



Aspire & Challenge

Year 9 Chemistry Curriculum Overview

Topic	Timing	Key knowledge and skills	Progression and links	SEND/ More able	Assessment & recording; factual recall checks
Chemistry of the Atmosphere	Autumn Term: Half-term one	<p>Students should:</p> <ul style="list-style-type: none"> State the composition, including formulae, of the Earth's early atmosphere. Describe a theory for the development of the Earth's atmosphere. Explain, using word equations, how gases were formed in the atmosphere and oceans were formed. Describe how the proportion of carbon dioxide in the early atmosphere was reduced. State the composition of dry air. Use word equations to show how carbon dioxide can form sedimentary rocks. Explain the greenhouse effect. Explain how greenhouse gases increase the temperature of the atmosphere. Explain how human activity can change the proportion of greenhouse gases in the atmosphere. Explain the possible effects of global climate change and why they are difficult to predict. Explain possible methods to reduce greenhouse gas emissions. Explain some of the problems in trying to reduce greenhouse gas emissions. Explain how sulphur dioxide and nitrogen oxides are made when fossil fuels are combusted. Describe the health impacts of atmospheric pollutants. Use balanced symbol equations to show how atmospheric pollutants are formed. 	<p>Numeracy</p> <ul style="list-style-type: none"> Graph skills Orders of magnitude <p>Literacy</p> <ul style="list-style-type: none"> Use of tier three words Extended writing opportunities 	<p>Challenge:</p> <ul style="list-style-type: none"> Explaining the causes of changes to the atmosphere. Higher level questions – evaluating methods of mitigating climate change. Order of magnitude calculations <p>Scaffold:</p> <ul style="list-style-type: none"> Pre prepared axes Knowledge organisers Scaffold for extended writing 	<ul style="list-style-type: none"> 5 questions to start – recall activity every lesson. Close the gap questions Self and peer feedback on tasks completed Structure strip Past paper exam Qs. Summative assessment at the end of the unit

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Using Resources	Autumn Term: Half term two	<p>Students should:</p> <ul style="list-style-type: none"> Describe and classify a resource as finite or renewable when information is given. Explain the use of natural, sustainable, and finite resources. Interpret information from different formats including graphs, charts, tables, and prose. Explain the method of obtaining potable water depends on the local conditions. Explain reasons for filtration and sterilisation in water treatment. Describe and explain in detail how to safely distil salty water. Explain why waste water should be treated before it is released into the environment. Describe the main processes in sewage treatment. Explain the uses of sewage slurry. Describe the processes of phytomining and bioleaching. Write balanced symbol equations to explain metal extraction techniques. Explain the need for new ways of extracting metals (in particular copper). Explain the importance of LCA and how it can be misused. Carry out LCAs for different products when data is supplied. 	<p>Numeracy</p> <ul style="list-style-type: none"> Graphs Yield calculations <p>Literacy</p> <ul style="list-style-type: none"> Use of tier three words Extended writing opportunities 	<p>Challenge:</p> <ul style="list-style-type: none"> Evaluating the use of different materials Higher level questions – comparison of methods to make water fit to drink. <p>Scaffold:</p> <ul style="list-style-type: none"> Pre prepared graph axes Knowledge organisers Scaffold for extended writing 	<ul style="list-style-type: none"> 5 questions to start – recall activity every lesson. Close the gap questions Self and peer feedback on tasks completed Structure strip Past paper exam Qs. Summative assessment at the end of the unit

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Using Resources	Autumn Term: Half term two	<ul style="list-style-type: none"> • Explain the importance of reusing and recycling products. • Explain why some recycling can be difficult. • Evaluate ways of reducing the use of limited resources when information is given. • Describe an experiment to investigate the conditions required for rusting to occur. • With the help of equations, describe the process of rusting. • Explain how different corrosion prevention techniques work. • Explain in detail why pure metals are often alloyed before they are used. • Describe how different amounts of carbon affect the properties of iron. • Identify an appropriate purpose for an alloy when given data on its properties. • Explain how thermosetting plastics and thermosoftening plastics are different in terms of structure and bonding. • Describe the different conditions used to make poly(ethene). • Explain how the structure of poly(ethene) affects its properties and therefore its uses. • Describe what a composite is. • Explain the difference between a composite and an advanced composite. • Compare quantitatively the physical properties of glass and clay ceramics, polymers, composites, and metals. • Describe how the raw materials are turned into the reactants for the Haber process. • Describe how the Haber process is a reversible reaction. • Describe the Haber process with the help of a balanced symbol equations including state symbols. • Explain the effect of changing temperature on yield of the Haber process. • Explain the effect of changing pressure on the yield of the Haber process. • Explain why the conditions used in the Haber process are a compromise. • Explain the importance of fertilisers for agriculture. • Describe in detail how fertilisers are produced in the laboratory. • Write balanced symbol equations for the reactions to make components of NPK fertilisers. • Describe production of fertilisers in industry. • Compare and contrast the industrial and laboratory production of fertilisers. • Write balanced symbol equations or the reactions to make components of NPK fertilisers. 			

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Atomic Structure and the Periodic Table	Spring Term	<p>Students should:</p> <ul style="list-style-type: none"> Describe the basic structure of an atom. Explain in detail, including diagrams, the difference between a pure element, mixture and compound. Name and give the chemical symbol of the first 20 elements in the periodic table. Explain why mass is conserved in a chemical reaction. Describe familiar chemical reactions with balanced symbol equations including state symbols. Balance given symbol equations. Explain the difference between a compound and a mixture. Explain how the chemical properties of a mixture relate to the chemical it is made from. Describe different separation techniques. Describe the process of fractional distillation. Explain the main processes occurring in paper chromatography. Describe the differences between the plum-pudding and the nuclear model of the atom. Explain how evidence from scattering experiments changed the model of the atom. Describe atoms using the atomic model. Explain why atoms have no overall charge. Use atomic number and mass numbers of familiar atoms to determine the number of each subatomic particle. Describe isotopes using the atomic model. Explain why ions have a charge. Use atomic number and mass numbers of familiar ions to determine the number of each subatomic particle. 	<p>Numeracy</p> <ul style="list-style-type: none"> Standard Form <p>Literacy</p> <ul style="list-style-type: none"> Use of tier three words Extended writing opportunities <p>CEIAG</p> <p>Gatsby 4 - Science and careers in Forensics</p>	<p>Challenge:</p> <ul style="list-style-type: none"> Explaining how ideas on atoms, ions and the periodic table etc all link together. Higher level questions – explaining patterns in the periodic table. Conversion between units and/or standard form <p>Scaffold:</p> <ul style="list-style-type: none"> Pre prepared results tables Knowledge organisers Scaffold for extended writing 	<ul style="list-style-type: none"> 5 questions to start – recall activity every lesson. Close the gap questions Self and peer feedback on tasks completed Structure strip Past paper exam Qs. Summative assessment at the end of the unit

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Atomic Structure and the Periodic Table	Summer Term	<ul style="list-style-type: none"> • Write the standard electronic configuration notation from a diagram for the first 20 elements. • Explain why elements in the same group react in a similar way. • Describe how the elements are arranged in groups and periods in the periodic table. • Explain why the periodic table was a breakthrough in how to order elements. • Describe how the electronic structure of metals and non-metals are different. • Explain in terms of electronic structure how the elements are arranged in the periodic table. • Explain why the noble gases are unreactive and the trend in their boiling points. • Recognise trends in supplied data. • Explain why the elements in Group 1 react similarly and why the first three elements float on water. • Describe how you can show that hydrogen and metal hydroxides are made when Group 1 metals react with water. • Recognise trends in supplied data. • Explain why the elements in Group 7 react similarly. • Explain how to complete a halogen displacement reaction and explain what happens in the reaction. • Explain how electronic structure affects the trend in reactivity of Group 1 and Group 7 elements. • Use the nuclear model to explain how the outer electrons experience different levels of attraction to the nucleus. • Describe how the properties of Group 1 metals compare with transition metals. • Interpret the formula and names of familiar transition metal compounds. 			