

GCSE

COMBINED SCIENCE: TRILOGY

Biology Paper 1 Foundation Tier

Mark scheme Practice Paper Series – Set 1 SGC/S1/B/1F

Version 1.1

This mark scheme is an original resource written for sciencegcse.co.uk to accompany the Set 1 practice paper SGC/S1/B/1F. It is not an AQA mark scheme and has not been produced or endorsed by AQA. It follows the structure and conventions of AQA GCSE science mark schemes so that students and teachers can mark the practice paper in the same way that a real paper is marked.

Marking should be carried out using the Information to Examiners on the following pages. The paper has not been standardised, so raw marks should not be converted into grades using any published grade boundaries.

Specification references are to the AQA GCSE Combined Science: Trilogy (8464) specification, Biology section 4.1–4.4. AO = assessment objective; WS = working scientifically; MS = mathematical skills; RP = required practical.

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the answer(s) expected, including alternative acceptable wording, in the **Answers** column
- guidance on which answers are and are not creditworthy in the **Extra information** column
- the assessment objective (AO) and specification reference for each marking point.

Award marks positively. Do not deduct marks for incorrect additional material unless it contradicts a correct answer (see 3.1). Marks are awarded for what the student has written, not for what they might have meant.

2. Emboldening and underlining

2.1 Where a list of acceptable answers is given and more than one mark is available, **any two from** (or similar) is used, followed by the acceptable answers.

2.2 A bold **and** indicates that both parts of the answer are needed to gain the mark.

2.3 Alternative answers acceptable for the same mark are separated by **or**. Different words that are acceptable within a marking point are separated by a forward slash (/).

2.4 Words in bold in the Answers column are the essential words that must be present, or their equivalent, for the mark to be awarded.

3. Marking points

3.1 Marking of lists

For a question asking for a fixed number of responses, consider the whole answer, including extra responses. Each incorrect or contradictory response cancels one correct response; ignore neutral additions. Numbered answer lines do not limit marking to the first responses. This rule does not apply to extended answers.

3.2 Marking procedure for calculations

Full marks can be awarded for a correct numerical answer without working, unless the question asks for working to be shown. If the answer is incorrect, marks may be awarded for the correct stages of working shown in the mark scheme. Anything shown in brackets in the Answers column (for example the unit) is not required for the mark.

3.3 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.4 Errors carried forward

Any error in the answer to a structured question causes the loss of the mark(s) for that part only. Later parts should be marked on the assumption that the incorrect answer was correct, where the mark scheme indicates that error carried forward (ECF) applies.

3.5 Phonetic spelling

Accept misspelled or phonetic scientific terms when the intended answer is clear, unless the spelling could be confused with a different technical term. This also applies when the question asks for the name of a process or structure.

3.6 Brackets

Words shown in brackets in the Answers column are not required to gain the mark but help to set the context.

3.7 Allow

Answers that are acceptable but which would not normally be expected are shown as **allow**.

3.8 Ignore

Statements shown as **ignore** are neither creditworthy nor penalised. Mark the rest of the answer normally.

3.9 Do not accept

Statements shown as **do not accept** are incorrect and, where they contradict or replace the expected answer, mean the mark is not awarded.

4. Level of response marking instructions

Extended-response questions (question 08.3 in this paper) are marked using a level of response mark scheme. The scheme has three levels, each covering two marks, plus a level descriptor and indicative content.

Step 1 – Determine a level. Read the whole answer and decide which level descriptor best fits it. Use a 'best-fit' approach: an answer does not need to meet every part of a descriptor to be placed in that level, and a weak part of the answer need not prevent it from reaching the higher level if the overall quality matches the descriptor.

Step 2 – Determine a mark within the level. Award the higher mark in the level if the answer meets the descriptor fully and the points made are well linked; award the lower mark if the answer only just meets the descriptor or contains minor errors or omissions.

The indicative content is not a checklist: students need not include every point to reach the top level, and other relevant, correct points should be credited. An answer that lists points without linking them into a coherent answer should be placed in a lower level than one that develops and connects them.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	A – nucleus		1	AO1 4.1.1.2
	B – cell membrane	allow membrane do not accept cell wall	1	AO1 4.1.1.2
01.2	cell membrane	if more than one box is ticked, no mark	1	AO1 4.1.1.2
01.3	(photosynthesis takes place in the) chloroplasts	allow chloroplast	1	AO1 4.1.1.2
	(proteins are made in the) ribosomes	allow ribosome words must be used in the correct sentences	1	AO1 4.1.1.2
01.4	any one from: • cell wall • chloroplast(s) • (permanent) vacuole	allow cellulose (cell wall) ignore letters C, D or E without a name	1	AO1 4.1.1.2
01.5	$30 \div 0.06$	an answer of 500 scores 2 marks	1	AO2 4.1.1.5
	(magnification =) ×500	an inverted calculation ($0.06 \div 30 = 0.002$) scores 0 marks ignore units	1	AO2 4.1.1.5
Total			8	
02.1	nucleus – contains the genetic information mitochondria – releases energy tail – moves the cell	all three lines correct = 2 marks one or two lines correct = 1 mark if more than one line is drawn from a part of the cell, that part is incorrect	2	AO1 4.1.1.3
02.2	differentiation	allow differentiate / differentiating do not accept specialisation	1	AO1 4.1.1.4
02.3	an undifferentiated / unspecialised cell that can develop into (many) different types of cell	allow a cell that can divide to produce more cells of the same type and can differentiate allow a cell that can become any type of cell ignore 'a cell that can divide' alone	1	AO1 4.1.2.3
02.4	bone marrow	if more than one box is ticked, no mark	1	AO1 4.1.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.5	any two from: - not all of the treated patients improved or only 28 (out of 40) improved - some patients improved without the treatment or 5 untreated patients improved - some treated patients developed an infection or the treatment has risks / side effects - eyesight 'improved' is not the same as 'cured' - only 40 patients were treated or the sample is small or only one type of blindness was tested	allow 'more people need to be tested' ignore 'newspapers exaggerate' or other answers not based on the data do not accept 'the treatment does not work'	2	AO3 4.1.2.3 WS 1.4
Total			7	
03.1	osmosis	if more than one box is ticked, no mark	1	AO1 4.1.3.2
03.2	any two from: - temperature (of the solutions) - volume of (salt) solution - width / thickness / diameter (of the strips) - same carrot or same part of the carrot - time (the strips are left in the solution) - starting length of the strips	allow surface area of the strips allow type of salt do not accept concentration of the solution (independent variable) do not accept length after 30 minutes (dependent variable)	2	AO2 4.1.3.2 WS 2.2
03.3	$(45 - 50) \div 50 \times 100$ or $-5 \div 50 \times 100$	an answer of -10 scores 2 marks allow 10% decrease / a fall of 10% for 2 marks	1	AO2 4.1.3.2 MS 1c
	(percentage change =) -10 (%)	an answer of 10 with no minus sign or the word 'decrease' scores 1 mark allow 1 mark for $5 \div 50 = 0.1$ (without $\times 100$)	1	AO2 4.1.3.2 MS 1c
03.4	water moved into the (carrot) cells / strip	allow water entered the cells	1	AO2 4.1.3.2
	(by osmosis) because the (distilled) water is more dilute than the (solution inside the) cells or the cell contents are more concentrated than the water	allow water moves from a dilute solution to a concentrated solution (through a partially permeable membrane) allow the cells swell / become turgid 'osmosis' alone is insufficient for this mark do not accept water moving out of the cells	1	AO2 4.1.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.5	any value from 0.25 to 0.35 (mol/dm ³)	allow 'between 0.2 and 0.4' allow 0.27	1	AO3 4.1.3.2 MS 2c
03.6	repeat (with more strips at each concentration) and calculate a mean	allow use several strips at each concentration allow repeat the investigation ignore 'measure more carefully' do not accept use more concentrations	1	AO3 4.1.3.2 WS 2.6
Total			9	
04.1	(amylase is produced in the) salivary glands	allow pancreas / small intestine / mouth	1	AO1 4.2.2.1
	(protease breaks down) protein(s)		1	AO1 4.2.2.1
	(lipase produces) fatty acids and glycerol	both required allow glycerol and fatty acids	1	AO1 4.2.2.1
04.2	40 (°C)	allow 39 to 41	1	AO2 4.2.2.1 MS 4a
04.3	(the rate) decreases (to zero at 60 °C)	allow the rate falls quickly / drops to zero	1	AO3 4.2.2.1
	(because) the enzyme is denatured	allow the enzyme changes shape do not accept the enzyme is killed / dies	1	AO2 4.2.2.1
	(so) the active site changes shape and the substrate / lipid no longer fits (in it)	allow the substrate can no longer bind to the active site ignore 'lock and key' alone	1	AO2 4.2.2.1
04.4	speeds up a (chemical) reaction or increases the rate of a reaction	allow (speeds up a reaction) without being used up ignore 'helps a reaction' do not accept 'starts a reaction'	1	AO1 4.2.2.1
Total			8	
05.1	something that increases the chance / likelihood / probability of a person developing a disease	allow a factor linked to an increased rate of a disease allow 'makes it more likely that you get a disease' do not accept something that causes a disease	1	AO1 4.2.2.6
05.2	72 ÷ 2000 (× 100)	an answer of 3.6 scores 2 marks	1	AO2 4.2.2.6 MS 1c

Question	Answers	Extra information	Mark	AO / Spec. Ref.
	(percentage of smokers =) 3.6 (%)	an answer of 0.036 scores 1 mark	1	AO2 4.2.2.6 MS 1c
05.3	12 (times)	allow ECF from 05.2: answer to $05.2 \div 0.3$, correctly calculated	1	AO2 4.2.2.6 MS 1c
05.4	any two from: - other risk factors were not controlled, e.g. air pollution / genes / passive smoking - a link / correlation alone does not prove a cause	Allow other named, plausible confounding factors. Ignore unequal group sizes or individual exceptions alone. Do not accept smoking does not cause lung cancer.	2	AO3 4.2.2.6 WS 1.4
05.5	benign tumour: (abnormal cells) contained in one area or does not invade other tissues / does not spread	allow usually within a membrane allow the converse for malignant tumours	1	AO1 4.2.2.7
	malignant tumour: invades neighbouring tissues or spreads to other parts of the body (in the blood) or forms secondary tumours	'malignant tumours are cancerous' alone is insufficient do not accept benign tumours are harmless	1	AO1 4.2.2.7
Total			8	
06.1	bacterium	if more than one box is ticked, no mark	1	AO1 4.3.1.3
06.2	any one from: - use a condom or use a barrier method of contraception - treat infected people with antibiotics - avoid sexual contact with infected people	allow testing / screening so that infected people can be treated do not accept vaccination do not accept the contraceptive pill	1	AO1 4.3.1.3
06.3	antibiotics (only) kill bacteria or viruses are not bacteria	allow antibiotics do not affect viruses	1	AO1 4.3.1.8
	viruses reproduce inside (body) cells so drugs that kill viruses would (also) damage the body's cells / tissues	allow viruses live inside cells so it is difficult to kill them without harming the cells do not accept viruses are not living	1	AO1 4.3.1.8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.4	any two from: - there are still new cases or 380 (new) cases in 2024 or the number of cases is not zero - the fall could be caused by something other than the campaign, e.g. fewer people being tested / people moving away - only two years of results since the campaign started or more years of data are needed - there is no comparison with a similar town without a campaign - the number of cases was already changing before the campaign (480 to 500)	allow 'the campaign has only reduced the spread' for the first point ignore 'the campaign has not worked'	2	AO3 4.3.1.3 WS 1.4
06.5	(the skin acts as a) barrier		1	AO1 4.3.1.6
	(the stomach produces) acid	allow hydrochloric acid words must be used in the correct sentences	1	AO1 4.3.1.6
Total			8	
07.1	by inhaling droplets from coughs and sneezes	if more than one box is ticked, no mark	1	AO1 4.3.1.2
07.2	any three from: - a small quantity of dead / inactive (measles) virus / pathogen is put into the body (by injection) (this) stimulates white blood cells to produce antibodies - if the (live) measles virus enters the body (later) the white blood cells respond quickly or produce (the correct) antibodies quickly (so) the virus is destroyed before the child becomes ill or the child does not develop measles	allow weakened for inactive allow memory cells for 'respond quickly' do not accept antibiotics for antibodies do not accept dead / inactive white blood cells ignore 'immune' without explanation	3	AO1 4.3.1.7
07.3	bar for 2014 drawn to 640	tolerance $\pm$ half a small square ($\pm$ 10 cases) each bar must be the same width as the 2010 bar, centred on the year label and not touching another bar	1	AO2 4.3.1.7 MS 4c
	bar for 2018 drawn to 260	if both heights are correct but the bars are drawn incorrectly (e.g. touching or different widths) allow 1 mark in total	1	AO2 4.3.1.7 MS 4c

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.4	as the percentage (of children) vaccinated decreases the number of (measles) cases increases	allow the converse allow negative / inverse correlation allow the fewer children vaccinated, the more cases there are do not accept 'they are linked' without the direction of the link	1	AO3 4.3.1.7 MS 2g
Total			7	
08.1	(carbon dioxide +) water	allow H ₂ O	1	AO1 4.4.1.1
	glucose (+ oxygen)	allow C ₆ H ₁₂ O ₆ ignore sugar do not accept starch	1	AO1 4.4.1.1
08.2	it is an endothermic reaction	if more than one box is ticked, no mark	1	AO1 4.4.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.3	Level 3 (5–6 marks)	A clear, logical plan that could be followed to obtain valid results. The plan explains how light intensity is changed, how the rate of photosynthesis is measured, and how the results are made valid (at least two relevant control variables and/or repeats), in a sensible order.	6	AO2 4.4.1.2 WS 2.2, 2.3 RP 5
	Level 2 (3–4 marks)	A plan that covers most of the required points. Some detail may be missing or the order may be unclear, but the method for changing light intensity and measuring the rate is workable, and at least one way of making the results valid is included.		
	Level 1 (1–2 marks)	Simple statements about some of the steps, for example move the lamp or count the bubbles, with little or no detail of how the results would be made valid.		
	0 marks	No relevant content.		
	Indicative content Changing the light intensity - place the lamp at different distances from the pondweed, e.g. 10, 20, 30, 40 and 50 cm - measure the distance with the ruler - use at least five different distances Measuring the rate of photosynthesis - count the number of bubbles (of oxygen) produced in a set time, e.g. one minute or collect the gas and measure its volume (e.g. with a measuring cylinder or gas syringe) - leave the pondweed for a few minutes at each distance before counting, so that it adjusts to the new light intensity - repeat the count (e.g. three times) at each distance and calculate a mean Making the results valid - use the same piece of pondweed throughout - keep the temperature of the water the same, e.g. put a beaker of water / heat shield between the lamp and the pondweed, or check the temperature with a thermometer - keep the carbon dioxide concentration the same, e.g. add the same amount of sodium hydrogencarbonate to the water - keep the volume of water the same - carry out the investigation in a darkened room so that the lamp is the only light source - plot a graph of bubbles per minute (or volume of gas) against distance from the lamp Credit other correct, relevant points. Do not credit ideas that would invalidate the investigation, e.g. changing the type of lamp at each distance, or that measure something other than the rate of photosynthesis, e.g. the height of the plant.			
Total			9	
09.1	(glucose →) lactic acid	allow lactate do not accept carbon dioxide / ethanol / water in the equation	1	AO1 4.4.2.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.2	30×1.2	an answer of 36 scores 2 marks	1	AO2 4.4.2.2 MS 1a
	(volume of air per minute =) 36 (dm ³)	allow 1 mark for $14 \times 0.5 = 7$ if the wrong column is used	1	AO2 4.4.2.2 MS 1a
09.3	any two from: • (so that) more oxygen is taken in / supplied to the muscles • for (more / faster) respiration to release more energy (for muscle contraction) • (so that) carbon dioxide is removed (from the blood) faster	allow the muscles need more energy for the second point ignore 'to get more air' do not accept respiration makes / produces energy do not accept 'to get more energy from the oxygen'	2	AO2 4.4.2.2
09.4	repeat the measurement (several times) and calculate a mean	allow count the breaths over a longer time (e.g. 5 minutes) and divide by the number of minutes allow repeat the measurement (on different days) ignore use a stopwatch / count more carefully	1	AO3 4.4.2.2 WS 2.6
Total			6	
TOTAL FOR PAPER			70	