

GCSE (9–1)

Biology A (Gateway)

J247/02: Paper 2 (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2019

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Annotations available in RM Assessor

Annotation	Meaning
	Correct response
	Incorrect response
	Omission mark
	Benefit of doubt given
	Contradiction
	Rounding error
	Error in number of significant figures
	Error carried forward
	Level 1
	Level 2
	Level 3
	Benefit of doubt not given
	Noted but no credit given
	Ignore

Abbreviations, annotations and conventions used in the detailed Mark Scheme (to include abbreviations and subject-specific conventions).

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
✓	Separates marking points
DO NOT ALLOW	Answers which are not worthy of credit
IGNORE	Statements which are irrelevant
ALLOW	Answers that can be accepted
()	Words which are not essential to gain credit
—	Underlined words must be present in answer to score a mark
ECF	Error carried forward
AW	Alternative wording
ORA	Or reverse argument

Subject-specific Marking Instructions**INTRODUCTION**

Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:

- the specification, especially the assessment objectives
- the question paper
- the mark scheme.

You should ensure that you have copies of these materials.

You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

The breakdown of Assessment Objectives for GCSE (9-1) in Biology A:

	Assessment Objective
AO1	Demonstrate knowledge and understanding of scientific ideas and scientific techniques and procedures.
AO1.1	Demonstrate knowledge and understanding of scientific ideas.
AO1.2	Demonstrate knowledge and understanding of scientific techniques and procedures.
AO2	Apply knowledge and understanding of scientific ideas and scientific enquiry, techniques and procedures.
AO2.1	Apply knowledge and understanding of scientific ideas.
AO2.2	Apply knowledge and understanding of scientific enquiry, techniques and procedures.
AO3	Analyse information and ideas to interpret and evaluate, make judgements and draw conclusions and develop and improve experimental procedures.
AO3.1	Analyse information and ideas to interpret and evaluate.
AO3.1a	Analyse information and ideas to interpret.
AO3.1b	Analyse information and ideas to evaluate.
AO3.2	Analyse information and ideas to make judgements and draw conclusions.
AO3.2a	Analyse information and ideas to make judgements.
AO3.2b	Analyse information and ideas to draw conclusions.
AO3.3	Analyse information and ideas to develop and improve experimental procedures.
AO3.3a	Analyse information and ideas to develop experimental procedures.
AO3.3b	Analyse information and ideas to improve experimental procedures.

For answers to Section A if an answer box is blank ALLOW correct indication of answer e.g. circled or underlined.

Question			Answer	Marks	AO element	Guidance
1			B	1	1.1	
2			A	1	1.1	
3			C	1	1.1	
4			D	1	1.1	
5			C	1	1.1	
6			B	1	2.1	
7			D	1	1.1	
8			B	1	1.2	
9			D	1	1.1	
10			B	1	1.1	
11			C	1	2.2	
12			B	1	2.1	
13			B	1	1.2	
14			B	1	1.2	
15			B	1	2.2	

Question		Answer	Marks	AO element	Guidance	
16	(a)	B, (C), E, D, (A) ✓✓	2	1.1	ALLOW 1 mark for B selected in first box	
	(b)	cow B x bull B ✓ cow makes creamy milk ✓ bull's mother produced high yield of milk ✓ Cow B / Bull B not aggressive ✓	4	3.2a 3.1b x3	If wrong cow or bull chosen = No marks IGNORE cow C has creamy milk IGNORE bull A's mother produced high yield	
	(c)	(i)	yield of milk has gone up and number of cows has decreased ✓	1	3.1a	IGNORE negative correlation
		(ii)	Any two from: (cows' milk yield has increased) due to selective breeding ✓ (cows' milk yield has increased) due to intensive farming ✓ need less cows to produce the same amount of milk ✓	2	3.2b	ALLOW improved medications / hormone injections / better quality food supply ✓

Question		Answer	Marks	AO element	Guidance
17	(a)	the population is increasing ✓	1	1.1	ALLOW more births than deaths
	(b)	(i) move genes ✓ from one organism to another ✓	2	1.1	ALLOW modifying/alter the genome IGNORE alter genes
		(ii) Any two from: disease resistance ✓ frost resistance ✓ pest resistance ✓ taste ✓ drought resistance ✓ vaccines ✓ colour ✓ flavour ✓	2	1.2	IGNORE yield /size of fruit
		(iii) FIRST CHECK ANSWER ON THE ANSWER LINE If answer = 48 (%) award 2 marks 96÷200 or 0.48 ✓ =48 (%) ✓	2	2.2 1.2	ALLOW correct conversion of the fraction of the people with a negative opinion into a percentage

Question		Answer	Marks	AO element	Guidance	
18	(a)	antigens ✓ white blood cells ✓	2	1.1		
	(b)	(i)	as a control / to compare the results ✓	1	1.2	ALLOW show the drug is having the effect/works /no psychological effect
		(ii)	FIRST CHECK ANSWER ON THE ANSWER LINE If answer = 75 (patients) award 2 marks 480/6.4 ✓ =75 (patients) ✓	2	2.2	
	(c)	Any two from: for peer review ✓ idea of checking the results ✓ to increase the number of patients tested ✓ conclusions more valid ✓	2	2.2	IGNORE get accurate results ALLOW check for safety/bias ALLOW conclusions are more reliable	

Question		Answer	Marks	AO element	Guidance
19	(a)	plants receive less light (for photosynthesis) / salt water/concentration affects osmosis / water is drawn out of the plants ✓	1	2.1	
	(b)	quadrat ✓	1	1.2	
	(c) (i)	<p>FIRST CHECK ANSWER ON THE ANSWER LINE If answer = 0.1 (%) award 3 marks</p> <p>10x0.25 or 2.5 (m²)✓</p> <p>2.5 ÷ 2500 / 0.001 ✓</p> <p>= 0.1 (%) ✓</p>	3	2 x 2.2 1.2	ALLOW correct conversion of the fraction of the area sampled into a percentage
	(ii)	<p>(student A):</p> <p>has taken more samples/quadrats than B ✓</p> <p>has sampled all over/spread out/ random over the marsh ORA ✓</p> <p>samples more likely to be representative / not bias / valid ✓</p>	3	3.1a x2 3.2a	<p>If student B chosen = No marks</p> <p>IGNORE A = 10 and B = 8 samples</p> <p>IGNORE plants more spread out</p>
	(iii)	<p>Any two from:</p> <p>wash hands (after sampling) ✓</p> <p>not to eat / do not put hands to mouth (whilst sampling) ✓</p> <p>protective clothing (whilst sampling) ✓</p>	2	3.3b	ALLOW sterilise equipment after use

Question		Answer	Marks	AO element	Guidance
		Cover cuts with plasters ✓			
	(d)	<p>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</p> <p>Level 3 (5–6 marks) Provides a detailed explanation for the uses for the land. AND Provides a detailed explanation how preserving the salt marsh will maintain biodiversity.</p> <p><i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i></p> <p>Level 2 (3–4 marks) Provides a detailed explanation for the uses for the land. OR Provides a detailed explanation how preserving the salt marsh will maintain biodiversity. OR Provides a basic explanation for the use for the land. AND Provides a basic explanation how preserving the salt marsh will maintain biodiversity.</p> <p><i>There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</i></p> <p>Level 1 (1–2 marks) Provides a basic explanation for the use for the land. OR</p>	6	1.1 x2 2.1 x4	<p>AO1.1 Demonstrates knowledge and understanding of land use and the need to maintain biodiversity</p> <ul style="list-style-type: none"> land may be used for growing crops/biofuels/ grazing animals/renewable energy protecting the salt marsh will maintain biodiversity/ecosystem/number of species/habitats/food chains ORA <p>AO2.2a Applies knowledge and understanding of land use and the need to maintain biodiversity</p> <ul style="list-style-type: none"> increases in population mean that land is needed to supply more food / biofuel/renewable energy farmers will gain more money from more food production increased demand for renewable energy resources to reduce climate change the salt marshes are rare habitats/species avoid species becoming extinct/endangered ORA maintaining biodiversity can provide medicines ORA pollinators are crucial in maintaining biodiversity ORA

Question			Answer	Marks	AO element	Guidance
			<p>Provides a basic explanation how preserving the salt marsh will maintain biodiversity.</p> <p><i>There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.</i></p> <p>0 marks No response or no response worthy of credit.</p>			

Question		Answer	Marks	AO element	Guidance																				
20	(a)	<p>clots the blood ✓</p> <p>prevents bleeding / allows wounds to heal / forms a scab ✓</p>	2	1.1	<p>IGNORE clump blood</p> <p>ALLOW prevents pathogens getting into the body</p>																				
	(b)	<div style="text-align: center;"> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td></td> <td colspan="2" style="text-align: center;">Rr</td> <td></td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">R</td> <td style="text-align: center;">r</td> <td style="text-align: center;">✓</td> </tr> <tr> <td style="text-align: center;">Rr</td> <td style="text-align: center;">R</td> <td style="text-align: center;">RR</td> <td style="text-align: center;">Rr</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">r</td> <td style="text-align: center;">Rr</td> <td style="text-align: center;">rr</td> <td style="text-align: center;">✓</td> </tr> </table> </div> <p>ratio 3 : 1 ✓</p>			Rr					R	r	✓	Rr	R	RR	Rr			r	Rr	rr	✓	3	<p>2.1</p> <p>correct gametes = one mark correct genotypes of offspring = 1 mark</p> <p>3.2b</p>	<p>ALLOW ECF for ratio ALLOW 3 in 4</p>
		Rr																							
		R	r	✓																					
Rr	R	RR	Rr																						
	r	Rr	rr	✓																					
	(c)	<p>Any three from:</p> <p>variation with some rats resistant and some who are not ✓</p> <p>(resistant rats) more likely to survive/less likely to be killed ORA ✓</p> <p>(resistant rats more likely) reproduce ORA ✓</p> <p>pass on the allele / gene for resistance ORA ✓</p>	3	2.1	<p>IGNORE selective breeding</p> <p>ALLOW mutation for resistance</p> <p>ALLOW offspring produced / breed together</p> <p>ALLOW pass on advantageous gene IGNORE trait is passed on / genes are passed on</p>																				

Question		Answer	Marks	AO element	Guidance
	(d)	<p>Any two from:</p> <p>(stops/less) respiration ✓</p> <p>(no/less) energy/ATP ✓</p> <p>key process interrupted e.g. cell metabolism/protein synthesis/chemical reactions/active transport ✓</p>	3	2.1	

Question		Answer				Marks	AO element	Guidance											
21	(a)	<table border="1"> <tr> <td colspan="3">Communicable disease</td> <td rowspan="2">Non-communicable disease</td> </tr> <tr> <td>Caused by a bacterium</td> <td>Caused by a fungus</td> <td>Caused by a virus</td> </tr> <tr> <td>crown gall disease</td> <td>barley powdery mildew</td> <td>AIDS</td> <td>type 2 diabetes</td> </tr> </table> <p>✓✓✓</p>				Communicable disease			Non-communicable disease	Caused by a bacterium	Caused by a fungus	Caused by a virus	crown gall disease	barley powdery mildew	AIDS	type 2 diabetes	3	1.1	4 correct = 3 marks, 2 or 3 correct = 2 marks, 1 correct = 1 mark
Communicable disease			Non-communicable disease																
Caused by a bacterium	Caused by a fungus	Caused by a virus																	
crown gall disease	barley powdery mildew	AIDS	type 2 diabetes																
	(b)	(i)	viruses are not destroyed/killed by antibiotics ✓ wants to avoid the spread of antibiotic resistant (bacteria) ✓			2	2.1	ALLOW antibiotics are ineffective in treating viruses / antibiotics only kill bacteria DO NOT ALLOW viruses can become antibiotic resistant											
		(ii)	virus sinusitis patient's should be getting better / the symptoms should have disappeared/only last 14 days ✓ any symptoms/infection (after 14 days) is caused by bacteria ✓			2	3.1a	IGNORE time for bacteria need to grow											

Question			Answer	Marks	AO element	Guidance
22	(a)	(i)	feeds on seeds it is a primary (consumer) ✓ feeds on insects, then it is a secondary (consumer) ✓	2	2.1	ALLOW eats seeds which are the producer/first trophic level ALLOW eats insects which are the primary consumer ALLOW it feeds on seeds and insects if no other marks scored. IGNORE references to herbivores/carnivores/predators
		(ii)	predator because it eats/kills pine martens ✓ competitor (with pine martens) because they eat flycatchers/same prey ✓	2	2.1	ALLOW pine martens are foxes prey ALLOW foxes hunt pine martens ALLOW competitor because pine martens also eat flycatchers
		(iii)	insect(s) / Great tits	1	1.1	
	(b)	(i)	correctly chosen axes, labelled with units ✓ suitable scale for the number of bird boxes ✓ bars correctly drawn ✓ suitable key ✓	4	2.2	height (m) must be on x-axis DO NOT ALLOW scale that use less than half the grid ALLOW +/- half a square IGNORE –touching adjacent bars

Question		Answer	Marks	AO element	Guidance
	(ii)	<p>Any three from: great tits (nest) higher (in the trees) / ORA ✓ this protects them from weasels who live mainly on the ground / ORA ✓ idea flycatchers (nest) at all heights ✓ as pine martens can move up and down/climb the tree ✓</p>	3	3.2b	<p>ALLOW weasels can't reach them/great tits ALLOW fewer great tits lower down as weasels eat them = 2</p> <p>ALLOW flycatchers can get killed anywhere in tree by pine marten IGNORE pine martens eat flycatchers and live in the trees</p>

Question		Answer	Marks	AO element	Guidance
23	(a)	<p>✓✓</p>	2	1.1	<p>ALLOW numbers matched to correct boxes All 4 lines correct = 2 marks 2 or 3 lines correct = 1 mark 1 or 0 lines correct = 0 mark</p>
	(b) (i)	<p>(no) microorganisms (in the soil) ✓</p> <p>no decay (takes place) ✓</p>	2	1.1 2.1	<p>AW microbes, decomposers, saprophytes, detritivores, bacteria, fungi</p> <p>AW decomposition, rotting, break down ALLOW not enough nitrifying bacteria to replace nitrates / no nitrates released by nitrifying bacteria = 2 IGNORE no organisms to recycle the minerals</p>
	(ii)	<p>plants release oxygen by photosynthesis ✓</p> <p>organisms in the soil / microbes / animals release carbon dioxide by respiration ✓</p>	2	2.2	<p>ALLOW correct word (or symbol) equations for photosynthesis linked to plants and respiration linked to organisms in the soil / microbes / animals</p> <p>AW microbes, decomposers, saprophytes</p> <p>IGNORE breathe out carbon dioxide IGNORE plants will respire and give out carbon dioxide ALLOW 1 mark for plants release oxygen/photosynthesis and microbes give out carbon dioxide/respire if no other marks are awarded.</p>

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