Foundation

GCSE

Combined Science Biology A Gateway Science

J250/02: Paper 2 (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2024

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It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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. Work crossed out:

   a. where a candidate crosses out an answer and provides an alternative response, the crossed out response is not marked and gains no marks

   b. if a candidate crosses out an answer to a whole question and makes no second attempt, and if the inclusion of the answer does not cause a rubric infringement, the assessor should attempt to mark the crossed out answer and award marks appropriately.

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 the annotation SEEN to confirm that the work has been seen.

7. There is a NR (No Response) option. Award NR (No Response)

   - if there is nothing written at all in the answer space
   - OR if there is a comment which does not in any way relate to the question (e.g. 'can't do', 'don't know')
   - OR if there is a mark (e.g. a dash, a question mark) which isn't an attempt at the question.

   Note: Award 0 marks – for an attempt that earns no credit (including copying out the question).

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 questions on this paper is **15**.

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
I	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**.

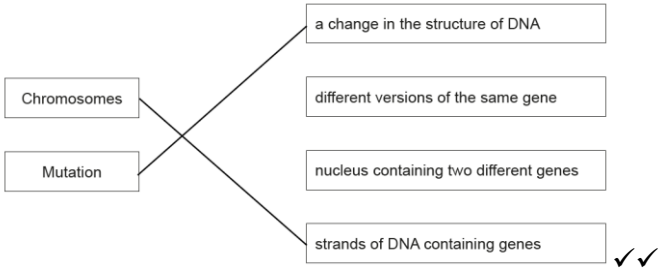
Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

The breakdown of Assessment Objectives for GCSE (9-1) in Combined Science 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	C	1	1.1	
2	D	1	1.2	
3	B	1	2.2	
4	B	1	1.1	
5	C	1	1.1	
6	B	1	1.1	
7	B	1	1.1	
8	D	1	2.1	
9	D	1	2.1	
10	A	1	1.1	

Question			Answer	Marks	AO element	Guidance
11	(a)		 ✓✓	2	2 x 1.1	
	(b)		Gamete ✓ Specialised ✓	2	2 x 1.1	Three ticked and two correct = 1 mark Three ticked and one correct = 0 marks
	(c)	(i)	Dominant ✓ Recessive ✓ Heterozygous ✓	3	3 x 2.1	
		(ii)	Correct genotypes ✓ 25% / 1 in 4 / $^1/_4$ / 1:3 / 0.25 ✓	2	2 x 2.1	**ALLOW ECF** from genotypes in genetic diagram

Question			Answer	Marks	AO element	Guidance
12	(a)		Fungus ✓ Wind ✓ Chlorophyll ✓ Decrease ✓	4	4 x 1.1	
	(b)		It can be spread/transmitted (between organisms) / Caused by a pathogen ✓	1	1.1	**ALLOW** it can be passed on / it can be caught / it is contagious **IGNORE** it can be shared **ALLOW** caused by fungus/microorganisms **IGNORE** germs
	(c)		Plant(s) that are (most) resistant are chosen ✓ These plants are crossed/bred ✓ Process repeated / process continued over many generations ✓	3	3 x 1.2	**DO NOT ALLOW** immune

Question			Answer	Marks	AO element	Guidance
13	(a)		The insulin will be digested/broken down (by the stomach enzymes) ✓ The insulin would not enter the blood / insulin would not reach the liver ✓	2	2 x 2.1	**IGNORE** disintegrate/destroy **IGNORE** references to stomach acid **IGNORE** the insulin will not reach the blood stream so easily/quickly
	(b)		Antiviral ✓	1	1.1	
	(c)		Diet ✓ Cardiac / heart ✓	2	2.1 1.1	**IGNORE** meal / food **IGNORE** cardiovascular **ALLOW** coronary

Question			Answer	Marks	AO element	Guidance
14	(a)	(i)	**First check the answers in the table** **If answer = 22.8, 28.7, 5.0 award 2 marks** 120.1- 97.3 **and** 154.2 – 125.5 **and** 126.3 - 121.3 ✓ = 22.8, 28.7, 5.0 ✓	**2**	 **1.2** **2.2**	 **ALLOW** for one mark 22.8, 28.7, 5 **ACCEPT** minus signs
		(ii)	Idea that the mass at start was not equal ✓	**1**	**3.1b**	**ALLOW** it may have lost more because it was heavier to start with **IGNORE** different amounts to start with
		(iii)	**Any two from:** (Start with) same mass for each sample ✓ Calculate a percentage change in mass ✓ Repeat the process / find a mean/average ✓ Place the samples back in the oven to see if mass changes again ✓	**2**	**2 x 3.3b**	 **IGNORE** same amount **IGNORE** use more samples **ALLOW** leave samples in the oven longer (to dry out more)

Question			Answer	Marks	AO element	Guidance
	(b)		**Any three from:** Less transpiration / transpiration reduced ✓ Less water evaporates/lost from the leaves ✓ Less water absorbed (by the roots) ✓ Less water moved up the stem/xylem/plant ✓ Plant (may) wilt ✓ Stomata (may) close ✓	3	3 x 2.1	**ALLOW** transpiration may stop **ALLOW** water not evaporated/lost from the leaves **ALLOW** water not absorbed **ALLOW** water not moved up the stem/xylem/plant **IGNORE** no water supply
	(c)		**Any two from:** Light (intensity) ✓ Soil pH ✓ Temperature ✓ Minerals ✓	2	2 x 1.1	**DO NOT ALLOW** biotic factor e.g., predation/food/nutrients/disease **IGNORE** just sun **IGNORE** just pH **ALLOW** heat **IGNORE** nutrients **ALLOW** a named mineral **IGNORE** space **ALLOW** carbon dioxide levels **ALLOW** named pollutant e.g., acid rain / sulfur dioxide

Question			Answer	Marks	AO element	Guidance
15			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)** Detailed description and explanation of a pattern in the graph, including identifying both the predator and the prey using clear evidence *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)** Description and explanation of a pattern shown by the graph **OR** Identifies the predator and the prey using clear evidence *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)** Describes a pattern shown by the graph *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.*	**6**	**2 x 2.1** **2 x 3.1a** **2 x 3.2a**	**AO2.1 Apply knowledge and understanding to describe the patterns** • gazelle numbers increase when lion numbers are low / gazelle numbers decrease when lion numbers are high • lion numbers increase when gazelle numbers are high / lion numbers decrease when gazelle numbers are low **AO3.1a Analyse information and ideas to explain the patterns** Gazelle numbers start to fall when lion numbers are high because • more lions to eat/hunt them / lions are the predators of the gazelles • fewer gazelles to breed • fewer offspring reach adulthood Lion numbers start to fall when gazelle numbers are low because • less food / gazelles are the prey of lions • less food for offspring • fewer offspring reach adulthood **ALLOW ORA** in each case **AO3.2a Analyse information and ideas make judgments about predator and prey** Lions are predators because • their numbers are lower / because their numbers peak after the gazelle / when lion numbers are increasing, gazelle numbers are decreasing

Question			Answer	Marks	AO element	Guidance
						Gazelles are prey because • their numbers are higher / because their numbers peak first / when lion numbers are decreasing, gazelle numbers are increasing

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>AO element</th><th>Guidance</th></tr>
<tr><td>16</td><td>(a)</td><td>(i)</td><td>Suitable scale on Y axis ✓

Y axis labelled with units ✓

Accurate bars drawn ✓

Clear indication of which bars are which ✓</td><td>4</td><td>4 x 2.2</td><td>Place ticks and crosses on right hand side of grid

Minimum 50% of grid used
Scale must be in ascending order and linear
ALLOW the use of an axis break

Labels are:
Mass of insects (trapped) g

ALLOW + or – half square
Bars must be same width
ALLOW touching bars within the month but DO NOT ALLOW bars for different months touching
ALLOW stacked bar chart 500, 640, 1080, 530, 120
<table><tr><th rowspan="2">Month</th><th colspan="2">Mass of insects trapped (g)</th></tr><tr><th>1995</th><th>2015</th></tr><tr><td>May</td><td>450</td><td>50</td></tr><tr><td>June</td><td>520</td><td>120</td></tr><tr><td>July</td><td>920</td><td>160</td></tr><tr><td>August</td><td>420</td><td>110</td></tr><tr><td>September</td><td>100</td><td>20</td></tr></table></td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Mass/it has decreased (from 1995 to 2015) / Mass/it is greater (in 1995) ✓

Pattern across the months is the same ✓</td><td>2</td><td>2 x 3.2b</td><td>IGNORE reference to differences in the numbers/population of insects

ALLOW comparison of months e.g., highest mass is July for both years. Must refer to both years
ALLOW reference to comparisons in the patterns of numbers/population of insects</td></tr>
</table>

Question			Answer	Marks	AO element	Guidance
		(iii)	Record the number of different species found in the nets ✓	1	3.3a	
	(b)	(i)	**Any one from:** Idea that mark must not make it more visible to predators ✓ Idea that mark should not be toxic or poisonous (to the insect) ✓	1	2.2	**ALLOW** mark not visible to predators / doesn't make it more likely they get eaten by predators / do not use bright ink **DO NOT ALLOW** so it is visible **BUT ALLOW** only visible under UV light **IGNORE** make sure it is marked in the same place **ALLOW** does not cause harm (to the insect / predator) **IGNORE** does not affect (the insect) **IGNORE** not too much paint or ink / different colours **ALLOW** answers in terms of questions e.g., will it make it visible to predators? will it harm the insect?
		(ii)	**First check the answer on the answer line** **If answer = 1530 award 2 marks** $\frac{146 \times 63}{6}$ or 1533 ✓ = 1530 (3 sig. figs) ✓	2	2 x 2.2	**ALLOW** clear evidence of correct conversion of incorrect answer to 3 significant figures from a reasonable calculation
	(c)		False False True True ✓✓	2	2 x 3.1a	All correct = 2 marks Three correct = 1 mark Two or one correct = 0 marks

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