CHEMISTRY Key Stage 4

Year 10

Chemistry: Foundations in Chemistry Atomic structure; protons, neutrons electrons and electron shells, and their relative masses, charges and sizes; relative atomic mass, charge and isotopes; how the theory of atomic structure has changed over time Structure of the periodic table; elements arranged relating to electronic and atomic structure Trends in the periodic table; can explain the reactivity and general properties as related to the atomic structure of groups 1, 7 and 0; between metals and non-metals. Bonding The main features of the particle model in terms of states of matter; predict the state of substances under given conditions Reactions take place via electron or proton transfer, or electron sharing Bonds are formed by transferring or sharing electrons; dot and cross diagrams for simple, ionic and covalent structure; limitations of bonding representations Types of bonding (double/ single bonds; ionic/covalent) and how bonding relates to bulk properties, including in carbon allotropes	Chemistry: Quantitative Chemistry balanced equations and conservation of mass, relative formula masses Calculating percentage yield, atom economy and theoretical yield Moles and determining the stoichiometry of an equation; know relationship between volume, mass and molar concentration; and the relationship between molar volume, Chemical changes Reactions of acids; neutralisation, reaction with carbonates, reactivity of metals and acid as related to the tendency of metal to form positive ions Acids as sources of hydrogen ions; alkalis contain hydroxide ions in solution Redox: reduction and oxidation in terms of loss and gain of oxygen Redox in terms of electrons lost and gained Electrolysis; common species at the cathode and anode, electrolysis of binary ionic compounds, competing reactions	Chemistry: Energy changes Bond breaking and making relates to exo- and endothermic reactions; reaction profiles Relative bond energies as related to exo- and endothermic reactions Extraction and purification in the industrial processes; including electrolysis and biological methods Chemistry of the atmosphere Composition and evolution of the atmosphere; evidence, causes, prevention and effects of climate change and pollutants	STEM club: Robotics team, From 2020 FtF launchpad visit from industry

Relative strengths of intra and inter-molecular bonds as related to state changes The main features of the particle model in terms of states of matter; predict the state of substances under given conditions Reactions take place via electron or proton transfer, or electron sharing Bonds are formed by transferring or sharing electrons; dot and cross diagrams for simple, ionic and covalent structure; limitations of bonding representations Types of bonding (double/ single bonds; ionic/covalent) and how bonding relates to bulk properties, including in carbon allotropes Relative strengths of intra and inter-molecular bonds as related to state changes			
Assessment:	**Assessment:**	**Assessment:**	
Year 11			
Chemistry: Earths resources How changing conditions leads to a changing equilibrium position Fertilisers; Haber process, industrial production and lab synthesis of fertilisers Explain why one reaction pathway is	Chemistry: Rates: factors that affect frequency and energy of collisions; activation energy; interpretation of simple rate graphs . Rates: factors that affect frequency and energy of collisions; activation energy; interpretation of simple rate graphs. Catalysts; how they affect	Chemistry: Revision and exam technique- going over required practical work and WS tasks.	

chosen over another; recycling and life cycle assessments Methods for obtaining potable water; separation techniques used for the treatment of waster, ground and salt water Compare the physical properties of materials and justify their use; corrosion; the composition of different alloys Principles of addition polymerisation, including monomers, repeat units and naturally occurring polymers Condensation polymerisation, repeat units, importance of functional groups Chemical analysis Analytical techniques; identification of common gases, flame tests, tests for aqueous ions, a type of instrumental analysis, including interpreting an instrumental result in tabular or chart form. Melting points and chromatography to define if a Separation techniques; filtration, crystallisation, advanced chromatography, simple and fractional distillation substance is pure	activation energy. Organic Carbon can form 4 covalent bonds, and this property allows it to form a vast array of natural and synthetic compounds Functional groups in organic compounds; (limited to alkanes, alkenes, alcohols and carboxylic acids) draw using structural formula Functionality can be used to predict reactions; simple reactions (combustion, addition across a double bond, and oxidation of alcohols) Fractional distillation and cracking to make useful materials; carbon compounds are a finite feedstock and fuel		
Assessment:	**Assessment:**	**Assessment:**	