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| **Chemistry Separate Science** | | | |
| **Year 10**  **KS3 links refer to the year 9 course the students studied previously** | | | |
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| **Term 1 content and skills** | **Term 2 Content and skills** | **Term 3 Content and Skills** | **Extended Curriculum (trips/visits/afterschool activities)** |
| **Module 1 Foundations in Chemistry** (Links to KS3 T6, and T12)   * Separation techniques * Atomic structure; protons, neutrons, electrons, and electron shells * Isotopes and calculating Relative Atomic Mass (Links the Physics GCSE module 4) * The development of the model of the atom (Same content as Physics Module 4) * Structure of the periodic table * Group 1 * Group 7 * Group 0 * Properties of transition metals   **Module 2 Bonding** (Links to KS3 T15 and T25)   * Using the particle model of matter to explain the properties of the 3 states of matter. * Chemical bonding * Ionic * Covalent * Metallic * How bonding and structure are related to the properties of substances. * Ionic compounds * Small molecules * Polymers * Giant covalent structures * Metals and alloys * Structure and bonding of carbon * Diamond * Graphite * Graphene and Fullerenes * Nanoparticles and their uses | **Module 4 Chemical changes** (Links to KS3 T15 and T25)   * Reactivity series * Extraction of metals * Redox reactions – Oxidation and reduction   + in terms of gain and loss of oxygen   + in terms of electrons lost and gained (H) * Reactions of acids with metals * Neutralisation reactions and salt production   **Required practical -**Making an insoluble salt.   * Acids as sources of hydrogen ions Alkalis produce hydroxide ions in solution. * Strong and weak acids * Electrolysis of molten and aqueous ionic compounds   **Required Practical -**Electrolysis of copper chloride, copper sulfate, sodium sulfate and sodium chloride.  **Module 5 Energy changes** (Links to KS3 T25)   * Bond breaking and making relates to exo- and endothermic reactions. * Reaction profiles * Relative bond energies as related to exo- and endothermic reactions * Calculation of energy changes from bond energy data * Fuel cells   **Required practical-** Neutralisation of sodium hydroxide and hydrochloric acid using temperature change to monitor the exothermic reaction | **Module 3 Quantitative Chemistry** (Links to KS3 T29) (Links to maths- ratios and units)   * Balanced equations and conservation of mass * Relative formula mass * Moles and its relationship to the stoichiometry of a chemical equation * Use of the relationship between moles and   + mass of a substance   + volumes of a gas   + concentration of a solution * Determination of limiting reactant   **Required practical-** Titrating an unknown concentration of acid   * Calculating % yield and atom ecconomy | * Medtech challenge – links to engineering, design + tech, business skills. Provide industry mentor. * Stem Club * Launchpad- working with Form the Futures and local industry |
| **Assessment**: Low stakes Microsoft Forms quizzes throughout all topics.  End of topic or subtopic open book tests | **Assessment:** Low stakes Microsoft Forms quizzes throughout all topics.  End of topic or subtopic open book tests. Jan/Feb Year 10 test 1 | **Assessment:** Low stakes Microsoft Forms quizzes throughout all topics.  End of topic or subtopic open book tests. June/July Year 10 test 2 |  |

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| **Chemistry Separate Science** | | | |
| **Year 11** | | | |
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| **Term 1 content and skills** | **Term 2 Content and skills** | **Term 3 Content and Skills** | **Extended Curriculum (trips/visits/afterschool activities)** |
| **Module 7 Organic** (Links to KS3 T18, T6 and T7)   * Carbon can form 4 covalent bonds and this property allows it to form a vast array of natural and synthetic compounds. * The petrochemical industry; Fractional distillation and cracking * Functional groups in organic compounds * alkanes, * alkenes, * alcohols, * carboxylic acids * esters * Characteristic reactions of the functional groups listed above. * Synthetic polymers made by * Addition polymerisation * Condensation polymerisation * Natural polymers * DNA * proteins   **Module 8 Chemical analysis** (Links to KS3 T6,T7 and T9)   * Separation techniques (Link to module 1)   + Filtration   + Distillation   + Crystalisation * Chromatography   **Required practical**-Chromatography of an unknown food colouring.   * Flame tests and the use of instrumental methods * Chemical tests for aqueous cations using NaOH. * Chemical tests for aqueous anions including. * Sulphates * Carbonates * Halides * Identification of unknown ionic compound using the results of the tests above   **Required practical-** Identification of an unknown salt. | **Module 6: Rates** (Links to KS3 T5)   * Calculating the rate of a chemical reaction using graphical techniques * Factors that affect the rate of chemical reactions * Temperature * Pressure * Catalyst * Surface area * Concentration   **Required practical-** measuring rates- looking at concentration**.**   * Reversible reactions * Chemical equilibrium * Factors that affect equilibrium * Concentration * Temperature * Pressure   **Module 10 Earths resources** (Links to KS3 T7 and T22)   * Sustainable development * Methods for obtaining potable water from fresh water and sea water. * Waste water treatment   **Required practical-** obtaining water from salt water and determining the mass of dissolved solids rainwater, sea water and distilled water samples   * recycling and life cycle assessments * Alternate methods of extracting metals (link with module 4)   + Phyto mining   + bioleaching * Using materials   + Corrosion   + Alloys   + Polymers   + Ceramics   + Composites * The Haber process and the production of NPK fertilisers | *Continuing with Module 10 from last term*  **Module 9 Chemistry of the atmosphere** (Links to KS3 T18 and climate change lessons and maths (Pie Charts))   * Composition and evolution of the atmosphere * Causes, effects of ways to reduce climate change. * Carbon footprints * Pollutants from fuels and their effect on the environment   Consolidation work and revision for exams | * Stem Club |
| **Assessment:** Low stakes Microsoft Forms quizzes throughout all topics.  End of topic or subtopic open book tests. Interim exam on paper 1 content | **Assessment:** Low stakes Microsoft Forms quizzes throughout all topics.  End of topic or subtopic open book tests. Mock exam on Paper 2 content | **Assessment:** Low stakes Microsoft Forms quizzes throughout all topics.  End of topic or subtopic open book tests.  GCSE exams |  |