

Year	GCSE	Planning	Obtaining and Analysing Data	Concluding and Evaluating	Communicating & Thinking scientifically
1		Identify phenomena in the world around them and raise their own simple questions	Identify changes when observing closely using simple equipment	Identify patterns in time and relationships	Identify ways they can record and communicate their findings in a range of ways and begin to use simple scientific language
		Differentiate between different types of science enquiries, including practical activities	Describe results collected using simple equipment	Describe patterns in time and relationships	
		Evaluate different ways in which they might answer scientific questions	Explain changes over time		
2		Describe when a simple fair test is necessary and help to decide how to set it up.	Identify types of simple measurements and equipment (e.g. hand lenses, egg timers) to gather data	Apply knowledge of their observations and ideas to suggest answers to questions	Identify how they should record and communicate their findings in a range of ways and begin to use simple scientific language
		Explain criteria for grouping, sorting and classifying; and use simple keys	Explain how to use a range of (new) equipment, such as data loggers / thermometers appropriately		
		Analyse when and how secondary sources might help them to answer questions that cannot be answered through practical investigations			
3		Evaluate a range of scientific experiences including different types of science enquiries to answer questions	Make systematic and careful observations	Identify naturally occurring patterns and relationships and decide what data to collect to identify them	Identify relevant simple scientific language to use to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions
		Justify their own decisions about the most appropriate type of scientific enquiry they might use to answer questions	Describe how to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used	Identify changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions	

		Describe simple practical enquiries, comparative and fair tests	Explain how to present the data they collected and recorded data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data			
			Apply knowledge of use of equipment to take accurate measurements using standard units			
4		Identify the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately	Apply knowledge of their science experiences to explore ideas and raise different kinds of questions		Identify secondary sources will be most useful to re-search their ideas and begin to separate opinion from fact	
5	WT 1-1	Identify the aim of an investigation.	Identify patterns in tables and bar charts	Describe what I have found in my investigation		GCSE GRADE 1 NEEDS PROGRESSIVELY MAPPING INTO HE
		Select equipment from those provided	Make simple observations	Write a simple conclusion.		
		Recognise obvious risks when prompted	Make whole number measurements			
		Identify variables in an investigation				
6	1 1+	Select appropriate equipment	Decide which type of graph or chart to draw based on the data I have.	Identify the evidence I have used in my conclusion	Students can use scientific terms correctly to label diagrams.	GCSE GRADE 1 NEEDS PROGRESSIVELY MAPPING INTO HE
		Identify possible risks to myself and others	Design a table for the data being collected.	Describe simple patterns from data		
		Identify variables in an investigation	Label the axes with correct headings			
		Decide how to measure the dependent variable.	Label the axes with correct units			
7	2	Write a simple method to explain how to carry out an explanation.	Follow a simple method to obtain accurate results.	Use data in tables or graphs to come to a conclusion.	Students can use a variety of appropriate resources to research and collect information.	GCSE GRADE 1 NEEDS PROGRESSIVELY MAPPING INTO HE
		Suggest methods to make data more accurate and precise when planning.	Choose the most appropriate method, table or graph to display data, using SI units.	Use key terms and scientific knowledge to explain conclusions.	Students can use scientific terms correctly to label diagrams.	

		Identify some variables that could affect the dependent variable. (control variables) and suggest how to control some of them.	Identify patterns in data presented in line graphs	Suggest improvements to method		GCSE GRADE 2 NEEDS PROGRESSIVELY MAPPING INTO HERE
		Explain why particular pieces of equipment are suitable	Spot a data point that does not fit the pattern	Explain with reasons the accuracy and precision of an experiment.		
		Apply previous experience to predict the outcomes of an investigation.	Explain the why different kinds of data are displayed on different kinds of graphs.	Use data to make simple calculations and to estimate values of data between known values.		
		Recognise a range of familiar risks and take action to control them.	Choose and draw suitable scales for a graph.	Apply results to experiments to learnt content.		
		Identify some hazards and risks and suggest ways to control obvious risks.	Calculate a mean from a set of data.			
		Use appropriate given sources to write a risk assessment	Draw a straight line or a curve of best fit.			
			Explain why I have drawn a straight line or curve of best fit.			
8	3	Suggest more than one method for an investigation and explain reason for chosen method.	Identify anomalous result and omit from mean calculations	Link conclusion to other known scientific explanations.	Student can correctly use terms like proportional, increasing and decreasing rate when referring to trends in graphs.	E 3 NEEDS PROGRESSIVELY MAPPING INTO HERE
		List all the variables that could affect the dependent variable (control variables) and explain how to control some variables.	Manipulate data from tables or graphs to include in calculations.	Identify inaccuracies in method.	Use a variety of secondary resources to research and collect appropriate and valid information.	
		Decide how to vary the independent variable, range and number of readings.	Understand and use the symbols =, <, >, ~	Suggest improvements to method with reasons.		
		Explain how to control all variables and explain why some variables are difficult to control.	Carry out calculations involving negative powers (only -1 for rate).	Apply results to experiments to different investigations.		

		Use scientific ideas to explain predictions.	Provide answers to calculations to an appropriate number of significant figures.			GCSE GRAD
		Choose the most appropriate equipment to make accurate measurements.				
9	4	Explain how to reduce the effect of variables which are difficult to control.	Understand and use direct proportion and simple ratios.	Suggest other possible conclusions from the data.	Use scientific terminology correctly to explain scientific phenomena.	GCSE GRADE 4 NEEDS PROGRESSIVELY MAPPING INTO HERE
		Explain how to deal with sources of error	Translate information between graphical and numeric form.	Explain how the data could be interpreted in different ways		
		Formulate questions or ideas using a range of sources	Estimate values of data between known values and extrapolate lines on graphs.	Suggest reasons for differences in repeat readings.		
		Choose and use appropriate sources to write a thorough risk assessment		Use the data to make further predictions		
		Use difficult scientific ideas, including models such as particle theory, to explain predictions		Suggest reasons for anomalies		
				Apply results to experiments to different investigations.		
10	5	Suggest better ways to control the control variables.	Explain why having a larger range of readings leads to more accurate data.	Propose scientific explanations for unexpected data and patterns	Understand the validity of information and data and recognise reliable and trusted sources.	GCSE GRADE 5 NEEDS PROGRESS
		Adapt approach to practical work in order to control risk	Assess the suitability of a measuring instrument	Explain ways to improve the precision and accuracy of experiment		
		Make quantitative scientific predictions based on detailed scientific ideas.	Understand how to use data to recognise precision and accuracy.	Critically evaluate my method giving strengths and further areas for investigation (limitations) with justifications		
				Apply results to experiments to different investigations in unfamiliar contexts.		
11	6	Justify a choice of strategy for investigating specific scientific questions	Manipulate data from graphs, including calculating gradient in calculations.	Design a new investigation based on limitations from the evaluation	Use complex scientific terminology correctly to explain difficult scientific phenomena.	DE 6 NEEDS

		Choose and justify data collection methods that produce precise, reproducible and accurate data.	Understand and use inverse proportion.	Apply results to experiments to different investigations in unfamiliar contexts.	Evaluating scitific ideas and technologies and justifying an opinion based on social, moral, religious, economic and environmental implications	GCSE GRA
			Change the subject of an equation when doiong calculations.			
			Interpret order and calculate with numbers written in standard form.			
	7		Undertake multiple step calculations involving more than one equation, involving change of subject and substitution.		Make conections between areas of science to understand and form explanations.	
					Use understanding of Science to discredit scientific journals.	
	8		Compare equations to the straight line equation $y = mx + c$ to predict the shape of a graph and value of intercept.		Understand and interpret scientific models to explain scientific phenomena.	GCSE GRA
	9					GCSE GRA
12	13	C-A	Create a strategy for investigating specific scientific questions	Manipulate data from graphs, including calculating gradient in calculations.	Design a new investigation based on limitations from the evaluation	Make conections between areas of science to understand and form explanations.
			Choose and justify data collection methods that produce precise, reproducible and accurate data.	Understand and use inverse proportion.	Apply results to experiments to different investigations in unfamiliar contexts.	Use understanding of Science to discredit scientific peer reviewed journals.
				Change the subject of an equation when doiong calculations.		Understand and interpret scientific models to explain scientific phenomena.
				Interpret order and calculate with numbers written in standard form.		
				Use statistical tests to analyse the significance of data		
				Use the chi-squared test to interpret whether a significant difference is present between observed and expected results.		