Curriculum Map

Subject Group	Subject: Chemistry	Set:

Threshold Concepts	
KS3 Particle Model; KS3 Elements	Enquiry Processes
KS4 Atomic Structure	

Year 7

	Term: Aut 1 / Unit:	Term: Aut 2 / Unit:	Term: Spr 1 / Unit:	Term: Spr 2 / Unit:	Term: Sum 1 / Unit:	Term: Sum 2 / Unit: 6
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	**THRESHOLD CONCEPT: Enquiry processes 1**	**THRESHOLD CONCEPT: Particle model**	**Pure Substances & Separating mixtures**	**THRESHOLD CONCEPT: Elements**	**Periodic Table**	**Earth Structure; Earth resources**
Knowledge	**Asking scientific questions and planning investigations** Enquiry question; how scientists develop an idea into a question that can be investigated- Identify independent, dependent, and control variables, ways to investigate different types of enquiry question. Explain in detail why a specific question cannot be investigated, suggesting alternative questions that can be investigated; Identify different types of variable and experimental errors; Describe how to write a plan for an investigation; Describe how to produce accurate and precise data, and reduce experimental error; Describe a risk assessment; Write a detailed plan for a hypothetical investigation.	Explain, in terms of particles, why different substances have different properties; Use data about particles to predict and explain differences in properties such as density; State that the properties of substances can be described in terms of the arrangement and movement of its particles; Compare the properties of a substance in its three states; Describe how the properties of a substance change as it melts or freezes; Recognise an energy transfer during a change of state; Describe how the properties of a substance change as it boils; Describe one difference between evaporation and boiling; Describe examples of diffusion; Describe examples of gas pressure; Draw annotated particle diagrams, and use words, to explain gas pressure; State definitions of atoms, elements, molecules and compounds; Name one element and one compound; Use diagrams to compare molecules of an element and a compound.	State what a mixture is and give examples of mixtures; State that a mixture can be separated as a result of the different melting points of its components; Explain how to use melting temperatures to distinguish mixtures from pure substances; Explain how substances dissolve using the particle model; Explain the relationship between solutes, solvents, and solutions; Explain why a stated physical property must be different in order for a given separation technique to work; Compare evaporation and distillation; Describe what happens to a mixture when it undergoes chromatography.	State what an element and atom is; use particle models to classify elements, compounds and mixtures; name componds using their chemical formulae; describe the structure of a polymer and explain properties	Describe how the Periodic table is arranged; Use data to describe a trend in physical properties; Explain how to predict missing data values using trends in properties; State that the elements in Group 1 all react in a similar way and show a pattern in reactivity and in physical properties; Use data about the properties of elements to identify similarities, patterns, and anomalies; State that the elements in Group 7 all react in a similar way and show a pattern in reactivity and physical properties; Describe the reactions of Group 0 elements.	Name the layers of the Earth; Describe properties of the different layers of the Earth's structure; Describe how sedimentary rocks are made; Describe how igneous and metamorphic rocks are formed; Use the rock cycle to explain how the material in rocks is recycled; Suggest similarities and differences between the rock cycle and everyday physical and chemical processes; Explain why properties of ceramics make them suitable for their uses; Describe how Earth's resources are turned into useful materials or recycled; Explain why given data is best presented as a bar chart.
Investigate skills	Plan and carry out an investigate into the boiling points of pure and salty water	Investigate the states of different substances and compare properties	Determine the most appropriate separation techniques for a number of mixtures, and carry these out to deduce appropriateness	Use molymods to represent the stucture of molecules	Carry out an investigation into the reactivity of group 1 metals (teacher demo)	Create a model to represent the structure of the Earth
Lit / Num	**Numeracy:** Scaling and plotting graphs, drawing a suitable line of best fit, calculate mean and range **Literacy**: Plan an investigation **Keywords:** observations, scientific enquiry, data, investigation, independent variable, dependent variable, control variable, fair test, evidence, prediction, hypothesis. plan, accurate, precise, spread, repeatable, experimental error, range, intervals, risk assessment, hazards, risk, control measures, outliers, mean, discrete, categoric, linear relationship, conclusion, evaluate, confidence, error	**Numeracy:** Calculate the density of an object using the formula D=m/v; Draw a cooling curve and use that to determine the melting point of a substance. **Literacy:** material, particle model, density, solid, liquid, gas, states of matter, changes of state, melts, freezes, boiling point, evaporation, condensation, sublimation, diffusion, gas pressure, element, compound, atom, molecules	**Numeracy:** Draw solubility graphs. **Literacy:** pure substance, mixture, dissolves, solvent, solute, solution, saturated solution, solubility, soluble, solubility curve, insoluble, filtration, filtrate, residue, distillation, chromatography, chromatogram	**Numeracy:** Compare the relative mass of different elements using the number of subatomic particles in its nucleus. **Literacy:**element, chemical symbol, atom, compound, molecule, chemical formula, polymer	**Numeracy:** Use data to draw conclusions about the trend in the physical and chemical properties of elements on the periodic table **Literacy:** physical properties, group, period, trend, alkali metals, chemical properties, halogen, noble gases, unreactive	**Numeracy:** Use pie charts to represent information. **Literacy:** crust, mantle, core, mineral, sedimentary, igneous, metamorphic, porous, weathering, erosion, compaction, cementation, deposition, durable, magma, lava, rock cycle, uplift, ceramic
Enrichment						
British Vals	Democracy: Students will learn to respect dispairing ideas to one's beliefs and to discuss those ideas in civilised debates (e.g. Embryonic vs Adult stem cells use in research). At certain points in the curriculum, students will also be offered the opportunity to take a democratic decision (e.g. majority rule, supermajority or consensus) on the next course of action during a (or series of) lesson(s). The rule of law: students will learn to respect everyone's rights for health and safety by following imposed rules that promote a safe environment for learning and for practical work, further developing the notion that actions are closely followed by consequences. Individual liberty: students are expected to exercise their rights and to respect those of others (e.g. the actions taken in class need to be limited so as to not stop others from learning). Mutual respect for and tolerance of those with different faiths and beliefs and for those without faith: All students will have equal rights to voice their opinions and have their doubts answered, provided these do not offend others beliefs through the promotion of a polite and constructive rather than offensive and destructive discussion (e.g. sharing answers to 6-mark questions and offering/receiving constructive feedback to/from peers).					
Character	Develop resilience, confidence and independence through the practice of 6-mark questions and other independent work, both in and out of lesson. Develop problem solving rationale by promoting students to work on challenges which reinforce links between different schema.					
Careers	Analytical Chemist, Chemical Engineer, Chemistry teacher, Forensic scientist, Geochemist, Pharmacy, Pharmacology, Medicine	Analytical Chemist, Chemical Engineer, Chemistry teacher, Forensic scientist, Geochemist, Pharmacy, Pharmacology, Medicine	Analytical Chemist, Chemical Engineer, Chemistry teacher, Forensic scientist, Geochemist, Pharmacy, Pharmacology, Medicine	Analytical Chemist, Chemical Engineer, Chemistry teacher, Forensic scientist, Geochemist, Pharmacy, Pharmacology, Medicine	Analytical Chemist, Chemical Engineer, Chemistry teacher, Forensic scientist, Geochemist, Pharmacy, Pharmacology, Medicine	Analytical Chemist, Chemical Engineer, Chemistry teacher, Forensic scientist, Geochemist, Pharmacy, Pharmacology, Medicine

Year 8

	Term: Aut 1 / Unit:	Term: Aut 2 / Unit:	Term: Spr 1 / Unit:	Term: Spr 2 / Unit:	Term: Sum 1 / Unit:	Term: Sum 2 / Unit:
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	**THRESHOLD CONCEPTS: Enquiry processes 2**	**Acids and Alkalis**	**Metals and non-metals**	**Types of reaction**	**Chemical energy**	**Universe; Climate**
Knowledge / Skills	Collecting, recording, and presenting data, Analysing patterns in data, Evaluating data and methods State an example of how data can be recorded. With help, calculate a mean of two values. Add data to a graph or chart. Describe how to make and record observations and measurements. Calculate a mean from three repeat measurements. Present data appropriately as tables and graphs. Explain how to collect and record accurate and precise data. Calculate a mean for repeat readings in a range of situations. Explain the choice of graph or chart for different types of data, and plot them. State what is meant by a line of best fit. List what should be included in a conclusion. Find a pattern in data using a graph State what is meant by a line of best fit. List what should be included in a conclusion. Find a pattern in data using a graph or chart, and draw a line of best fit on a line graph. Interpret data to draw conclusions using scientific explanations. Plot data on a graph and draw the line of best fit. Analyse data from an investigation to draw up a detailed conclusion, describe relationships, and suggest alternative explanations where appropriate. State how to evaluate data. Suggest one improvement to an investigation. Describe the stages in evaluating the data. Suggest ways of improving a practical investigation. Compare and contrast data, suggesting reasons why the data may be different. Explain ways of improving data in a practical investigation.	Describe some features of chemical reactions; Describe, in simple terms, what the key words 'concentrated' and 'dilute' mean; Compare the properties of acids and alkalis; Use the pH scale to measure acidity and alkalinity; Explain the difference between a strong acid and a weak acid; Deduce the hazards of different acids using data about their concentration and pH; Explain how neutralisation reactions are used in a range of situations; Describe what a salt is; Describe the steps in making a salt in a neutralisation reaction; Predict the names of salts formed when acids react with metals or bases and write word equations to represent the reactions.	State what an element is. - State examples of elements. - Identify an unknown element from its physical and chemical properties. - Compare the properties of typical metals and non-metals. - Record observations and data on elements. - Describe a difference in physical properties betw oxygen to form oxides. - State what the arrow means in a word equation. een typical metal and non-metal oxides. - Decide whether a word equation represents an oxidation reaction. - Interpret a word equation to name reactants and products. - Deduce the physical or chemical changes a metal has undergone from its appearance - State that when a metal reacts with an acid the products are a salt and hydrogen gas. - State which metals produce bubbles when reacting with acid. - Compare the reactions of different metals with dilute acids. - Predict the names of the products formed in a metal-acid reaction, and describe the reaction with a word equation or represent it with a particle diagram. - Suggest how temperature changes may be linked with differences in reactivity between metals with acid. State the product of a reaction between a metal and oxygen. - Name one metal that reacts vigorously with oxygen and one metal that does not react with oxygen. - Compare the reactions of different metals with oxygen. - Describe an oxidation reaction with a word equation. - Rank metals in order of how vigorously they react with oxygen. - Explain the reactivity of metals according to how they react with oxygen. Justify the use of specific metals for different applications, using data provided. - Deduce the physical or chemical changes a metal has undergone from its appearance. State the products of the reaction between metals and water. - State whether a metal is more or less reactive than another metal. - Write a simple method to find out how easily metals react with acids or water. Compare the reactions of different metals with water. - Use the reactivity series to predict reactions, and place an unfamiliar metal into the reactivity series based on information about its reactions. - Plan a practical to compare the reactivity of three metals, including identifying control variables and planning how to control them. - Link a metal's reactions with its place in the reactivity series. Deduce a rule from data about which reactions will occur or not, based on the reactivity series. - Write a suitable fair test question and plan in detail which variables to control and how to control them. State which metal is more reactive in a pair of named metals. - State where different metals are found in the reactivity series. - Use observations from experiment to state whether or not a displacement reaction has occurred. Predict if a given pair of substances will react in displacement reactions. - Use the reactivity series to explain displacement reactions. - Use word equations and particle diagrams to represent displacement reactions. - Explain predictions about displacement reactions. - Devise a model to explain displacement reactions.	- State that in a chemical reaction particles are rearranged, but the total number of atoms is conserved. - Write word equations from information about chemical reactions. - Identify possible hazards in a demonstration. Apply - Interpret particle diagrams and models to explain what happens in a chemical reaction.	State that an exothermic reaction is one in which energy is given out, usually as heat or light. - State that an endothermic reaction is one in which energy is taken in, usually as heat. - Record temperature changes in exothermic and endothermic changes. - Compare the characteristics of exothermic and endothermic reactions. - Use experimental observations to distinguish exothermic and endothermic reactions. - Calculate the temperature change and make a conclusion in a range of exothermic and endothermic changes. - Explain exothermic and endothermic reactions in terms of energy transfers to and from the surroundings. - Use energy data to select a reaction for a chemical hand warmer or cool pack. - State that an endothermic reaction is one in which energy is taken in, usually as heat. - Identify whether an energy level diagram is showing an exothermic or endothermic change. - Use a diagram of relative energy levels of particles to explain energy changes observed during changes of state and chemical reactions. - Compare the energy transferred during the combustion of 1 kg of different heating fuels. - Use models and diagrams to explain energy level diagrams. - Suggest why the temperature of the system decreases at first for an endothermic process. - Use models and diagrams to explain energy level diagrams clearly and in detail. - Use an energy level diagram to explain whether a given reaction would be more suitable for a chemical hand warmer or a cool pack. - State that during a chemical reaction bonds are broken (requiring energy) and new bonds formed (releasing energy). If the energy released is greater than the energy required, the reaction is exothermic. If the reverse, the reaction is endothermic. - State that catalysts are substances that speed up chemical reactions but are unchanged at the end. - Use ideas about bond energies to outline an explanation about energy changes in chemical reactions. - Use a diagram of relative energy levels of particles to explain energy changes observed during a change of state. - Use ideas about bond energies to explain energy changes in chemical reactions. - Predict whether a chemical reaction will be exothermic or endothermic given data on bond strengths. - Explain in detail bond breaking and bond making in terms of energy changes.	Name some objects seen in the night sky. Describe how space observation of stars is affected by the scale of the Universe. - Explain the choice of light years as a unit of measuring distances in astronomy. - Describe the structure of the Universe in detail, in order of size. and of distance away from the Earth. - Use the speed of light to describe distances between astronomical objects. Name some objects in the Solar System. - Explain how we see planets. - Explain why we see objects in the Solar System, and describe how they appear to move. - Explain how the properties and features of planets are linked to their place in the Solar System. - Explain why we see objects in the Solar System, and why they appear to move as they do. - Make deductions from observation data of planets, stars, and galaxies. Describe differences between seasons. - Explain the motion of the Sun, stars, and Moon across the sky. - Explain why seasonal changes happen. - Explain simply why we see the Moon from Earth. - Show the different phases of the Moon using models provided. - Describe the phases of the Moon. - Describe the appearance of the Moon from diagrams of the Earth, Sun and Moon. - Explain phases of the Moon using the models provided. - Explain how total eclipses are linked to phases of the Moon. - State that the greenhouse effect is when energy from the Sun is transferred to the thermal energy store of gases in the Earth's atmosphere. - State the names and percentages of the gases that make up the Earth's atmosphere and name two greenhouse gases. Outline a design for a model to explain the greenhouse effect. Design a model to explain the greenhouse effect, and use an annotated diagram to describe the model in detail. - Interpret graphs that show trends over time. - Describe and explain what is meant by global warming. Compare the relative effects of human-produced and natural global warming. - Design and evaluate a model to explain the greenhouse effect, and use an annotated diagram to describe the model in detail. - Interpret graphs that show trends over time, and explain their limitations State the changes in levels of carbon dioxide over time. - Name one carbon sink. - List the processes that recycle carbon naturally. - Explain why the concentration of carbon dioxide in the atmosphere did not change for many years. - Use the carbon cycle to identify carbon sinks. - Use the carbon cycle to show how carbon is recycled Explain changes in the levels of carbon dioxide using stages of the carbon cycle. - Use equations to explain processes that exchange carbon dioxide into and out of the atmosphere. State that scientists have evidence that global warming caused by human activity is causing changes in climate. - Give examples of impacts of climate change. - Describe how human activities affect the carbon cycle. - Describe how global warming can impact on climate and local weather patterns. - Give arguments for and against the claim that human activity is causing global warming and climate change. - Compare the relative effects of human-produced and natural global warming. - Evaluate the implications of a proposal to reduce carbon emissions. - Evaluate claims that human activity is causing global warming or climate change.
Lit / Num	**Numeracy:** Collecting, recording, and presenting data, Analysing patterns in data, Evaluating data and methods **Literacy**: Plan an investigation **Keywords:** observations, scientific enquiry, data, investigation, independent variable, dependent variable, control variable, fair test, evidence, prediction, hypothesis. plan, accurate, precise, spread, repeatable, experimental error, range, intervals, risk assessment, hazards, risk, control measures, outliers, mean, discrete, categoric, linear relationship, conclusion, evaluate, confidence, error	**Numeracy:** Use pH chart to describe the properties of different substances. **Literacy:** chemical reaction, reversible, physical change, acid, alkali, concentrated, dilute, indicator, pH scale, neutral, strong acid, weak acid, base, salt	**Numeracy:** Write balanced symbol equations for chemical reactions. **Literacy:** element, Perioidic table, metal, non-metal, physical property, chemical property, word equation, reactant, product, salt, oxidation, reactive, reactivity, reactivity series, displacement	**Numeracy:** Use calculations to show that mass is conserved in a chemical reaction. **Literacy:** reactants, products, conservation, fuel, combustion, fossil fuel, renewable, non-renewable, decomposition, thermal decomposition, conservation of mass, balanced symbol, equation	**Numeracy**: Draw energy change diagrams for exothermic and endothermic reactions. Calculate bond energies and enthalpy change. **Literacy:** endothermic, exothermic, energy level diagram, chemical bond, catalyst	**Numeracy:** Interpret graphs, write balanced chemical equations. **Literacy:** atmosphere, climate change, greenhouse gas, global warming, combustion, natural resources
Enrichment						
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Year 9

	Term: Aut 1 / Unit: 13	Term: Aut 2 / Unit: 14	Term: Spr 1 / Unit: 15	Term: Spr 2 / Unit: 16	Term: Sum 1 / Unit: 17	Term: Sum 2 / Unit: 18
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syl	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	**THRESHOLD CONCEPT: Atomic structure**	**The periodic Table**	**The Earth's atmosphere**	**The Earth's resources**	**Using Resources; Structure and bonding (Part 1)**	**Chemical analysis**
Knowledge / Skills	• Describe the basic structure of an atom.	• Describe how the elements are arranged in groups and periods in	• State the composition, including formulae, of the Earth's early atmosphere.			
Lit / Num	Describe the relationship between atomic number and position of	Look at the relationship between group number of elements	Write and balanced symbol equations	Calculate the concentration of dissolved salts in potable water	Write balanced symbol equations. Show how atoms form ions and	Calculate Rf values, identify charges on metal ions, write balance symbol equations.
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Year 10

	Term: Aut 1 / Unit: 19	Term: Aut 2 / Unit: 20	Term: Spr 1 / Unit: 21	Term: Spr 2 / Unit: 22	Term: Sum 1 / Unit: 23	Term: Sum 2 / Unit: 24
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	**Chemical changes**	**Electrolysis**	**Energy changes**	Rate and equilibrium	**Chemical calculations**	**Structure and bonding (Part 2)**
Knowledge / Skills	- Use general equations to write specific word equations for metals listed in the reactivity series reacting with oxygen, water, and acid, and balance given symbol equations. - Use the reactivity series to determine whether a reaction between a metal and a different metal salt will occur. - Describe how metals can be extracted. - Explain why a displacement reaction occurs. - Identify species that are being oxidised and reduced in a chemical reaction. - Describe the pH scale. - Recall a general equation for a metal reacting with an acid and use it to write specific word equations. - Recall a general equation for a base reacting with an acid and use it to write specific word equations. - Write a general word equation for metal carbonates and alkalis reacting with dilute acids and use this to make specific word equations. - Safely make and record observations. - Safely prepare a pure, dry sample of a soluble salt from an insoluble base and a dilute acid. - Safely make a salt by reacting a metal carbonate with a dilute acid.	- Describe electrolysis of solutions in terms of movement of ions. - Write a balanced symbol equation including state symbols for the overall electrolysis of a molten ionic compound, or ionic solution. - Predict the products at each electrode for the electrolysis of a molten ionic compound. - Explain why electrolysis is an expensive metal extraction method and illustrate this with the extraction of aluminium. - Describe how to electrolyse brine in terms of ions moving. - Plan and carry out an electrolysis investigation.	- Define activation energy. - State that energy is conserved in a chemical reaction. - Explain, using the particle model, how reactants become products in a chemical reaction. - Explain why bond breaking is endothermic and bond making is exothermic. - Sketch a generic reaction profile diagram for an exothermic or endothermic reaction. - Generate a specific reaction profile diagram for a given chemical reaction when its energy change is also supplied. - State a use of an exothermic reaction and an endothermic reaction. - Explain how a hydrogen fuel cell produces electricity - List the advantages and disadvantages of hydrogen fuel cells. - Explain why hydrogen fuel cells are an alternative to rechargeable cells and batteries - Safely complete a calorimetry experiment for a reaction that takes place in solution. - Explain, using observations from calorimetry, how to classify a reaction as exothermic or endothermic.	- State that chemical reactions can only occur when a collision occurs with enough energy. - Recall a definition for rate of reaction. - Calculate the rate of a chemical reaction. - List the factors that can affect the rate of a chemical reaction. - Use collision theory to explain how adding a catalyst alters the rate of reaction. - Safely describe and follow a method to monitor rate of reaction. - Describe and carry out a method to safely investigate which catalyst is best for a reaction. - Write a word equation for a familiar reversible reaction. - State whether a reversible reaction is exothermic or endothermic in the reverse direction if the forward direction is stated. - Describe a closed system - Describe how to achieve dynamic equilibrium - Describe how rate of the forward reaction compares to rate of the backward reaction in a dynamic equilibrium. - Describe Le Chatelier's Principle. - Explain how changing conditions for a system at dynamic equilibrium affects the rate of the forward and reverse reactions - Predict the effect on yield of changing temperature, concentration, or pressure in a given equilibrium system. - Describe how the Haber process is a reversible reaction - Describe the Haber process with the help of a balance symbol equation including state symbols. - Explain why the conditions used in the Haber process are a compromise.	o Use the periodic table to identify the relative atomic mass for the first 20 elements. o Calculate relative formula mass (Mr) of substances when the formula is given o Balance simple equations and explain why chemical equations must be balanced o State the units for the amount of substance o Calculate percentage yield when actual yield and theoretical yield are given o Calculate the atom economy for a given chemical reaction o Explain the effect of a limiting reactant on the amount of product made o Evaluate different reactions to decide the best production method of a chemical o Identify the limiting reactant in a chemical reaction o Explain the concentration of a solution in terms of particles o Calculate the number of moles, and mass of solute (in g), in a solution when given the concentration in g/dm3 and volume in dm3 or cm3 o Calculate the amount of acid or alkali needed in a neutralisation reaction o Calculate the unknown concentration of a reactant in a neutralisation reaction when the volumes are known and the concentration of one reactant is also known o Justify the use of a pipette and burette for a titration, evaluating the errors involved in reading these instruments o Explain how precise results are obtained in a titration o Explain how accuracy can be improved in a titration o Justify the use of an indicator in an acid–base titration o Calculate the amount in moles of gas in a given volume at room temperature and pressure o Convert units o Extract data from given information to perform multi-step calculations independently	o List the main physical properties of diamond, graphite and fullerenes o Describe the structure of graphite, graphene, diamond and fullerenes in terms of layers of carbon atoms o Describe the relationship between graphite and graphene o State that giant covalent structures have high melting points o Explain the properties of diamond and graphite in terms of its bonding o List the properties and consequent uses of fullerenes and carbon nanotubes o Describe the size of nanoparticles o Explain why surface area to volume ratio increases as particle size decreases o Convert lengths into standard form o List the advantages and disadvantages of using nanoparticles o Explain why nanoparticles can have new applications
Lit / Num	Define oxidation and reduction in terms of electrons.	Write balanced half equations for redox reactions.	Draw reaction profile diagrams. Calculate bond energies and enthalpy change in	Plot rate graphs and work at rates using graphs. Write balanced	Mole, percentage yield and atom economy calculations. Calculate the	Convert lengths to standard form. Describe nanoparticles in terms of their size.
Enrichment						
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Year 11

	Term: Aut 1 / Unit: 25	Term: Aut 2 / Unit: 26	Term: Spr 1 / Unit: 27	Term: Spr 2 / Unit: 28	Term: Sum 1 / Unit: 29	Term: Sum 2 / Unit: 30
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	**Crude oil and fuels**	**Organic reactions**	**Polymers**			
Knowledge / Skills	o Describe the composition of crude oil and name the different fractions from crude oil o State a definition of a hydrocarbon o Describe how the trend in colour, viscosity, flammability, and boiling point changes as the length of the hydrocarbon chain changes o Describe how the properties of a fraction of crude oil make it appropriate for its use o Recognise and give examples of alkanes and alkenes o Explain the similarities and differences between alkanes and alkenes o Describe a chemical test to show an alkene is present o Write word and balanced symbol equations to describe the complete and incomplete combustion of a hydrocarbon o Use balanced symbol equations to calculate amounts of reactants or products in a combustion reaction o Explain how to test for the products of complete combustion o Explain in detail how the production of carbon monoxide in incomplete combustion can be lethal o Generate word and balance symbol equations to describe the process of cracking o Use examples to explain the process of cracking and why it is so important to the petrochemical industry	• State a definition of an alkene. • Name the first four alkenes. • State the product of a combustion and an addition reaction of an alkene. • Recognise the functional group in an alcohol and a carboxylic acid. • Name for the first four primary alcohols and the first four carboxylic acids. • Recognise a carboxylic acid from its name or formula. • List some chemical properties of carboxylic acids. • Describe an ester and state some uses of this class of compounds. Name ethyl ethanoate from its formula. • State that fermentation can be used to make ethanol. • List some chemical properties of the first four alcohols. • Recognise the formula and structure of ethanol and state some of its uses. • Draw the displayed structural formulae for the first four alkenes. • Draw the displayed structural formulae for the products of the addition reactions between alkenes and hydrogen, water (steam), or a halogen. • Predict the word and balanced symbol equations for the complete combustion of an alkene when the number of carbon atoms is given. • Classify an organic compound as an alcohol, a carboxylic acid, or an ester. • Draw the structural and displayed formulae for the first four primary alcohols and the first four carboxylic acids. • Draw the structural and displayed formulae for ethyl ethanoate. • Describe fermentation to make aqueous solutions of ethanol, including a word equation. • Describe the reactions of alcohols, including using word equations. • Explain the relationship• Describe why carboxylic acids are acidic. • Use word equations to describe the reactions of carboxylic acids with metal carbonates and with alcohols. • Describe how to make an ester.ip between ethanol and ethanoic acid.	• Define a monomer and a polymer. • State some uses of poly(ethene) and poly(propene). • Write a word equation for the formation of poly(ethene) and poly (propene). • Describe how monomers become polymers. • Draw the monomer for an addition polymer when the structure of the polymer is given. • Draw an addition polymer structure when the structure of the monomer is given. • Describe the properties of a thermosetting plastic. • Describe the properties of a thermosoftening plastic. • Describe the difference between LD and HD poly(ethene) • 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 condensation polymerisation. • Draw a simplified structure of the monomers for a condensation polymer when the structure of the polymer is given. • Draw a simplified structure of a condensation polymer when the structure of the monomers are given. • State an example of a natural polymer. • Describe the relationship between sugar as a monomer and starch or cellulose as a polymer • Identify the monomer from the structural formula of a polymer. • (H) Describe the structure of an amino acid • Describe the relationship between amino acids as a monomer and protein as a polymer. • (H) Predict the products of condensation polymerisation using natural monomers. • Explain in detail the process of condensation polymerisation with natural monomers, including using equations. • (H) Explain how amino acids react together in an acid–base reaction. • State that DNA is an example of a natural polymer • Describe the main structure of DNA. • Describe the importance of DNA for living systems. • Sketch the shape of a DNA strand. • State what DNA stands for. • Predict the products of condensation polymerisation. • Explain the process of condensation polymerisation in detail, including using equations. • Compare and contrast in detail, giving appropriate examples, the two methods of polymerisation. • Name the type of monomers used to make DNA. • (H) Predict the products of condensation polymerisation using natural monomers. • Explain in detail the process of condensation polymerisation with natural monomers, including using equations. • (H) Explain how amino acids react together in an acid–base reaction. • Explain the shape of the DNA polymer. • Explain how nucleotides form DNA. • Explain the purpose of DNA.	Revision	Exams	Exams
Lit / Num	Write balanced symbol equations for reactions.	Write balanced symbol equations for reactions	Write balanced symbol equations for reactions			
Enrichment		.				
British Vals	Democracy: Students will learn to respect dispairing ideas to one's beliefs and to discuss those ideas in civilised debates (e.g. Embryonic vs Adult stem cells use in research). At certain points in the curriculum, students will also be offered the opportunity to take a democratic decision (e.g. majority rule, supermajority or consensus) on the next course of action during a (or series of) lesson(s). The rule of law: students will learn to respect everyone's rights for health and safety by following imposed rules that promote a safe environment for learning and for practical work, further developing the notion that actions are closely followed by consequences. Individual liberty: students are expected to exercise their rights and to respect those of others (e.g. the actions taken in class need to be limited so as to not stop others from learning). Mutual respect for and tolerance of those with different faiths and beliefs and for those without faith: All students will have equal rights to voice their opinions and have their doubts answered, provided these do not offend others beliefs through the promotion of a polite and constructive rather than offensive and destructive discussion (e.g. sharing answers to 6-mark questions and offering/receiving constructive feedback to/from peers).					
Character	Develop resilience, confidence and independence through the practice of 6-mark questions and other independent work, both in and out of lesson. Develop problem solving rationale by promoting students to work on challenges which reinforce links between different schema.					
Careers	Analytical Chemist, Chemical Engineer, Chemistry	Analytical Chemist, Chemical Engineer, Chemistry teacher,	Analytical Chemist, Chemical Engineer, Chemistry teacher, Forensic			

Year 12

	Term: Aut 1 / Unit:	Term: Aut 2 / Unit:	Term: Spr 1 / Unit:	Term: Spr 2 / Unit:	Term: Sum 1 / Unit:	Term: Sum 2 / Unit:
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	1/ Atomic Structure 2/ Amount of Substance 3/	1/ Bonding 2/ Energetics 3/ Alkenes 4/ Alcohols	1/Kinetics 2/Periodicity 3/Organic analysis	1/ Group 2 2/ Group 7 3/ Practical Skills	1/ Redox 2/Equilibria	
Knowledge / Skills	1/ 1.1 Fundamental particles 1.2 Mass number, atomic number, isotopes 1.3 Arrangement of electrons 1.4 The mass spectrometer To include electrospray and electron impact ionisation. 1.5 More about electron arrangements 1.6 Ionisation energy					
Lit / Num						
Enrichment						
British Vals	Democracy: Students will learn to respect dispairing ideas to one's beliefs and to discuss those ideas in civilised debates (e.g. Embryonic vs Adult stem cells use in research). At certain points in the curriculum, students will also be offered the opportunity to take a democratic decision (e.g. majority rule, supermajority or consensus) on the next course of action during a (or series of) lesson(s). The rule of law: students will learn to respect everyone's rights for health and safety by following imposed rules that promote a safe environment for learning and for practical work, further developing the notion that actions are closely followed by consequences. Individual liberty: students are expected to exercise their rights and to respect those of others (e.g. the actions taken in class need to be limited so as to not stop others from learning). Mutual respect for and tolerance of those with different faiths and beliefs and for those without faith: All students will have equal rights to voice their opinions and have their doubts answered, provided these do not offend others beliefs through the promotion of a polite and constructive rather than offensive and destructive discussion (e.g. sharing answers to 6-mark questions and offering/receiving constructive feedback to/from peers).					
Character	Develop resilience, confidence and independence through the practice of 6-mark questions and other independent work, both in and out of lesson. Develop problem solving rationale by promoting students to work on challenges which reinforce links between different schema.					
Careers						

Year 13

	Term: Aut 1 / Unit:	Term: Aut 2 / Unit:	Term: Spr 1 / Unit:	Term: Spr 2 / Unit:	Term: Sum 1 / Unit:	Term: Sum 2 / Unit:
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title						
Knowledge / Skills						
Lit / Num						
Enrichment						
British Vals	Democracy: Students will learn to respect dispairing ideas to one's beliefs and to discuss those ideas in civilised debates (e.g. Embryonic vs Adult stem cells use in research). At certain points in the curriculum, students will also be offered the opportunity to take a democratic decision (e.g. majority rule, supermajority or consensus) on the next course of action during a (or series of) lesson(s). The rule of law: students will learn to respect everyone's rights for health and safety by following imposed rules that promote a safe environment for learning and for practical work, further developing the notion that actions are closely followed by consequences. Individual liberty: students are expected to exercise their rights and to respect those of others (e.g. the actions taken in class need to be limited so as to not stop others from learning). Mutual respect for and tolerance of those with different faiths and beliefs and for those without faith: All students will have equal rights to voice their opinions and have their doubts answered, provided these do not offend others beliefs through the promotion of a polite and constructive rather than offensive and destructive discussion (e.g. sharing answers to 6-mark questions and offering/receiving constructive feedback to/from peers).					
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Careers						