Foundation

GCSE

Biology A Gateway

J247/02: Paper 2 (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2024

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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.

MARKING INSTRUCTIONS

PREPARATION FOR MARKING

RM ASSESSOR

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *RM Assessor Online Training*; *OCR Essential Guide to Marking*.
2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are available in RM Assessor.
3. Log-in to RM Assessor and mark the **required number** of practice responses (“scripts”) and the **required number** of standardisation responses.

MARKING

1. Mark strictly to the mark scheme.
2. Marks awarded must relate directly to the marking criteria.
3. The schedule of dates is very important. It is essential that you meet the RM Assessor 50% and 100% (traditional 50% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.
4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone, email or via the RM Assessor messaging system.

5. **Crossed Out Responses**

Where a candidate has crossed out a response and provided a clear alternative then the crossed out response is not marked. Where no alternative response has been provided, examiners may give candidates the benefit of the doubt and mark the crossed out response where legible.

Rubric Error Responses – Optional Questions

Where candidates have a choice of question across a whole paper or a whole section and have provided more answers than required, then all responses are marked and the highest mark allowable within the rubric is given. Enter a mark for each question answered into RM assessor, which will select the highest mark from those awarded. *(The underlying assumption is that the candidate has penalised themselves by attempting more questions than necessary in the time allowed.)*

Multiple Choice Question Responses

When a multiple choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate).
When a question requires candidates to select more than one option/multiple options, then local marking arrangements need to ensure consistency of approach.

Contradictory Responses

When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

Short Answer Questions (requiring only a list by way of a response, usually worth only one mark per response)

Where candidates are required to provide a set number of short answer responses then only the set number of responses should be marked. The response space should be marked from left to right on each line and then line by line until the required number of responses have been considered. The remaining responses should not then be marked. Examiners will have to apply judgement as to whether a 'second response' on a line is a development of the 'first response', rather than a separate, discrete response. *(The underlying assumption is that the candidate is attempting to hedge their bets and therefore getting undue benefit rather than engaging with the question and giving the most relevant/correct responses.)*

Short Answer Questions (requiring a more developed response, worth two or more marks)
If the candidates are required to provide a description of, say, three items or factors and four items or factors are provided, then mark on a similar basis – that is downwards (as it is unlikely in this situation that a candidate will provide more than one response in each section of the response space.)

Longer Answer Questions (requiring a developed response)
Where candidates have provided two (or more) responses to a medium or high tariff question which only required a single (developed) response and not crossed out the first response, then only the first response should be marked. Examiners will need to apply professional judgement as to whether the second (or a subsequent) response is a 'new start' or simply a poorly expressed continuation of the first response.

6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add the annotation 'SEEN' to confirm that the work has been seen.

7. Award No Response (NR) if:

    - there is nothing written in the answer space

    Award Zero '0' if:
    - anything is written in the answer space and is not worthy of credit (this includes text and symbols).

    Team Leaders must confirm the correct use of the NR button with their markers before live marking commences and should check this when reviewing scripts.

8. The RM Assessor **comments box** is used by your Team Leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**

    If you have any questions or comments for your Team Leader, use the phone, the RM Assessor messaging system, or email.

9. Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

10. For answers marked by levels of response:

Read through the whole answer from start to finish, using the Level descriptors to help you decide whether it is a strong or weak answer. The indicative scientific content in the Guidance column indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance. Using a 'best-fit' approach based on the skills and science content evidenced within the answer, first decide which set of level descriptors, Level 1, Level 2 or Level 3, best describes the overall quality of the answer.

Once the level is located, award the higher or lower mark:

The higher mark should be awarded where the level descriptor has been evidenced and all aspects of the communication statement (in italics) have been met.

The lower mark should be awarded where the level descriptor has been evidenced but aspects of the communication statement (in italics) are missing.

In summary:

The skills and science content determines the level.

The communication statement determines the mark within a level.

Level of response question on this paper is **23(c).**

11. Annotations available in RM Assessor

Annotation	Meaning
	Correct response
	Incorrect response
	Omission mark
BOD	Benefit of doubt given
CON	Contradiction
RE	Rounding error
SF	Error in number of significant figures
ECF	Error carried forward
L1	Level 1
L2	Level 2
L3	Level 3
NBOD	Benefit of doubt not given
SEEN	Noted but no credit given
I	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

12. **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**.

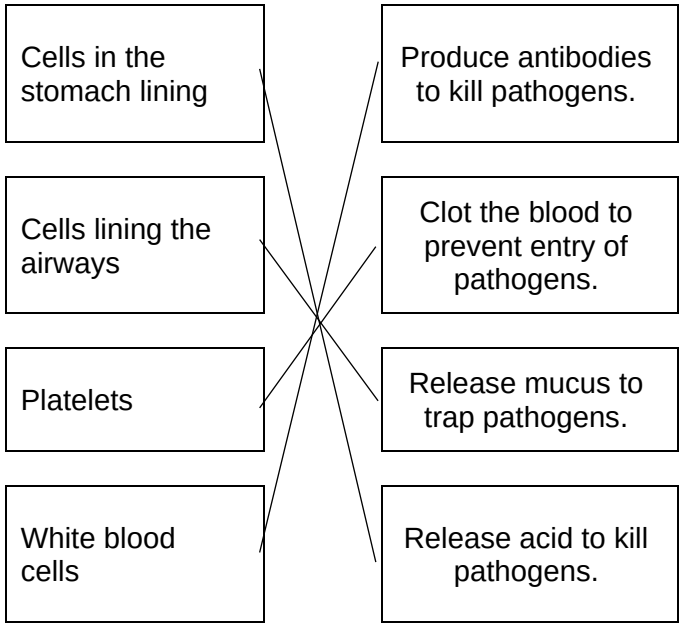
Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

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	D	**1**	**1.1**	
3	C	**1**	**2.1**	
4	D	**1**	**1.1**	
5	C	**1**	**1.1**	
6	B	**1**	**2.1**	
7	B	**1**	**1.1**	
8	A	**1**	**2.1**	
9	C	**1**	**1.1**	
10	A	**1**	**1.1**	
11	B	**1**	**1.1**	
12	D	**1**	**2.1**	
13	C	**1**	**2.1**	
14	C	**1**	**1.1**	
15	B	**1**	**1.1**	

Question			Answer	Marks	AO element	Guidance
16	(a)		 ✓✓✓	3	3 x 1.1	All four correct = 3 marks Two or three correct = 2 marks 1 correct = 1 mark
	(b)		**Answers in either order** Weakened ✓ Dead ✓	2	2 x 1.1	**ALLOW** antigens / fragments / pieces / attenuated / inactive /altered / harmless

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>AO element</th><th>Guidance</th></tr>
<tr><td>17</td><td>(a)</td><td></td><td>
<table>
<tr><th></th><th>Number of pesticide resistant insects</th><th>Number of pesticide sensitive insects</th><th>Ratio</th></tr>
<tr><td>At the end</td><td>4</td><td>2 ✓</td><td>2 : 1 ✓</td></tr>
</table>
</td><td>2</td><td>2.2

1.2</td><td>ALLOW 4 : 2</td></tr>
<tr><td></td><td>(b)</td><td></td><td>Natural selection ✓</td><td>1</td><td>2.1</td><td></td></tr>
<tr><td></td><td>(c)</td><td></td><td>Pesticides kill pests/insects ✓

The pests/insects may become resistant ✓</td><td>2</td><td>2 x 3.1a</td><td>ALLOW idea that may deter them from using pesticide

ALLOW may choose alternative named methods / alternative pesticide/ become organic farmers</td></tr>
</table>

Question			Answer	Marks	AO element	Guidance
18	(a)		Virus ✓ Bacteria ✓	2	2 x 1.1	
	(b)	(i)	Spores / fungi / powdery mildew more likely to be splashed by the rain (on to plants) / transported by splashes of rain ✓ Spores / fungi / powdery mildew grow better in moist weather ✓	2	2 x 2.1	**IGNORE** references to wind **ALLOW** moist weather **/** rain helps spores / fungi / powdery mildew to grow
		(ii)	Sexual (reproduction) ✓	1	2.1	
		(iii)	Fungi on the pieces of dead barley ✓ Stops spores / fungi / powdery mildew spreading (to the new plants) ✓	2	2.1 3.1b	 **ALLOW** contaminating / infecting / moving as **AW** for spreading

Question			Answer	Marks	AO element	Guidance
19	(a)		**First check the answer on the answer line** **If answer = 0.005 (%) award 2 marks** (35 ÷ 700 000) × 100 ✓ 0.005(%) ✓	**2**	**2 x 2.1**	**ALLOW** $5x10^{-3}$(%)
	(b)	**(i)**	Female without SMA ✓	**1**	**2.1**	
		(ii)	Homozygous recessive ✓	**1**	**3.1b**	
		(iii)	Person **C** has SMA ✓ Their motor neurones cannot pass <u>impulses</u> to their muscles ✓ Their muscles cannot contract ✓	**3**	**2.1 x 3**	 **ALLOW** signals as AW for impulses **ALLOW** muscles cannot move
	(c)	**(i)**	(The nucleus) contains the DNA / genetic material / chromosomes / faulty gene ✓	**1**	**2.1**	
		(ii)	Make sure it is safe / identify side effects / To see if it works / To find the correct dosage ✓	**1**	**1.1**	**ALLOW** could go wrong / unknown effect **IGNORE** cannot test on humans

Question			Answer	Marks	AO element	Guidance
20	(a)		Parasite ✓	1	1.1	
	(b)		Photosynthesis ✓ Chlorophyll ✓ Sunlight ✓ Phloem ✓	4	4 x 1.1	

Question			Answer	Marks	AO element	Guidance
21	(a)	(i)	**First check the answer on the answer line** **If answer = 3.25 award 2 marks** 1 300 000 ÷ 400 000 ✓ = 3.25 ✓	2	2 x 2.2	**ALLOW** ECF for wrong conversion of 1.3 million e.g., 130000
		(ii)	**Any two from:** There are too many to count them all ✓ They are spread over a large area ✓ Might count the same ones more than once ✓ Some areas are difficult to access ✓ Some might be born / some might die ✓	2	2 x 3.3a	**ALLOW** idea it would take too long to count them all **ALLOW** elephants move around **ALLOW** population fluctuates **IGNORE** references to being killed by hunters
	(b)		*Elephants benefit from ecotourism because:* The elephants are protected (from hunting) ✓ *Local people benefit from ecotourism because:* They receive money/employment due to the tourists ✓	2	2 x 2.1	**ALLOW** habitats are protected

Question			Answer	Marks	AO element	Guidance
22	(a)		Bacteria / fungi ✓	1	1.1	
	(b)	(i)	Water bath ✓	1	1.2	**ALLOW** descriptions of a water bath **ALLOW** incubator
		(ii)	Dependent variable ✓	1	2.2	
	(c)	(i)	A line starting at the same point as 15 °C and 35 °C but with a slope in between these two ✓	1	2.2	
		(ii)	Faster ✓ (Kinetic) energy ✓ Collisions ✓ Sugar ✓	4	3.2b 2.2 2.2 2.2	**ALLOW** quicker/quickly/rapidly **IGNORE** more **ALLOW** speed / movement **ALLOW** interactions **IGNORE** reactions **ALLOW** substrate
		(iii)	Repeat at higher temperatures ✓ Identify the temperature where the pH does not decrease ✓	2	2 x 3.3a	

Question			Answer	Marks	AO element	Guidance
23	(a)		Growing crops with their roots in water ✓	1	1.1	
	(b)		Suitable scale ✓ Axes labelled ✓ Bars correctly drawn ✓	3	3 x 2.2	
	(c)		Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question. **Level 3 (5–6 marks)** Identifies **and** explains a reason why people may be short of food **AND** Compares the information between Haiti and USA recognising the difference between percentage and the actual number of people. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Level 2 (3–4 marks)** Identifies **and** explains reasons why people may be short of food **OR** Compares the information between Haiti and USA recognising the difference between percentage and the actual number of people.	6	2 x 1.1 2 x 2.1 2 x 3.2a	**AO1.1 Demonstrates knowledge and understanding of scientific ideas to give reasons why people might be short of food.** • Increasing populations • New pests and pathogens • Changes to the environment / weather • Conditions might not be right • Costs of agricultural inputs e.g., fertilisers, feed stuffs, pesticides, irrigation systems, equipment • Land availability **AO2.1 Applies knowledge and understanding to explain why people might be short of food** • Increasing population means there is less food to go round • New pests and pathogens will result in lower yields of crops • Changes to the environment / weather might reduce crop yields • Costs of agricultural inputs may be too high for farmers to afford

Question			Answer	Marks	AO element	Guidance
			There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence. **Level 1 (1–2 marks)** Identifies a reason why people may be short of food with a limited explanation **OR** Makes a basic comparison between Haiti and USA *There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant***.** **0 marks** *No response or no response worthy of credit.*			**AO3.2a Analyses information to compare food security between Haiti and USA.** • A much larger percentage (almost half) in Haiti do not have enough food compared to USA • The population in USA is much higher than Haiti • More people in USA do not have enough food • The impact on Haiti is more significant as it affects a larger proportion of the population

Question			Answer	Marks	AO element	Guidance
24	(a)		Two / 2 ✓	1	2.1	**IGNORE** lizard and frog
	(b)		(Idea they are Predators) because they hunt/eat the racers/snake ✓ (Idea they are competitors because) they both feed on lizards / eat the same food ✓	2	2 x 2.1	**ALLOW** racers are its prey **IGNORE** predators of snakes/racers **ALLOW** they are both predators of lizards **DO NOT ALLOW** both feed on lizards and frogs
	(c)		Egestion and respiration ✓	1	1.1	
	(d)	(i)	Biological control ✓	1	1.1	
		(ii)	Idea Mongooses produce more offspring and would eat/predate the racer/snake ✓	1	2.1	**ALLOW** mongooses produce more offspring and eat the racer's/snake food/lizard **ALLOW** mongooses produce more offspring and outcompete the snake **ALLOW** mongoose produce 9 offspring where snake produces 5 / 4 more offspring to eat the snake/racer
	(e)	(i)	(The snakes survived because) there was no/less mongoose/predator ✓	1	3.1b	**ALLOW** no/less competition / not/less eaten by the mongoose
		(ii)	**Any two from:** Mongoose could reach the island ✓ They could eat/hunt/kill/predate/the remaining snakes ✓ (Tourists) could destroy habitat/poach/eat/hunt/kill/predate snake ✓ Introduce disease/pathogens ✓	2	2 x 3.1b	**ALLOW** predators / new predators **ALLOW** idea predator/tourists would eat snakes' food **IGNORE** snakes become extinct/endangered **ALLOW** e.g., tourists litter the island

Question			Answer	Marks	AO element	Guidance
25	(a)		Antibiotics are used inside the body, but antiseptics are not ✓	1	1.1	**DO NOT ALLOW** more than one box ticked
	(b)	(i)	Use a wire / (inoculating) loop / pour liquid culture over the agar ✓ Lift lid of Petri dish slightly / sterilise (wire) ✓	2	2 x 1.2	**ALLOW** pour solution with bacteria over the agar **ALLOW** use a spreader / rod / swab / pipette / cotton buds **ALLOW** idea of aseptic technique **ALLOW ECF** for incorrect named wire/loop
		(ii)	Allow oxygen to enter the dish / prevent anaerobic conditions ✓ Stop pathogens/harmful bacteria growing/reproducing/created / Otherwise, pathogens/harmful bacteria could grow/reproduce/create ✓ **OR** Stops oxygen to enter the dish / anaerobic conditions ✓ Pathogens/harmful bacteria grow/reproduce ✓	2	2 x 1.2	**ALLOW (**for bacteria) to carry out aerobic respiration **ALLOW** stop anaerobic bacteria from growing = 2 **ALLOW** bacteria need oxygen to carry out aerobic respiration = 2 (lack of oxygen, bacteria) can't carry out aerobic respiration bacteria **ALLOW** anaerobic bacteria can grow = 2 **ALLOW** bacteria can't get oxygen which is needed for aerobic respiration = 2
	(c)	(i)	Idea that B is the most effective/killed the most/removed all the bacteria ✓ Idea C is the least effective/killed/removed the least bacteria ✓	2	2 x 3.2b	**IGNORE** references to petri dish A **ALLOW** B is more efficient than C/D (at killing bacteria) **ALLOW** D is more efficient than C (at killing bacteria) Correct order of efficiency (of killing bacteria) is B → D → C = two marks **IGNORE** strongest/weakest

Question			Answer	Marks	AO element	Guidance
		(ii)	**Any two from:** Using different concentrations/volume of disinfectant / make each disinfectant more dilute ✓ Using different concentrations/amounts of bacteria ✓ Using different types of bacteria ✓	**2**	**2 x 3.3b**	 **IGNORE** amount **IGNORE** stronger bacteria **ALLOW** repeat for one mark if no marks are awarded **IGNORE** reference to time

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