



GCSE MARKING SCHEME

SUMMER 2025

**GCSE
SCIENCE (DOUBLE AWARD) – UNIT 6
HIGHER TIER
3430UF0-1**

About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

GCSE SCIENCE (DOUBLE AWARD) UNIT 6 – PHYSICS 2**HIGHER TIER****SUMMER 2025 MARK SCHEME****GENERAL INSTRUCTIONS**Recording of marks

One tick must equate to one mark (apart from the questions where a level of response mark scheme is applied).

Marking rules

All work should be seen to have been marked.

Marking schemes will indicate when explicit working is deemed to be a necessary part of a correct answer.

Crossed out responses not replaced should be marked.

Credit will be given for correct and relevant alternative responses which are not recorded in the mark scheme.

Extended response question

A level of response mark scheme is used. Before applying the mark scheme please read through the whole answer from start to finish. Firstly, decide which level descriptor matches best with the candidate's response: remember that you should be considering the overall quality of the response. Then decide which mark to award within the level. Award the higher mark in the level if there is a good match with both the content statements and the communication statement.

Marking abbreviations

The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.

cao	=	correct answer only
ecf	=	error carried forward
bod	=	benefit of doubt

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1	(a)	(i)		Granite varies OR {different / more} rocks	1			1		
		(ii)		[F3] has {no / lower / 0-1} [concentration of] radon (1) Radon {segment / portion / percentage} would be less (1) Other [segments] would increase (1) accept a single named segment			3	3	2	
		(iii)		{Decay / radioactivity / radon level} is {random / changeable} (1) So smooths out the {randomness / fluctuations} [over longer time periods] (1) accept makes the result more accurate	1	1		2		2
	(b)	(i)		[Radon emits] alpha [radiation] (1) must be correct context absorbed inside body OR <u>highly</u> ionising (1)	1	1		2		
		(ii)		84 (1) ${}^4_2\text{He}/\alpha$ (1) 83 (1)		3		3	2	
		(iii)		Isotopes	1			1		
		(iv)		Both contain {82 / the same number of} protons (1) Any 2 × (1) from: - They have different numbers of neutrons - They have different {mass / nucleon} numbers - Lead 210 contains 128 neutrons - Lead 214 contains 132 neutrons - Lead 214 has 4 more neutrons so Owain is incorrect – must be present to award all 3 marks			3	3	3	
				Question 1 total	4	5	6	15	7	2

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)		[Car has travelled] 5 [spaces] (1) Distance = $5 \times 1.5 = 7.5$ [m] (1) Award 1 mark only for an answer of 9 [m]		2		2	2	
		(ii)		$\frac{7.5 \text{ ecf}}{0.5} = 15$ [m/s] (1) So $15 - 13.4 = 1.6$ m/s [over the limit] (1)		2		2	2	
	(b)	(i)		Selection of a TRL distance of 21 m (1) Manipulation i.e. Time = $\frac{21}{14}$ or $\frac{\text{distance}}{\text{speed}}$ (1) Time = 1.5 [s] (1)	1	1 1		3	3	
		(ii)		$17 + 6 = 23$ [m] [for 11 m/s which is less than 25.56 m] (1) 8.9 m/s gives [a stopping distance] less than 23 m [so ok] (1) Alternative: Thinking distance = 8.9×1.5 ecf = 13.35 [m] (1) + 6 = 19.35 [m] [which is less than 25.56 m] (1) N.B. Recognition that the thinking distance will be less than 17 m award 1 mark			2	2		
	(c)	(i)		Objects will stay at rest or at a {constant speed in a straight line / constant velocity / constant motion} (1) Unless a {resultant / unbalanced} force acts OR if the forces are balanced (1) We're not expecting reference to external	2			2		
		(ii)		The seat belt exerts an [unbalanced] <u>force</u> on a passenger (1) Preventing the passenger moving [forward at a constant speed] (1)		2		2		
Question 2 total					3	8	2	13	7	0

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)			Indicative content: Fusion - During most of a star's lifetime, hydrogen nuclei fuse to form helium nuclei. - As the star runs out of hydrogen, other fusion reactions take place forming the nuclei of other elements. - Heavier elements than hydrogen and helium are formed. Supernova: - High mass stars produce supernovas. - Supernova explosions result when the cores of massive stars have exhausted their fuel supplies. - Heavy elements are formed and ejected during these explosions. Formation of solar system - The solar system starts as a cloud of dust and gas, left over from a supernova. - Gravity collapsed the material in on itself as it began to spin, forming the star in the centre. N.B. Treat reference to forces as neutral	6			6		

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
				5 – 6 marks Comprehensive description of all 3 sections. <i>There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.</i> 3 – 4 marks Comprehensive description of 2 sections or partial description of all 3. <i>There is a line of reasoning which is partially coherent, largely relevant, supported by some evidence and with some structure.</i> 1-2 marks Partial description of 1 or 2 sections. <i>There is a basic line of reasoning which is not coherent, largely irrelevant, supported by limited evidence and with very little structure.</i> 0 marks <i>No attempt made or no response worthy of credit.</i>						
	(b)			Gravitational force and {radiation / gas} <u>pressure</u> (1) accept gravity are balanced OR equal <u>and</u> opposite (1)	2			2		
				Question 3 total	8	0	0	8	0	0

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)		It takes <u>5.3</u> years to halve (1) Activity OR mass OR number of {atoms / nuclei / particles} (1)	2			2		
		(ii)		Technetium[-99m] (1) because it will <u>decay</u> {quickest / quicker than the others} OR shortest half-life (1)		2		2		
	(b)	(i)		Sequence of at least 2 halvings starting from 1 shown (1) $1 \rightarrow \frac{1}{2} \rightarrow \frac{1}{4} \rightarrow \frac{1}{8} \rightarrow \frac{1}{16} \rightarrow \frac{1}{32} = 5$ half-lives (1) Time = $5 \times 59 = 295$ [days] (1) Award 1 mark only for 6 half-lives = 354 [days]		3		3	3	
		(ii)		20 [mm] (1) [is the thickness it takes] to halve the radiation (1) For the 3rd mark: - [Needs many pellets to] make sure one is close to cancer - A single pellet being 50 mm away will reduce to below a quarter [of its radiation] - If one pellet is used centrally it will have a diameter of coverage of only 40 mm [before it halves its radiation] - One pellet [at the edge] will only penetrate 40% of the prostate [before it halves its radiation]			3	3		
				Question 4 total	2	5	3	10	3	0

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)		Measure {unstretched / original} length of spring (1) Add a mass and measure the new length OR calculate the extension for each mass added (1)	2			2		2
		(ii)		Plot a graph of force against {extension / length} (1) Determine the point where line {is not straight / starts to curve} (1)	2			2		2
	(b)	(i)		All the points lie on the line OR no anomalies ORA			1	1		1
		(ii)		Subs of pair from graph e.g. 900 and 49.5 (1) allow ½ small square tolerance on extension value Manipulation (1) Ans = 18 [N/cm] (1) NB Don't award this mark unless 2 sig figs is given Award 2 marks only for an answer of 18.18 [N/cm]		3		3	3	3
		(iii)		Area under graph or use of $W = \frac{1}{2} Fx$ or can be implied (1) Use of 800 (1) $0.5 \times 0.44 \times 800 = 176$ and 176 doubled = 352 [J] (1)	1 1	1		3	3	3
		(iv)	I	$540 - 352 = 188$ [J] Only apply ecf for (b)(iii) if answer < 540		1			1	
			II	Subs into W (ecf) = Fd i.e. 188 ecf = $F \times 1.2$ (1) Manipulation and answer = 156.7 [N] (1)	1	1		2	2	
				Question 5 total	7	6	1	14	9	11

HIGHER TIER

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	AO1	AO2	AO3	Total	Maths	Prac
1	4	5	6	15	7	2
2	3	8	2	13	7	0
3	8	0	0	8	0	0
4	2	5	3	10	3	0
5	7	6	1	14	9	11
Total	24	24	12	60	26	13