Science Long Term Map Chemistry y11

Subject Intent/Aims

Expose all students to a broad range of learning opportunities to deepen their knowledge and understanding of themselves and the world around them and to build a solid foundation of Science knowledge and skills.We believe in developing curiosity and understand that science is an active process with many questions to be answered and still to be asked. We provide an understanding of how knowledge was derived, discovered and came to be accepted by the scientific community. By focusing on thinking, interpreting and evaluating rather than simply memorising scientific fact we intend to enable our students to use the skills that they need to answer their own scientific questions.

Our focus on the scientific process as a way of thinking and working will allow our students to develop their own ideas, attitudes and interpretations.

Topic **Rate and extent of reactions**	**Topic** **Organic**	**Topic** **The Atmosphere**	**Topic** Resources	**Topic** Chemical analysis
National Curriculum: Rate and extent of chemical change • factors that influence the rate of reaction: varying temperature or concentration, changing the surface area of a solid reactant or by adding a catalyst • factors affecting reversible reactions. GCSE Chemistry Specification Specification for first teaching in 2016 (aqa.org.uk)	**National Curriculum:** carbon compounds, both as fuels and feedstock, and the competing demands for limited resources • fractional distillation of crude oil and cracking to make more useful materials• bonding of carbon leading to the vast array of natural and synthetic organic compounds that occur due to the ability of carbon to form families of similar compounds, chains and rings GCSE Chemistry Specification Specification for first teaching in 2016 (aqa.org.uk)	**National Curriculum:** Earth and atmospheric science • evidence for composition and evolution of the Earth's atmosphere since its formation • evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change • potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate • common atmospheric pollutants: sulphur dioxide, oxides of nitrogen, particulates and their sources GCSE Chemistry Specification Specification for first teaching in 2016 (aqa.org.uk)	**National Curriculum:** • life cycle assessment and recycling to assess environmental impacts associated with all the stages of a product's life the viability of recycling of certain materials• the Earth's water resources and obtaining potable water. GCSE Chemistry Specification Specification for first teaching in 2016 (aqa.org.uk)	**National Curriculum:** Chemical analysis • distinguishing between pure and impure substances • identification of common gases Identification of common anions and cations GCSE Chemistry Specification Specification for first teaching in 2016 (aqa.org.uk)
Composition	**Composition**	**Composition**	**Composition**	**Composition**
Rates of reaction Factors affecting rate of reaction Measuring rate of reaction Rates experiments Rate of reaction graphs Reversible reactions Le Chatelier's principle	Hydrocarbons Fractional distillation Uses of and cracking of crude oil Alkenes Reactions of alkenes	Describe the evolution of the atmosphere and the reasons for and consequences of the changes	Recognise the properties and uses of Ceramics, composites and polymers. Explain the issues around corrosion Explain the differences between Finite and renewable resources Describe Potable water and link to water treatment	Understand how scientists use Chemical analysis to detect specific chemicals
Components	**Components**	**Components**	**Components**	**Components**

Component 1: Know ways of speeding up reactions . Component 2: Know Le Chatelier's principle Component 3: Know the variables and hazards in an investigation. Component 4: Know how to plan and carry out investigations to test different hypotheses.	Component 1: Know the process of fractional distillation and cracking of crude oil Component 2: Know the difference between individual alkanes and alkenes. Component 3: Know how organic molecules can be modified to produce new and useful materials such as polymers.	Component 1: know how the composition of gases has changed from earths early atmosphere. Component 2: know why data needed to answer scientific questions may be uncertain, incomplete or unavailable. Component 3: know how the atmosphere has changed over geological timescales. Component 4:know the environmental implications of greenhouse gas emissions and other pollutants, inc carbon footprint	Component 1: know what is required to produce potable water and to treat waste water. Component 3: know the impact of products on the environment from the raw materials through to their disposal. Component 4: Know that the reusing, recycling or reducing of materials to sustain raw materials has less impact on the environment.	Component 1: know what is meant by 'pure substances' and how they can be distinguished from mixtures. Component 2: know how instrumental methods are used to identify substances. Component 3: know the different tests used to test gases such as hydrogen, oxygen carbon dioxide and chlorine
composites	**composites**	**composites**	**composites**	**composites**
predict the effects of changing temperature, pressure and concentration on equilibrium systems whilst exploring reversible reactions use collision theory and ideas about activation energy to make predictions recognise and describe patterns and trends in data use models and data to make predictions and communicate findings and reasoned conclusions	Explain the use of fractional distillation as a separation technique Relate the properties of the fractions to their structure Explain the financial benefits of cracking	Suggest how the atmosphere has changed due to chemical processes Analyse data to formulate conclusions about atmospheric changes Debate issues around the greenhouse effect Suggest solutions to reduction of atmospheric pollution	Investigate water samples to analyse salt content and potability Complete a life cycle assessment on a range of products Evaluate the uses of different materials	Compare the use of instrumental methods with wet analysis methods Identify gases using recognised gas tests
Higher Order Knowledge	**Higher Order Knowledge**	**Higher Order Knowledge**	**Higher Order Knowledge**	**Higher Order Knowledge**
Know how to calculate the gradient of a tangent to the curve on these graphs as a measure of rate of reaction at a specific time. Know the relative amounts of all the reactants and products at equilibrium depend on the conditions of the reaction. If a system is at equilibrium and a change is made to any of the conditions, then the system responds to counteract the change. The effects of changing	Know the functional groups of organic compounds: Addition polymers Alcohols Carboxylic acids Condensation polymers Naturally occurring polymers Know natural polymers	Explore the use of computer models to make predictions. Evaluate the quality of evidence in reports about global climate change and learn how peer review works.	know alternative methods to extract a metal from low-grade ores that avoid the environmental impact of mining. Use LCAs to evaluate the uses of different materials for products Know how the Haber process is useful as a feedstock for fertilizers	Know the chemical tests for anions and cations and be able to use them qualitatively to identify unknown compounds

conditions on a system at equilibrium can be predicted using Le Chatelier's Principle. Know the effects of changing conditions in the Haber Process				
Key terms	**Key terms**	**Key terms**	**Key terms**	**Key terms**
Activation Energy Enzymes Closed System Dynamic Equilibrium Le Chatelier's Principle Turbidity Catalyst	Finite Resource Biomass Hydrocarbon Displayed Formula Homologous Series Alkanes Saturated Fractional Distillation Fraction Complete Combustion Incomplete Combustion Flammability Viscosity Cracking Alkenes Unsaturated Functional Group Addition Reaction Hydrogenation Hydration Alcohols Carboxylic Acids Esters	Atmosphere Carbon Footprint Fossil Fuels Sulfur Impurities Greenhouse Gases Global Dimming Incomplete Combustion Nitrogen Oxides Particulate	Finite Resource Renewable Resource Sustainable Development Life Cycle Assessment Potable Water Desalination Ore Alloy Corrosion Rusting Sacrificial Protection Bioleaching Leachate Leaching Phytomining Thermosetting Polymer Thermosoftening Polymer	Pure Substance Formulation Cation Anion Precipitate Compound Element Impure Melting Point Mixture Chromatography Stationary Phase Mobile Phase Chromatogram Rf Value
Final Composition/Deliberate Practice	**Final Composition/Deliberate Practice**	**Final Composition/Deliberate Practice**	**Final Composition/Deliberate Practice**	**Final Composition/Deliberate Practice**
Planning, carrying out and analysing an investigation Required practical: measuring rate of reaction using different methods	Complete a series of 6 mark questions related to the industrial processes	Debate the benefits of alternative fuels on global warming	Required practical investigating the purity of water samples	Planning, carrying out and analysing an investigation RP chromatography TRIPLE analysis investigation
Summative/Formative assessment	**Summative/Formative assessment**	**Summative/Formative assessment**	**Summative/Formative assessment**	
Core questions RRR to recall prior knowledge will be tested at the beginning of each lesson and self- assessed by the student. Century nuggets and PPQs LC for collision theory End of unit assessment will be marked with	**Core questions RRR to recall prior knowledge will be tested at the beginning of each lesson and self- assessed by the student. Century nuggets and PPQs LC for organic chemistry End of unit assessment will be marked with**	**Core questions RRR to recall prior knowledge will be tested at the beginning of each lesson and self- assessed by the student. Century nuggets and PPQs LC for evolution of ther atmosphere End of unit assessment will be marked with**	**Core questions RRR to recall prior knowledge will be tested at the beginning of each lesson and self- assessed by the student. Century nuggets and PPQs LC for water purification End of unit assessment will be marked with**	**Core questions RRR to recall prior knowledge will be tested at the beginning of each lesson and self- assessed by the student. Century nuggets and PPQs LC for chemical analysis End of unit assessment will be marked with**

personalised feedback		**personalised feedback**		**personalised feedback**		**personalised feedback**		**personalised feedback**	
Numeracy	**Literacy**	**Numeracy**	**Literacy**	**Numeracy**	**Literacy**	**Numeracy**	**Literacy**	**Numeracy**	**Literacy**
Maths skills – graphs, calculations	English – literacy skills – focusing on keywords, tier 3 vocabulary, connectives, SPAG, synonyms,	Maths skills – graphs, calculations	English – literacy skills – focusing on keywords, tier 3 vocabulary, connectives, SPAG, synonyms,	Maths skills – graphs, calculations	English – literacy skills – focusing on keywords, tier 3 vocabulary, connectives, SPAG, synonyms,	Maths skills – graphs, calculations	English – literacy skills – focusing on keywords, tier 3 vocabulary, connectives, SPAG, synonyms,	Maths skills – graphs, calculations	English – literacy skills – focusing on keywords, tier 3 vocabulary, connectives, SPAG, synonyms,
Cross curricular links		**Cross curricular links**		**Cross curricular links**		**Cross curricular links**			
History- Fritz Haber and use of gases in concentration camps. Biology- Use of enzymes in reactions. Food technology- Use of enzymes in food production and washing powder.		Biology- Structure and use of biological molecules. Food Technology- Use of esters in food production. DT- Use of materials, development of new materials. Geography- Use of plastics and the problems this creates		Geography- Climate change, impact of human activity on the earth.		Geography – water sources, mining Engineering – reuse of materials Biology - bioleaching		Food technology – analysis of additives in foods	

SMSC	**British Value**	**RSHE**
There will be multiple opportunities for students develop spiritually; being creative in their learning and a range of activities *The high expectations placed on the student from the school and department mean that pupils will regularly be made aware of the right and wrong morally* *Pupils are expected to share the views morally on the different topics but also show respect and appreciate others in the classroom.* *The majority of topics will give the students opportunity to develop their social skills, from giving presentations to working in group tasks.*	*Students will be taught the legal implications of using the internet* *Students will be taught to fully appreciate other students viewpoints and the importance of being respectful* *Students will be taught the importance of selecting valid information from reliable sources for any presentation tasks that they do.* *Students are taught how to contribute to life in modern Britain by learning about the history of scientific discovery* *Students will learn how to display British Values to use the internet*	*The students will be taught about how to be safe online and the dangers.* *The students will be made aware of online relationships and the sexual issues that may arise.* *The students will be regularly conversed on their physical and mental health when issues arise within topics* *They will be taught about the need for tolerance of other people'sviewpoints*

Adapted Curriculum Content:	**Adapted Curriculum Content:** combined: limited to alkanes, fractional distillation and cracking.	**Adapted Curriculum content:** Thers are no adaptations in this unit	**Adapted curriculum content:** Phytomining and bioleaching triple only	**Adapted curriculum content:** Anion and cation analysis triple only
Adaptive Implementation Practices: Coloured paper/pens Differentiated worksheets Differentiated tasks Seating plans to maximise concentration allowing for visual/hearing impairments etc Appropriate use of IWB Dual coding Spare equipment Modelling experimental detail Pre drawn tables/graphs/diagrams to be labelled	**Adaptive Implementation Practices:** Coloured paper/pens Differentiated worksheets Differentiated tasks Seating plans to maximise concentration allowing for visual/hearing impairments etc Appropriate use of IWB Dual coding Spare equipment Modelling experimental detail Pre drawn tables/graphs/diagrams to be labelled	**Adaptive Implementation Practices:** Coloured paper/pens Differentiated worksheets Differentiated tasks Seating plans to maximise concentration allowing for visual/hearing impairments etc Appropriate use of IWB Dual coding Spare equipment Modelling experimental detail Pre drawn tables/graphs/diagrams to be labelled	**Adaptive Implementation Practices:** Coloured paper/pens Differentiated worksheets Differentiated tasks Seating plans to maximise concentration allowing for visual/hearing impairments etc Appropriate use of IWB Dual coding Spare equipment Modelling experimental detail Pre drawn tables/graphs/diagrams to be labelled	**Adaptive Implementation Practices:** Coloured paper/pens Differentiated worksheets Differentiated tasks Seating plans to maximise concentration allowing for visual/hearing impairments etc Appropriate use of IWB Dual coding Spare equipment Modelling experimental detail Pre drawn tables/graphs/diagrams to be labelled