



**...day SAMs – Morning/Afternoon**

**GCSE (9–1) Combined Science (Biology) A (Gateway Science)  
J250/08 Paper 8 (Higher Tier)**

**SAMPLE MARK SCHEME**

**Duration:** 1 hour 10 minutes

**MAXIMUM MARK      60**

**DRAFT**

**This document consists of 16 pages**

**MARKING INSTRUCTIONS****PREPARATION FOR MARKING****SCORIS**

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *scoris 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 posted on the RM Cambridge Assessment Support Portal <http://www.rm.com/support/ca>.
3. Log-in to scoris and mark the **required number** of practice responses (“scripts”) and the **required number** of standardisation responses.

YOU MUST MARK 10 PRACTICE AND 10 STANDARDISATION RESPONSES BEFORE YOU CAN BE APPROVED TO MARK LIVE SCRIPTS.

**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 scoris 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 scoris messaging system.

5. Work crossed out:
- where a candidate crosses out an answer and provides an alternative response, the crossed out response is not marked and gains no marks.
  - 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 add a tick 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 scoris **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 scoris 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.**

## 11. Annotations

<b>Annotation</b>	<b>Meaning</b>
<b>DO NOT ALLOW</b>	Answers which are not worthy of credit
<b>IGNORE</b>	Statements which are irrelevant
<b>ALLOW</b>	Answers that can be accepted
( )	Words which are not essential to gain credit
—	Underlined words must be present in answer to score a mark
<b>ECF</b>	Error carried forward
<b>AW</b>	Alternative wording
<b>ORA</b>	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 (Gateway Science):

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

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Mark Scheme

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## SECTION A

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



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Question		Answer	Marks	AO element	Guidance
11	(a)	antibodies attach to antigens (on pathogens) (1)  idea that antibodies on pathogens help the white blood cells to identify the pathogens (1)  white blood cells <i>engulf</i> the pathogens (1)	3	1.1	for extra marking points <b>ALLOW</b> idea that antibodies are specific to antigens (1)  <b>ALLOW</b> higher level ideas of white blood cells being memory cells / multiplying quickly (1)
	(b)	1958 or 1965 (1)  big drop in the number of cases / initial drop followed by fewer cases over time (1)	1  1	3.1b  3.2a	<b>ALLOW</b> 1965
	(c) (i)	415 (3)	3	1.1  2.2  2.1	if incorrect then <b>ALLOW</b> :  $\pi r^2$ (1) or identifying radius as 11.5 (1)  $\pi \times 11.5 \times 11.5$ (2)
	(c) (ii)	correct in that it does have the largest area / clear zone (1)  but only correct for the antibiotics tested (1)  idea that results are not valid as very close together or idea that results are not valid because he has only tested them once / not done any repeats (1)	3	3.2b  3.3a  3.3a	<b>ALLOW</b> comment on specific bacterial infections / don't know which bacteria were used in this test / may get different results for different bacteria

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Question		Answer	Marks	AO element	Guidance
12	(a)	continuous (1)  as complete range of measurements from one extreme to the other or gradual changes over a range of values (1)	2	2.2	
	(b) (i)	plant may have slightly different genes/alleles that control size of leaves (1)  idea that higher light intensity results in smaller leaves (1)  low light intensity means that the leaves need larger surface area to absorb more light (1)  needs to absorb enough light as light is a limiting factor / need enough light for sufficient rate of photosynthesis (1)	3	2.1	IGNORE just 'different genes / genome'
	(b) (ii)	both areas have leaves in all the ranges (1)	1	3.1a	
	(b) (iii)	<b>any two from:</b>  collect more leaves from each area because this enables a calculation of mean to increase accuracy / validity (1)  they could look at more areas with more extreme differences in light intensities as they have only looked at two areas where the difference is not great (1)  they should record light intensities in both places over a period of time to see if there is always a difference (1)	2	3.3b	

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Question		Answer	Marks	AO element	Guidance	
13	(a)	place a line / tape measure from the cliff down towards the sea in a straight line (1)	5	2.2	<b>ALLOW</b> use a key to identify species	
		place a quadrat next to the start of the line (1)		1.2		
		record the species inside the quadrat (1)		1.2		
		how to record abundance e.g. percentage cover of seaweeds or number of animals (1)		2.2		
		repeat at certain distances along the line (1)		1.2		
	(b)	(i)	bladder wrack (1)	1	2.2	
	(b)	(ii)	limpets and barnacles are found in the same area (1) mussels are found further down the shore (1)	2	2.2	<b>ALLOW</b> data quotes e.g. 12–21 m from the cliff face  <b>ALLOW</b> quotes e.g. 24–30 m
	(c)	<b>Any three from:</b> species higher up the shore left uncovered by the sea for longer periods of time / <b>ORA</b> (1)  higher up the shore there is more chance of desiccation / more moisture loss / <b>ORA</b> (1)  idea that some species have to cope with more wave action (1)  some species may have to cope with higher salt concentration if they are found in rock pools (1)  those exposed for longer times may have to cope with extreme temperature change (1)	3	2.1		

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## SECTION B

Question		Answer	Marks	AO element	Guidance
14	(a)	<p><b>any four from:</b></p> <p>blood is placed onto a microscope slide (1)</p> <p>use of cover slip (1)</p> <p>use of stains so that the <b>nucleus</b> stands out (1)</p> <p>idea of using low power first (1)</p> <p>any safety measure (1)</p>	4	1.2	e.g. always move objective lens away from slide when looking down the eye piece / safely disposing of the slide in disinfectant
	(b)	multiply the objective lens by the eyepiece lens (1)	1	1.2	
	(c)	<p>yes</p> <p>value for white blood cells is <math>3 \times 10^9</math> (1)</p> <p>which is below the acceptable range (1)</p>	2	3.2b	No mark for yes
	(d)	<p>the cells would not cease division (1)</p> <p>the growth stages (G2/G1) would be larger / the cells would continue to grow out of control (1)</p>	2	1.1	

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Question			Answer	Marks	AO element	Guidance
15	(a)	(i)	ligase (1) restriction enzyme (1)	2	1.1	either order
	(a)	(ii)	gene to make poison is cut out of the bacteria (using restriction) enzyme (1)  <b>Same</b> enzyme used to cut open corn DNA (1)  <b>Then any one from:</b>  idea of sticky ends matching (1)  gene to make poison is stuck into corn DNA using (ligase) enzyme (1)	3	2.1  2.1  1.1	<b>IGNORE</b> incorrect names of enzymes as this is tested in part (i)  <b>ALLOW use of a plasmid</b> <b>Same</b> enzyme used to cut open plasmid Idea of sticky ends matching gene to make poison is stuck into plasmid using (ligase) enzyme  Plasmid is added to cells of corn plant
	(b)*		Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.  <b>Level 3 (5–6 marks)</b> <b>An explanation as to how insects become resistant. Provides a balanced argument with more than 1 reason for both being produced and not being produced AND concludes an answer backed up with scientific reasoning.</b>  <i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i>  <b>Level 2</b>	6	2 x 3.2b  2 x 2.1  2 x 1.1	<b>AO3.1a: Analyse the information and conclude whether the data favours the production of Bt-corn or not</b>  <ul style="list-style-type: none"> <li>A suitable interpretation as to whether the science associated with Bt-corn favours its production or not which is backed up by a suitable scientific explanation</li> </ul> <b>AO2.1: Apply scientific knowledge to identify the pros and cons for the production of Bt-corn</b>  Cons: <ul style="list-style-type: none"> <li>the poison could still get into</li> </ul>

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Question	Answer	Marks	AO element	Guidance
	<p><b>(3–4 marks)</b>  <b>An explanation as to how insects become resistant. Identifies suitable reasons for the production of Bt corn and a reason why it should not be.</b></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><b>Level 1</b>  <b>(1–2 marks)</b>  <b>An explanation as to how insects become resistant.</b></p> <p><i>The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.</i></p> <p><b>0 marks</b>  <i>No response or no response worthy of credit.</i></p>			<p>animals higher up the food chain / Bioaccumulation</p> <ul style="list-style-type: none"> <li>• gene may get into other plants that could result in the death of insects not feeding on crops</li> <li>• gene may get into other plants that could result in more growth of weeds</li> </ul> <p>Pros:</p> <ul style="list-style-type: none"> <li>• reduces the use of insecticides</li> <li>• less insecticides getting into the environment</li> <li>• less chance of bioaccumulation / harm to animals higher up the food chain by general insecticides</li> <li>• farmer is less likely to be harmed as he does not need to spray insecticides</li> <li>• more crops could be grown in places that can't afford insecticides / improves yield of corn</li> </ul> <p><b>IGNORE</b> reference to cost unqualified</p> <p><b>AO1.1: Demonstrate scientific knowledge as to how resistance to Bt may develop in a population</b></p> <ul style="list-style-type: none"> <li>• idea of a mutation that makes them resistant mention of natural selection</li> <li>• variation in a population</li> <li>• some may be resistant</li> </ul>

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Question			Answer	Marks	AO element	Guidance
						<ul style="list-style-type: none"><li>• these outcompete the non-resistant</li><li>• survive</li><li>• reproduce</li></ul>

SPECIMEN