

EARTH STRUCTURE AND UNIVERSE												
Year 7	Working Towards	RAG			Meeting	RAG			Exceeding	RAG		
Enquiry Skills	Draw simple graphs outlining information about planets				Construct models of the rock cycle using practical equipment				Analyse data on distances, sun intensity and atmosphere on other planets and what information this gives us			
					Create models of the solar system							
Application					Compare explanations from different periods in history about the motion of objects and structures in the universe				Predict planetary conditions from descriptions of rocks on other planets			
					Predict patterns in day length and shadows depending on latitude							
Explanations	Explain the importance of some gases in our atmosphere				Explain why a rock has a particular property based on the way it was formed				Explain the choice of particular units for measuring distance			
					Explain why places on Earth experience different daylight hours and amounts of sunlight during the year							
Descriptions	State different types of rock				Construct a labelled diagram of the rock cycle				Describe similarities and differences between the rock cycle and everyday physical and chemical changes			
	State the parts of the structure of the Earth				Describe what is meant by weathering and erosion				Describe how space exploration and observations of stars are affected by the scale of the universe			
	Describe the appearance of planets or moons from diagrams showing their positions in relation to the sun											

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PARTICLE MODEL												
Year 7	Working Towards	RAG			Meeting	RAG			Exceeding	RAG		
Enquiry Skills	Make observations for changes in temperature by reading thermometers accurately				Record temperatures in results tables and collect enough evidence to use in a conclusion				Use melting point graphs to assess how pure a substance is			
Application	Decide whether substances are solid, liquid or gas based on their appearance				Use evidence from examples and experiments to explain changes of state, diffusion and gas pressure				Make predictions about what will happen during unfamiliar process, in terms of particles and their energy			
									Argue how to classify substances which behave unusually as solid, liquids and gases			
Explanations	Explain the conditions needed to change states of substances				Explain the properties of solids, liquids and gases based on the arrangement and movement of their particles				Explain the link between density and gas pressure			
					Explain changes in state in terms of changes to the energy of particles							
					Explain how diffusion and gas pressure work							
Descriptions	State examples of solids, liquids and gases				Describe the arrangement of particles in solids, liquids and gases				Describe conditions and their effect on the pressure of gas and the process of diffusion			
	Draw a particle diagram of a solid, liquid and gas											
	Identify simple examples of changes of state				Describe the state changes between solids, liquids and gases							
					Draw before and after diagrams of particles when changes of state have occurred							

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SEPARATING MIXTURES												
Year 7	Working Towards	RAG			Meeting	RAG			Exceeding	RAG		
Enquiry Skills					Choose the most appropriate apparatus to separate a mixture Use chromatography, evaporation and distillation apparatus				Plot a solubility curve for a solution			
Application					Choose the right separation techniques based on the mixture Use information from chromatography to identify substances in a mixture				Analyse and interpret solubility curves Suggest a combination of separation techniques to separate an unknown mixture			
Explanations	Explain how a simple mixture of metal and sand can be separated				Explain how substances dissolve based on the particle model Explain how filtration, evaporation and distillation can separate a mixture				Explain what information can be gained from a solubility curve Explain how mixtures can be separated based on their boiling points			
Descriptions	State simple examples of everyday mixtures State the names of separation techniques				Describe differences in properties between compounds and mixtures				Compare the properties of compounds and mixtures, describing their similarities and differences			

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PERIODIC TABLE AND ELEMENTS												
Year 7	Working Towards	RAG			Meeting	RAG			Exceeding	RAG		
Enquiry Skills	Present data in an appropriate results table				Use apparatus to identify metals and non metals				Create the best way to show data based on trends and patterns from the periodic table			
					Suggest hazards involves with Group 7 elements							
Application	Suggest whether an element is a metal or non-metal based on its appearance and properties				Use a formula to name a chemical				Use data to identify whether a substance is a metal or non-metal and where it may be located on the periodic table			
					State the number of atoms and elements present in a given formula				Predict the position of an element in the periodic table based on its characteristics			
Explanations	Explain the uses of some elements in the periodic table				Explain why different polymers have different uses				Explain how the properties of atoms are different to the properties of elements			
					Explain the properties of composites and ceramics				Explain the difference between elements, compounds and mixtures using models			
					Explain how the location of an element in the periodic table indicates the properties							
Descriptions	Describe what is meant by an atom and an element				Describe the structure of an atom				Write word and symbol equations for Group 7 displacement reactions			
					State some examples of polymers				Describe the trends and patterns in Group 1 and Group 7 based on observations			
					State some uses of elements in the periodic table							
					Describe the differences between elements, compounds and mixtures including particle diagrams							
					Describe what is meant by a polymer and composite							
					Describe the arrangements of elements in the periodic table							

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CHEMICAL ENERGY AND TYPES OF REACTIONS												
Year 7	Working Towards	RAG			Meeting	RAG			Exceeding	RAG		
Enquiry Skills	Use a balance to find the mass of a substance				Collect sufficient data during a conservation of mass experiment				Calculate the mass of product based on mass of reactants in a chemical equation			
					Collect sufficient data to distinguish whether a reaction is exothermic or endothermic				Calculate the total energy lost or gained based on bond energies			
Application	Identify whether reactions are exothermic or endothermic				Predict the properties of a combustion reaction based on the reactants				Deduce whether a reaction is exothermic or endothermic based on its energy profile diagram			
					Predict the products of a thermal decomposition reaction based on its reactants				Use energy data to decide a use for an exothermic or endothermic reaction			
Explanations	Explain why a reaction is an examples of exothermic or endothermic energy changes				Explain observation of change in mass in a reaction				Explain the pros and cons of different fuels in terms of their products of combustion			
					Explain the energy transfers that occur in a reaction							
Descriptions	State some exothermic and endothermic reactions				Use particle diagrams to show what happens in a chemical reaction				Use models to describe changes that occur in chemical reactions			
					Write word equations based on information about a reaction				Write and balance symbol equations			
					Describe what is meant by combustion, thermal decomposition and conservation of mass							
					Describe uses for different exothermic and endothermic reactions							

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DIGESTION												
Year 9 C1	Working Towards	RAG			Meeting	RAG			Exceeding	Evidence		
How Science Works	Describe each practical technique of separating mixtures.				Explain how chromatography, distillation and filtration practical techniques occur.				Explain why crystallisation happens.			
	Safely use a range of equipment to separate chemical mixtures				Explain how testing a prediction can support or refute a scientific idea				Use SI Units and the prefix nano			
Application	Use scientific conventions to identify chemical symbols.				Write word equation for reactions from a practical				Write symbol equations for reactions from practicals			
					Identify link between electron configuration and the structure of the periodic table for elements 1 to 20. Identify anomalies.				Describe the relationship between number of positive and negative charges. Apply this relationship to explain why there is no overall charge			
Explanations	Explain how properties of the elements in Group 0 depend on the outer shell of electrons of the atoms				Explain why the Periodic table has changed throughout the years				Explain the trends in Group 0.			
	Explain how properties of the elements in Group 1 depend on the outer shell of electrons of the atoms								Explain the trends in Group 1.			
	Explain how properties of the elements in Group 7 depend on the outer shell of electrons of the atoms.				Explain the links between properties of transition metals with their common uses.				Explain the trends in Group 7.			
Descriptions	Define an atom, element and compound, mixture				Describe how many electrons there can be in the first, second and third energy shells.				Describe the differences between the plum-pudding model, nuclear model and atomic model.			
	Describe the structure of atoms					Describe the properties of Cr, Mn, Fe, Co, Ni and Cu.					Describe why changes to the atomic model happened	
	Describe the relationship between number of positive and negative charges. Apply this relationship to explain why there is no overall charge				Describe the trends in properties in Group 7.				Describe the experimental techniques involved in the history of the atomic model.			
					Describe the trends in properties in Group 1.					Explain how the experimental techniques work.		
					Describe the trends in properties in Group 0							
					Describe the differences between the early Periodic tables and our current Periodic table							

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How Science Works	Recognise substances as small molecules, polymers or giant structures from diagrams showing their bonding.				Recognise substances as metallic giant structures from diagrams showing their bonding											
	Visualise and represent 2D and 3D forms including two-dimensional representations of 3D objects															
Application					link the properties of diamond to the structure.				link the properties of graphene to the structure.							
					link the properties of graphite to the structure.				link the uses of nanoparticles to their properties. evaluate the use of nanoparticles in applications, eg sun cream							
Explanations	explain why the melting point and boiling point of metallic substances are high				explain why sodium chloride is difficult to melt				explain an example of ionic bonding including detail on electron transfer, group numbers of the atoms involved and the use of correct terms, eg cation and anion							
					explain why covalent substances do not conduct electricity											
					explain how ethene polymerises											
					explain how covalent substances boil.				explain an example of covalent bonding including				detail on electron transfer, group numbers of the atoms involved and the use of correct terminology			
					explain why metallic substances conduct electricity				explain how ionic substances dissolve in water.							
									explain why the melting point and boiling point increases as the size of the molecule does in terms of intermolecular forces							
explain why pure water does not conduct electricity but tap water does conduct electricity				explain the differences in changes of state in terms of intermolecular forces of attraction between a short molecule ie methane and a longer molecule ie pentane												



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	Working Towards	RAG			Meeting	RAG			Exceeding	Evidence	
How Science Works					use measurements of mass before and after an experiment to explain what has happened to the mass during the experiment and why it has happened				Be able to convert $\text{cm}^3$ into $\text{dm}^3$ . Rearrange the equation: $C = m / v$ to make mass the subject		
					Calculate the number of moles in a substance using the relative formula mass						
						Use the masses of substances present in a reaction to write a balanced equation.					
						Use the equation: $C = m / v$ to calculate the concentration of a solution					
Application	Write simple word equations.				Write simple symbol equations.				Balance symbol equations		
	Review the definition of relative atomic mass.				write instructions to another student how to calculate the relative formula mass.				balance complex equations and add state symbols.		
	Recall how to find the relative atomic mass from				Link the limiting reactant to the number of moles.				Balance chemical equations and use these to calculate the masses of substances present.		
					Link the limiting reactant to the masses in grams.				Explain the meaning of concentration and the unit grams per $\text{dm}^3$		
Explanations				Explain the meaning of the law of conservation							
Descriptions	Define the relative molecular mass				describe the equations given in terms of number of moles, reactants and products						
	Define the term limiting reactant.				Define one mole in terms of $M_r$ and $A_r$						

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