) for photosynthesis (1)		2		2		
				Question 1 total	**1**	**5**	**3**	**9**	**1**	**2**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)		<u>Moved</u>	1			1		
		(ii)		Oesophagus	1			1		
	(b)			Stomach		1		1		
	(c)	(i)		Liver clearly labelled	1			1		
		(ii)		<table><tr><td>True or false</td></tr><tr><td>True</td></tr><tr><td>True</td></tr><tr><td>False</td></tr><tr><td>True</td></tr></table> All four correct = 3 Three correct = 2 Two correct = 1 0/1 correct = 0	3			3		
	(d)			**Any one (x1) from** Energy (1) insulation (1) accept keeps you warm protection of organs (1)	1			1		

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(e)	(i)		Fat is not {digested/ broken down}/ fat is {too large/ not small enough} (1) So {not absorbed/does not pass into blood} (1)		2		2		
		(ii)		**Any one (x1) from** Lack of energy (1) Underweight / lose too much weight/ owtte(1) lack of insulation/ owtte (1) lack of protection for organs (1) reference to {unbalanced/ unhealthy} diet (1)			1	1		
				Question 2 total	**7**	**3**	**1**	**11**	**0**	**0**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)			Protein	1			1		
	(b)			Increases then decreases (1) optimum pH/ pH 8 (1) **Award two marks for:** **peaks** at {optimum pH/pH 8}		2		2		
	(c)	(i)		Ref to {changed shape/destruction of} (enzyme/active site)		1		1		
		(ii)		• nothing for the substrate (to fit into)/ cannot make enzyme substrate complexes (1) • No reaction/ will not react (1) ignore no products		2		2		
	(d)			pH/ acid/ alkali (1) (high) temperature/boiling (1) Ignore heat	2			2		
				Question 3 total	**3**	**5**	**0**	**8**	**0**	**0**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)			Oxygen/O_2(1) Carbon dioxide/ CO_2 (1)	1 1			2		
	(b)	(i)		(Method) **2** – (1) allows gas exchange/ allows {air/oxygen} through {air/oxygen} in and out / method 1 does not allow {air/ oxygen} in (1) MP2 linked to MP1			2	2		4
		(ii)	I	All 5 points plotted accurately - 2 marks (2) 4/3 points - 1 mark (1) < 1 small square tolerance		2		2	2	
			II	Straight line joining all the plots		1		1	1	
		(iii)		• Prediction 1 is correct **and** (the temperature of) A rose but B stayed the same/ owtte (1) • Prediction 2 {not correct/cannot be sure} **and** it keeps rising (1)			2	2		2
		(iv)		Extend time of investigation/ owtte			1	1		1
		(v)		Decreased		1		1		
				Question 4 total	**2**	**4**	**5**	**11**	**3**	**7**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
5				**Indicative content:** A. reference eye protection B. (draw up) 10 cm^3 of solution C. using the syringe (**fill** syringe with solution = B & C) D. transfer to the test tube E. place in test tube rack F. add iodine (solution) G. using the {pipette/dropper} H. (change from) brown I. to {blue-black/ black/ dark blue} **5-6 marks** At least 7 points *There is a sustained line of reasoning which is coherent, substantiated and logically structured. The information included in the response is relevant to the argument.* **3-4 marks** At least 4 points *There is a line of reasoning which is partially coherent, supported by some evidence and with some structure. Mainly relevant information is included in the response but there may be some minor errors or the inclusion of some information not relevant to the argument.*	5	1	0	6		6

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
				1-2 marks Any one point *There is a basic line of reasoning which is not coherent, supported by limited evidence and with very little structure. There may be significant errors or the inclusion of information not relevant to the argument.* **0 marks** *No attempt made or no response worthy of credit.*						
				Question 5 total	**5**	**1**	**0**	**6**	**0**	**6**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
6/1	(a)	(i)		A = trachea (1) B = bronchus/ bronchi (1)	2			2		
		(ii)		(Air) pressure falls (1) Air {pushed/drawn/rushes} (in) (1)	2			2		2
	(b)			**Any one (x1) from** Some air enters {chest (cavity/space)/ hole/ wound} (1) Reject in **and** out no change in pressure (1) pressure in chest cavity is equal to air pressure (1)			1	1		
				Question 6/1 total	**4**	**0**	**1**	**5**	**0**	**2**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
7/2	(a)	(i)		100 = 2 marks If incorrect award one mark for (3.8 - 1.9)/1.9 x 100		2		2	2	
		(ii)		Reference to {high temperature/ shed is heated} (1) less heat lost (1) OR Limited space/ huddled/ owtte (1) so less {movement/ heat loss} (1) 2nd mark must be comparative in both cases			2	2		
	(b)			**Any two (x1) from:** reference to animal welfare e.g. less risk of disease/ more ethical/ owtte (1) (eggs/ they are) more nutritious/ more healthy/ better quality (1) (eggs/ they) taste better (1)		2		2		

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)		fertiliser/pesticide/animal waste/antibiotics/hormones/ detergents (1) **Any one (x1) from** • getting into waterways/ owtte (1) • **fertiliser or animal waste given for MP1** {eutrophication/ or description of} (1) • **pesticide given for MP1** ref to {bioaccumulation/ or description of} (1) **OR** carbon dioxide/methane/ greenhouse gases (1) ref climate change/global warming/ ozone (layer) (1)	2			2		
		(ii)		**Any one (x1) from** **planning stage:** • assess {impact/effect} on {environment/wildlife/people}/ assess damage to environment (1) • ensure that pollutants {cannot escape/are controlled} (1) • reference to humane conditions/ owtte (1) **subsequently:** monitoring / owtte (1)		2		2		
				Question 7/2 total	**2**	**6**	**2**	**10**	**2**	**0**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)			**Indicative content:** A. Add $NaHCO_3$/ sodium hydrogen carbonate (to water) B. Using spatula C. Measure distance of lamp from {pondweed/ beaker/ boiling tube/ apparatus} D. Using (metre) ruler E1 Count number of bubbles (produced) E2 specific number of bubbles F1 In 1 minute/ 5 minutes/ given time. F2 how long it takes to produce that number G. Repeat (at the same distance) H. Move lamp to new (measured) distance (from pondweed/ beaker/ boiling tube) I. Ref. to at least 5 {distances/ values} If refer to boiling water Max 4 marks **5-6 marks** 7-9 points from indicative content. *There is a sustained line of reasoning which is coherent, substantiated and logically structured. The information included in the response is relevant to the argument.* **3-4 marks** 4-6 points from indicative content. *There is a line of reasoning which is partially coherent, supported by some evidence and with some structure. Mainly relevant information is included in the response but there may be some minor errors or the inclusion of some information not relevant to the argument.*	6			6		6

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
				1-2 marks 1-3 points from indicative content. *There is a basic line of reasoning which is not coherent, supported by limited evidence and with very little structure. There may be significant errors or the inclusion of information not relevant to the argument.* **0 marks** *No attempt made or no response worthy of credit.*						
	(b)			Starch test will only give a positive or negative result/ it is not quantitative/ OWTTE Ignore ref to photosynthesis			1	1		1
				Question 3 total	**6**	**0**	**1**	**7**	**0**	**7**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)		A – right atrium B – left ventricle **Both for 1 mark**	1			1		
		(ii)		Blood passes through the heart twice (1) during each (full) {circuit/ cycle/ circulation} (1) 2nd mark point linked to 1st mark point OR (Blood must pass) through {pulmonary {system/ circulation/ circuit}/ through lungs and back to heart} (1) {through systemic {system/ circulation/ circuit}/ through body and back to heart} (1)	2			2		
	(b)	(i)	I	96		1		1	1	
			II	(Left ventricle/ it) {is more muscular/ has thicker muscle/ has thicker walls} Needs to be comparative	1			1		
		(ii)		Aorta receives blood {straight/ directly} from the left ventricle/ blood goes (from left ventricle) {straight/ directly} to aorta/ blood leaves the left ventricle {through/ into} the aorta		1		1		

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)			**Any two (x1) from:** • {High/rich in} nitrate (food/ drink) lowers blood pressure/ {more/ most} nitrate helps reduce blood pressure (1) • {Low(er)/ no} nitrate (diet) increases blood pressure/ (1) • Beetroot (juice) lowers BP {the most/ more} (1) Does not matter if it is consumed in food or drink/ named food/ drink from investigation} effect is the same (1)			2	2		
	(d)			**Any two (x1) from** {Blood flows more easily/ improved blood flow} to heart (muscle) (1) {Glucose/ oxygen} supply to the heart not restricted (1) Less chance of (artery) becoming blocked (1) Accept reverse arguments for all mark points			2	2		
				Question 4 total	**4**	**2**	**4**	**10**	**1**	**0**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)			A – Liver B – Stomach C – Pancreas reject pancrease All correct = 2 marks 2 correct = 1 mark	2			2		
	(b)			active site is not complementary to fat/ fat (molecule) will not fit into active site		1		1		
	(c)	(i)		• Glucose (1) **Any three (x1) from** • {Absorption/ uptake} decreases when cyanide is added (1) • Active transport requires {energy/ ATP} (1) • but ATP not produced/ energy not released (1) • to move substance against concentration gradient/ or description (1) No {ATP/ energy} for active transport = 2 marks Glucose is moved from a low to high concentration = 2 marks		4		4		
		(ii)		{All/ the three sugars/ they} are still {absorbed/ taken up} in the presence of cyanide (1) Diffusion {is passive/ does not require ATP/ energy not required} (1)			2	2		
	(d)			{Lower/ reduced/ small/ not enough} surface area (of villi)			1	1		
				Question 5 total	**2**	**5**	**3**	**10**	**0**	**0**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
6	(a)	(i)		Humans ate {shellfish/ fish} (that contained the toxin) (1) Toxins {built up/ accumulated/ bioaccumulated} (through food chain) (1)		2		2		
		(ii)		0.98 = 3 marks If incorrect award 2 marks for correct answer not to two significant figures 0.98039 1(.00) 0.99 If incorrect award 1 mark for: 500/51000 × 100		3		3	3	
	(b)			**Any five (×1) from:** A. {Algal bloom/ algae} blocks (sun)light (1) B. causes death of plants (1) C. (plants) {decay/ decompose} (1) D. By {bacteria/ fungi/ decomposers} (1) E. (Bacteria) {multiply/ reproduce} (1) F. Use oxygen (1) G. For respiration (1) H. (not enough oxygen left in the water so) {fish/ aquatic animals} {suffocate/ die} (1)	4	1		5		
				Question 6 total	**4**	**6**	**0**	**10**	**3**	**0**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
7	(a)	(i)		Independent -Concentration of protein (1) Dependent - Time taken to change from cloudy to clear/ time taken to {become clear/ change colour} (1) Reject {time/ time taken}	2			2		2
		(ii)		Protease (1) Protein {digested/ broken down} into amino acids (1)		2		2		2
		(iii)		Judging end point/ OWTTE (1) Use a {colorimeter/ colour standard} (to compare) (1)		1	1	2		2
	(b)			Whey powder contains 49% (Accept 48-50%) protein but milk powder only contains 34% (Accept 33-35%) protein/ whey powder contains 15% (Accept 13-17%) more protein (1) Protein needed for (building) <u>muscle</u> (1)		2		2	1	2
				Question 7 total	**2**	**5**	**1**	**8**	**1**	**8**

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FOUNDATION TIER

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	1	5	3	9	1	2
2	7	3	1	11	0	0
3	3	5	0	8	0	0
4	2	4	5	11	3	7
5	5	1	0	6	0	6
6	4	0	1	5	0	2
7	2	6	2	10	2	0
Total	**24**	**24**	**12**	**60**	**6**	**17**

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HIGHER TIER

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	4	0	1	5	0	2
2	2	6	2	10	2	0
3	6	0	1	7	0	7
4	4	2	4	10	1	0
5	2	5	3	10	0	0
6	4	6	0	10	3	0
7	2	5	1	8	1	8
Total	**24**	**24**	**12**	**60**	**7**	**17**

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