

Year 9 Chemistry Curriculum

Unit:	Core knowledge/skill development:	Sequence:	Assessment:	Literacy, numeracy, PSHE, FBV, other links	Key areas of ACP and VAA development:	Home learning and enrichment
9F Reactivity	This topic builds on previous knowledge of chemical reactions covered in Y7 & 8. Different types of reaction are studied such as exothermic, endothermic and displacement. Particle theory and rates of reaction are discussed. Quantitative ideas are introduced such as percentage loss or gain during reactions	9Fa Types of explosions 9Fb Reactivity 9Fc Energy and reactions 9Fc Percentage loss or gain 9Fd Displacement 9Fe Extracting metals.	Starter questions Exam-type questions Hinge questions Use of web-based applications to assess knowledge in lesson (e.g. Educake, Seneca, Active Learn etc.) There is a Working Scientifically opportunity looking at decimal places and significant figures. End-of-topic tests.	Literacy: 9Fa Active and passive Numeracy: 9Fc Percentage loss of gain	Connection finding (linking) to use connections, to generalise the abstract concept of particle theory, energy released in reactions and reactivity Analysing Determining whether a reaction would go ahead based on the reactivity of the reactants, whether a reaction would be exothermic or endothermic	Homework typically set via online platforms such as Educake, Seneca, Active Learn. Worksheets. Exam preparation via exam / test papers.
States of matter	Describe the arrangement, movement and the relative energy of particles in each of the three states of	Sc1 States of matter		Literacy: key words, definitions, summary notes.	Linking: abstract thinking Being able to understand the sub-microscopic models of particles in the 3 phases of matter	

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	matter: solid, liquid and gas. Recall the names used for the interconversions between the three states of matter, recognising that these are physical changes: contrasted with chemical reactions that result in chemical changes Explain the changes in arrangement, movement and energy of particles during these interconversions Predict the physical state of a substance under specified conditions, given suitable data			Numeracy: calculations involving Rf values		
Methods of separating and purifying	Explain the difference between the use of 'pure' in chemistry compared with its everyday use and the	Sc2a mixtures Sc2b Filtration and crystallisation Sc2c Paper chromatography			Analysing: critical or logical thinking Determining which is the best technique for the	

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	differences in chemistry between a pure substance and a mixture Interpret melting point data to distinguish between pure substances which have a sharp melting point and mixtures which melt over a range of temperatures Explain the types of mixtures that can be separated by using the following experimental techniques: a simple distillation b fractional distillation c filtration d crystallisation e paper chromatography Describe an appropriate experimental technique to separate a mixture, knowing the properties of the components of the	Sc2d distillation Sc2d investigating inks Sc2e drinking water			separation of various substances and why	

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	mixture should: Maths skills Describe paper chromatography as the separation of mixtures of soluble substances by running a solvent (mobile phase) through the mixture on the paper (the paper contains the stationary phase), which causes the substances to move at different rates over the paper Interpret a paper chromatogram: a to distinguish between pure and impure substances b to identify substances by comparison with known substances c to identify substances by calculation and use of R_f values Core Practical: Investigate the composition of inks					

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	using simple distillation and paper chromatography Describe how: a waste and ground water can be made potable, including the need for sedimentation, filtration and chlorination b sea water can be made potable by using distillation c water used in analysis must not contain any dissolved salt					
Atomic structure	Describe how the Dalton model of an atom has changed over time because of the discovery of subatomic particles Describe the structure of an atom as a nucleus containing protons and neutrons, surrounded by electrons in shells	Sc3a Structure of the atom Sc3b Atomic number and mass number Sc3c isotopes			Linking: abstract thinking Being able to picture the sub-microscopic world of the atom	

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	Recall the relative charge and relative mass of: a a proton b a neutron c an electron Explain why atoms contain equal numbers of protons and electrons Describe the nucleus of an atom as very small compared to the overall size of the atom Recall that most of the mass of an atom is concentrated in the nucleus Recall the meaning of the term mass number of an atom Describe atoms of a given element as having the same number of protons in the nucleus and that this number is unique to that element Describe isotopes as			Literacy: key words, definitions, summary notes. Numeracy: calculations involving working out relative atomic mass		

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	different atoms of the same element containing the same number of protons but different numbers of neutrons in their nuclei Calculate the numbers of protons, neutrons and electrons in atoms given the atomic number and mass number Explain how the existence of isotopes results in relative atomic masses of some elements not being whole numbers Calculate the relative atomic mass of an element from the relative masses and abundances of its isotopes					
The periodic table	Describe how Mendeleev arranged the elements, known	SC4a Elements and the periodic table			Linking: Big picture thinking	

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	at that time, in a periodic table by using properties of these elements and their compounds Describe how Mendeleev used his table to predict the existence and properties of some elements not then discovered Explain that Mendeleev thought he had arranged elements in order of increasing relative atomic mass but this was not always true because of the relative abundance of isotopes of some pairs of elements in the periodic table Explain the meaning of atomic number of an element in terms of position in the periodic table and	SC4b Atomic number and periodic table SC4c Electronic configurations and the periodic table			Understanding how the periodic table explains the patterns and behaviours of the elements	

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	number of protons in the nucleus Describe that in the periodic table a elements are arranged in order of increasing atomic number, in rows called periods b elements with similar properties are placed in the same vertical columns called groups Identify elements as metals or non-metals according to their position in the periodic table, explaining this division in terms of the atomic structures of the elements Predict the electronic configurations of the first 20 elements in the periodic table as diagrams and in the form, for example 2.8.1					

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	Explain how the electronic configuration of an element is related to its position in the periodic table					
Environmental chemistry	Recall that the gases produced by volcanic activity formed the Earth's early atmosphere Describe that the Earth's early atmosphere was thought to contain: a little or no oxygen b a large amount of carbon dioxide c water vapour d small amounts of other gases and interpret evidence relating to this Explain how condensation of water vapour formed oceans Explain how the amount of carbon dioxide in the atmosphere was decreased when	Sc21a The early atmosphere Sc21b The changing atmosphere Sc21c The atmosphere today Sc21d Climate change		Literacy: key words, definitions, summary notes. Numeracy: interpreting graphs	Linking: Big picture thinking Understanding how the atmosphere has changed	

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	carbon dioxide dissolved as the oceans formed Explain how the growth of primitive plants used carbon dioxide and released oxygen by photosynthesis and consequently the amount of oxygen in the atmosphere gradually increased Describe the chemical test for oxygen Describe how various gases in the atmosphere, including carbon dioxide, methane and water vapour, absorb heat radiated from the Earth, subsequently releasing energy which keeps the Earth warm: this is known as the greenhouse					

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	effect Evaluate the evidence for human activity causing climate change, considering: a the correlation between the change in atmospheric carbon dioxide concentration, the consumption of fossil fuels and temperature change b the uncertainties caused by the location where these measurements are taken and historical accuracy Describe: a the composition of today's atmosphere b the potential effects on the climate of increased levels of carbon dioxide and methane generated by human activity, including burning					

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	fossil fuels and livestock farming c that these effects may be mitigated: consider scale, risk and environmental implication					