Foundation

GCSE

Combined Science Biology A Gateway Science

J250/02: Paper 2 (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2025

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

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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. 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 question on this paper is **Q14***

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

12. 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

13. **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	2.2	
2	B	1	1.1	
3	C	1	1.1	
4	C	1	2.1	
5	A	1	2.1	
6	D	1	1.1	
7	C	1	2.1	
8	A	1	1.1	
9	B	1	2.1	
10	A	1	2.1	

Question			Answer	Marks	AO element	Guidance
11	(a)	(i)	Buffalo ✓	1	2.1	
		(ii)	Sun / (Sun)light ✓	1	2.1	**IGNORE** temperature / heat
	(b)		Uses light/photosynthesis ✓ Makes/produces food/glucose/sugar ✓	2	2 × 1.1	**ALLOW** uses energy from the sun **IGNORE** nutrients **IGNORE** acts as a source of food / provides food **ALLOW** converts light (energy) into chemical energy for 2 marks If no other mark awarded, allow for one mark for energy/food passed on to primary consumer
	(c)		**Ticks and buffalo:** Parasitism ✓ **Oxpeckers and buffalo:** Mutualism ✓	2	2 x 2.1	 **ALLOW** symbiotic

Question			Answer	Marks	AO element	Guidance
12	(a)		Nucleus ✓	1	1.1	**IGNORE** mitochondrion/DNA **ALLOW** chromosome(s)
	(b)		Genome ✓ Diploid ✓ Haploid ✓ Genes ✓	4	4 × 1.1	
	(c)		**Genetic:** eye colour / blood group ✓ **Environmental:** scars / accent / language ✓ **Both:** weight / intelligence ✓	3	3 × 1.1	**ALLOW** ability to roll tongue / ear lobe attachment **ALLOW** correct genetic condition **ALLOW** tattoos / piercings / hair style/cut / dyed hair **ALLOW** cancer / height / body mass / type of build / nose shape **IGNORE** strength **ALLOW** hair colour/type/length for genetic or both but once only **ALLOW** skin colour for genetic or both but once only

Question			Answer	Marks	AO element	Guidance
13	(a)	(i)	Correctly identifies: Photosynthesis ✓ Respiration ✓	2	2 × 1.1	
		(ii)	**Any two from:** Respire ✓ Breaks down/decomposes/rots carbon compounds (from decaying matter) ✓ Releasing carbon dioxide (back into atmosphere) ✓	2	2 × 1.1	**ALLOW** named carbon compound / organic material **DO NOT ALLOW** turns organic material to fossil fuels
		(iii)	Without/no oxygen ✓	1	2.1	**IGNORE** without air
	(b)		Photosynthesis ✓	1	2.2	
	(c)		**Any two from:** Hunting/poaching/overfishing ✓ Habitat destruction ✓ Deforestation ✓ Pesticides / herbicides / fertilisers / named air pollutants e.g. sulfur dioxide / named water pollutant ✓ Idea of the introduction of an invasive species ✓	2	2 × 1.1	**ALLOW** destroy areas where organisms live **ALLOW** removal of rainforest / shrubland / hedgerows / fields **IGNORE** carbon dioxide / burning fossil fuel / pollution unless qualified **ALLOW** intensive farming

Question			Answer	Marks	AO element	Guidance
14	(a)*		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)** Compares the effectiveness of the different nicotine methods in quitting smoking with data **AND** Explains the role of the placebo **and** what the results using the placebo show *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)** Compares the effectiveness of the different nicotine methods in quitting smoking **AND** Explains the role of the placebo **or** explains what the results using the placebo show *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)** Compares the effectiveness of the different nicotine methods in quitting smoking. **OR** Explains the role of the placebo **OR** Explains what these results of using the placebo show	**6**	**2 × 1.1** **4 × 3.2a**	**AO1.1 Demonstrates knowledge and understanding on the role of the placebo** • people are not aware if they are taking the drug or not • eliminates any psychological effect • provides a control group/comparison **AO3.2a Analyses information and ideas to make judgements about the different methods** • nasal spray was most effective in quitting smoking at 24% • gum and patch similar effectiveness / gum/patch least effective at 15 to 16% • inhaler is second most effective in quitting smoking at 16.5% • apart from nasal spray other three methods have similar effectiveness at 15 to 17% **AO3.2a Analyses information and ideas to make judgements about these results obtained using the placebo** • idea that the effectiveness is always lower with the placebo, so the drug is having an effect • idea that the placebos allow some people to give up smoking, so part of the effect seen with the drugs is psychological

Question			Answer	Marks	AO element	Guidance
			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.*			• idea that the placebos allow some people to give up smoking so could be used to prevent smoking
	(b)		Mutation ✓ Cell division✓	**2**	**2 × 2.1**	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>AO element</th><th>Guidance</th></tr>
<tr><td>15</td><td>(a)</td><td>(i)</td><td>2.0 ✓</td><td>1</td><td>2.2</td><td>Check white space for answer but answer in table takes precedence
ALLOW 2</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>pH 8 result 2 ✓</td><td>1</td><td>3.1b</td><td>DO NOT ALLOW more than one box ticked</td></tr>
<tr><td></td><td>(b)</td><td></td><td>Suitable scale on both axes ✓

All points accurately plotted ✓✓</td><td>3</td><td>3 × 2.2</td><td>More than 50% of grid must be used
Scale must be in ascending order / 0,0 not required

Each incorrect plot negates a mark
ALLOW +/- half a square for plotting
IGNORE pH10

<table><tr><th>pH</th><th>Mean</th></tr><tr><td>2</td><td>0.8</td></tr><tr><td>4</td><td>3.2</td></tr><tr><td>6</td><td>10.5</td></tr><tr><td>8</td><td>4.6</td></tr></table></td></tr>
<tr><td></td><td>(c)</td><td></td><td>Suitable best fit line ✓</td><td>1</td><td>2.2</td><td>IGNORE any extrapolation of line
DO NOT ALLOW double lines / discontinuous lines / ruled lines</td></tr>
<tr><td></td><td>(d)</td><td></td><td>Any two from:

As pH increases the dandelion height increases and then decreases ✓

Idea that the optimum pH is pH 6 ✓

Above and /or below pH 6, <u>enzymes</u> start to denature ✓</td><td>2</td><td>2 × 3.2b</td><td>

ALLOW reference to lower growth rates at quoted pH values at both sides of the optimum

ALLOW pH 6 gives the best/highest</td></tr>
</table>

Question			Answer	Marks	AO element	Guidance
16	(a)	(i)	Most effective antibiotic = C **AND** Least effective antibiotic = A ✓ C has the largest zone of inhibition/clear area (around disc with no bacterial growth) ✓	**2**	**2 × 3.2b**	 **ALLOW ORA** for antibiotic A e.g. A doesn't have any clear area / zone of inhibition of A = 0cm / A killed the most bacteria
		(ii)	**Any two from:** (Repeat) use different bacteria ✓ Spread the bacteria evenly ✓ Leave for a shorter time ✓ Same diameter/thickness of the antibiotic disc ✓ Same concentration of antibiotic ✓ Same temperature of incubation ✓ Incubate for the same time ✓ Idea of ensuring there are no contaminating bacteria ✓ Control should be used ✓ Use different plates for different antibiotics (to avoid cross contamination) ✓	**2**	 **3.3b** **3.3a**	 **ALLOW** same concentration of bacteria **IGNORE** just 'repeat' **DO NOT ALLOW** leave for longer time **ALLOW** same size disc **ALLOW** soak the discs for the same length/amount of time **ALLOW** same volume of antibiotic **IGNORE** same amount of antibiotic **ALLOW** description of an aseptic technique **ALLOW** disc with no antibiotics/disc with just distilled water

Question			Answer	Marks	AO element	Guidance
	(b)		**Any two from:** White blood cells ✓ Antibodies produced ✓ Antitoxins produced ✓ Antibodies attach to antigens ✓ Antibodies cause pathogens to stick together ✓ Phagocytosis ✓ Correct reference to memory cells ✓	**2**	**2 × 1.1**	**ALLOW** lymphocytes or phagocytes **DO NOT ALLOW** produce antigens **ALLOW** correct description of phagocytosis e.g. enveloping/engulfing bacteria **IGNORE** bacteria being eaten
	(c)	(i)	**First check the answer on the answer line** **If answer = 13 (%) award 2 marks** 1.1 (million) / 8.7 (million) x 100 ✓ = 13 (%) ✓	**2**	**2 × 2.2**	**ALLOW** evidence of another correct method **ALLOW** any correct rounding 12.64367816 for 2 marks
		(ii)	(HIV/AIDS) damages/weakens the immune system / targets/destroys white blood cells ✓	**1**	**3.1a**	**ALLOW** immunocompromised / immunosuppressed / immune system compromised/weakened **IGNORE** body is weakened by HIV

Question			Answer	Marks	AO element	Guidance
	(d)		**Any three from:** (Resistance first produced) by a mutation ✓ Resistant bacteria less likely/not killed by antibiotic / survive / **ORA** ✓ (Resistant bacteria) reproduce **/ ORA** ✓ Pass on allele (for resistance) **ORA** ✓ Repeated over many generations ✓	**3**	**3 × 2.1**	If selective breeding described award no marks If their answer refers to antibodies throughout rather than antibiotics maximum 2 marks **DO NOT ALLOW** idea that mutation happens in humans **IGNORE** just some of them survive / some of them are killed **IGNORE** survival of the fittest unless qualified **IGNORE** ideas of being immune to antibiotics **ALLOW** produce offspring/multiply/divide **IGNORE** breed **ALLOW gene** **IGNORE** pass on traits/characteristics/mutation **IGNORE** takes a long time **ALLOW** pass on allele / gene (for resistance) to offspring for 2 marks = MP3 and MP4

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