Curriculum Plans: Year 10 (Combined Chemistry)

	Topic	Knowledge: By the end of the unit students will know:	Skills: What skills will students have developed by the end of this unit?	Key terms: What new key terms and vocabulary will be learnt in this unit?	Summative Assessment: How will pupils be assessed in this unit?
Michaelmas 1	**Bonding, Structure and Properties of Matter**	**Different types of chemical bonding** **Ionic bonding and properties of ionic compounds** **Particle model for states of matter and state symbols**	Draw dot-cross diagrams to represent ionic and covalent bonding Explain how properties such as melting point, electrical conductivity, and hardness depend on structure and bonding Explain different properties of solids, liquids, and gases using the particle model	**Ion:** a positive or negative charged particle formed when an atom loses or gains electrons **Electrostatic attraction:** attraction between positively and negatively charged particles **Ionic Bond:** electrostatic force of attraction between positively and negatively charged ions **Covalent Bond:** the strong attraction between two non-metal atoms that share one or more pairs of electrons **Delocalised Electrons:** electrons from an element's outer shell that is free to move through a structure **Metallic bond:** strong attraction between the nucleus of a metal atoms and delocalised electrons occurring in metal elements and alloys **Molecule:** particle made from atoms, joined together by covalent bonds **Intermolecular forces** : the attraction between the individual molecules in a covalently bonded substance	

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				Ionic lattice : a giant 3D structure of alternating positive and negative ions, held together by strong electrostatic attraction	
Michaelmas 2	**Bonding, Structure and Properties of Matter** Continued **Chemical Changes**	Covalent bonding and properties of covalent molecules Metallic Bonding **and properties of metal** Properties of polymers Examples and properties of giant covalent structures Structure and properties of diamond and graphite How alloying affects metals Structures and uses of fullerenes, nanotubes, (nanoparticles), and graphene Reactions of metals with oxygen(air), water and acids Reactivity of metals	Explain how properties such as melting point, electrical conductivity, and hardness depend on structure and bonding Ability to recognise and work with numbers in standard form Write word, balanced symbol, and half-equations for reactions Predict when reactions will occur and identify the products of reaction	**Polymer:** a very large molecules made up of many repeating units, with atoms linked by strong covalent bonds **Giant Covalent Structure:** covalently bonded structure where many atoms are joined together by many strong covalent bonds e.g. diamond or silicon dioxide **Fullerene**: a form of the element carbon that can exist as cage-like or tubular structures based on hexagonal rings of carbon atoms **Diamond**: a form of the element carbon where each carbon atom is covalently bonded to 4 others **Graphite**: a form of the element carbon where each carbon atom is covalently bonded to 3 others **Graphene**: a form of the element carbon where each atom is covalently bonded to 3 others AND is only one atom thick **Reactivity series:** An arrangement of metals in order of reactivity	Written test using past exam questions, including those from previous topics

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				Displacement reaction: Reaction where a more reactive element takes the place of a less reactive element in a compound	
Lent 1	**Chemical Changes** ctd	How extraction of metals depends on reactivity Definitions of Oxidation and Reduction Neutralisation reactions of acids How to prepare a pure salt sample from an acid Definitions of Acid and Alkali How indicators and pH can be used to identify acids and alkalis Differences between strong and weak acids	Explain choice of extraction method for different metals using the reactivity series Identify reduction and oxidation Safely heating solutions using a water bath Classify solutions as acidic, alkaline of neutral using litmus, UI, or pH Predict effect of changes such as dilution on pH Predict and explain the products of electrolysis, at each electrode, of molten compounds and aqueous solutions Identify which of 2 unknown solutions is a strong/weak acid by comparing reactions and properties. Explain why weak acids have higher pH, react more slowly, and conduct less well than strong acids of the same concentration	**Oxidation**: A reaction in which a substance loses electrons (gains oxygen) **Reduction**: Reaction in which a substance gains electrons (loses oxygen) **Ore**: A rock from which a metal can be extracted for profit **Electrolysis**: Decomposition of ionic compounds using electricity **Acid:** Solution with a pH less than 7; produces H^+ ions in water **Alkali**: Solution with a pH more than 7; produces OH^- ions in water **Aqueous**: Dissolved in water **Strong acid**: Acid in which all the molecules break into ions in water **Weak acid**: Acid in which only a small fraction of the molecules break into ions in water **Dilute**: A solution in which there is a small amount of solute dissolved **Concentrated:** A solution in which there is a lot of solute dissolved	

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				Neutralisation: A reaction that uses up some or all of the H^+ ions from an acid **Thermal decomposition**: Reaction where high temperature causes a substance to break down into simpler substances.	
Lent 2	**Chemical Changes** ctd	Electrolysis of molten compounds and aqueous solutions		**Electrolyte**: A liquid that conducts electricity **Discharge**: Gain or lose electrons to become electrically neutral	
Trinity 1	**Chemical Changes** ctd **Energy Changes**	Representing redox reactions using half-equations (ion-electron equations) Exothermic and endothermic reactions Energy diagrams Measuring energy changes Calculating energy changes	Identify exothermic and endothermic reactions Draw, interpret and label energy diagrams Use bond energy values to calculate energy changes for reactions Explain why reactions are exothermic or endothermic referring to the bonds broken and formed	**Exothermic reaction**: Reaction where thermal energy is transferred from the chemicals to the surroundings and so the temperature increases **Endothermic reaction**: Reaction where thermal energy is transferred from the surroundings to the chemicals and so the temperature decreases **Activation energy**: The minimum energy particles must have to react – measured on an energy	Written test using past exam questions, including those from previous topics. Possible written test using past exam questions, including those from previous topics. This (and previous topics) will be assessed as part of the EoY exam.

				diagram from the level of the reactants to the peak of the line **Reaction Profile**: A diagram that shows how the energy changes during a chemical reaction from reactants to products **Energy Change**: Always measured on the energy diagram from the level of the reactants to the level of the products	
Trinity 2	**Rate of Reaction**	How to measure and calculate rates of chemical reaction How changes in surface area, concentration, pressure, and temperature affect rate of reaction Collision Theory What a catalyst is How catalysts work	Describe how to carry out simple practical investigations to investigate rate of reaction. Safely carry out required practical investigating the effect of concentration on rate. Calculate average rate of reaction over a time period. Draw a tangent to a curve and use it to find the gradient (and therefore rate of reaction) at a point in time. Predict and explain the effect of changing surface area, concentration,	**Rate of reaction**: The speed at which a reaction takes place. This can be worked out in two ways: Mean rate of reaction = quantity of reactant used ÷ time Mean rate of reaction = quantity of product formed ÷ time **Activation energy**: The minimum energy particles must have to react **Catalyst**: A substance that speeds up a chemical reaction by lowering the activation energy **Enzymes**: Molecules that act as catalysts in biological systems	Written test using past exam questions, including those from previous topics. This will be completed in Y11 when the topic has been completed.

			pressure and temperature on rate of reaction.		