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	
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. <u>GCSE Chemistry Specification Specification for</u> <u>first teaching in 2016 (aqa.org.uk)</u>	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 (aga.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 (agn.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 (aga.org.uk) 	National Cu Chemical a pure and it of commo anions and <u>GCSE Chem</u> first teachir
Composition	Composition	Composition	Composition	Compositio
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	Understan Chemical a
components	Components	Components	Components	Componen





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Topic

Chemical analysis

- arriculum:
- analysis distinguishing between mpure substances • identification n gases Identification of common d cations
- istry Specification Specification for ng in 2016 (aga.org.uk)

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nd how scientists use analysis to detect specific chemicals

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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.	Compone substance distinguis Compone methods Compone to test ga carbon di
composites	composites	composites	composites	composi
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 with wet Identify
Higher Order Knowledge	Higher Order Knowledge	Higher Order Knowledge	Higher Order Knowledge	Higher C
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 th cations a to identi





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ent 1: know what is meant by 'pure ces' and how they can be shed from mixtures.

ent 2: know how instrumental s are used to identify substances.

ent 3: know the different tests used

ases such as hydrogen, oxygen

ioxide and chlorine

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re the use of instrumental methods et analysis methods gases using recognised gas tests

Order Knowledge

he chemical tests for anions and and be able to use them qualitatively tify 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 term
Activation Energy	Finite Resource	Atmosphere	Finite Resource	Pure Subs
Enzymes	Biomass	Carbon Footprint	Renewable Resource	Formulati
Closed System	Hydrocarbon	Fossil Fuels	Sustainable Development	Cation
Dynamic Equilibrium	Displayed Formula	Sulfur Impurities	Life Cycle Assessment	Anion
Le Chatelier's Principle	Homologous Series	Greenhouse Gases	Potable Water	Precipitat
Turbidity	Alkanes	Global Dimming	Desalination	Compoun
Catalyst	Saturated	Incomplete Combustion	Ore	Element
	Fractional Distillation	Nitrogen Oxides	Alloy	Impure
	Fraction	Particulate	Corrosion	Melting P
	Complete Combustion		Rusting	Mixture
	Incomplete Combustion		Sacrificial Protection	Chromato
	Flammability		Bioleaching	Stationary
	Viscosity		Leachate	Mobile Ph
	Cracking		Leaching	Chromato
	Alkenes		Phytomining	Rf Value
	Unsaturated		Thermosetting Polymer	
	Functional Group		Thermosoftening Polymer	
	Addition Reaction			
	Hydrogenation			
	Hydration			
	Alcohols			
	Carboxylic Acids			
	Esters			
		Final Composition/Deliberate Practice	Final Composition/Deliberate Practice	Final Com
Practice	Final Composition/Deliberate Practice			
Planning, carrying out and analysing an	Complete a series of C mark questions	Debate the benefits of alternative fuels on	Required practical investigating the purity of	Planning, o
investigation	complete a series of 6 mark questions	global warming	water samples	investigati
Required practical: measuring rate of	related to the industrial processes			RP chrom
reaction using different methods				TRIPLE an
		Summative /Formative assessment		
Summative/Formative assessment	Summative/Formative assessment	Summative/Formative assessment	Summative/Formative assessment	
Core questions RRR to recall prior knowledge	Core q			
will be tested at the beginning of each lesson	will be tested at the beginning of each lesson	will be tested at the beginning of each lesson	will be tested at the beginning of each lesson	will be
and self- assessed by the student.	and se			
Century nuggets and PPQs	Centur			
LL TOR COllision theory	LL TOR Organic chemistry	LL TOP EVOLUTION OF THE Atmosphere	LC TOR Water purification	LC for
End of unit assessment will be marked with	End of unit assessment will be marked with	End of unit assessment will be marked with	End of unit assessment will be marked with	End of





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position/Deliberate Practice

- carrying out and analysing an ion
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- nalysis investigation

uestions RRR to recall prior knowledge e tested at the beginning of each lesson elf- assessed by the student. ry nuggets and PPQs chemical analysis f unit assessment will be marked with





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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 link	S		
History- Fritz Haber a concentration camps Biology- Use of enzyn Food technology- Use food production and	nd use of gases in nes in reactions. e of enzymes in washing powder.	Biology- Structure an molecules. Food Technology- Us production. DT- Use of materials, new materials. Geography- Use of pl problems this creates	d use of biological e of esters in food development of astics and the	Geography- Climate of human activity on the	change, impact of e earth.	Geography – water Engineering – reus Biology - bioleachin	sources, mining e of materials ng	Food technology – and foods	ılysis of additives in
	SMSC			Brit	ish Value			RSHE	
There will be multiple of learning and a range of The high expectations p pupils will regularly be Pupils are expected to s and appreciate others if The majority of topics w giving presentations to	pportunities for students de factivities blaced on the student from t made aware of the right an share the views morally on t n the classroom. vill give the students opport working in group tasks.	evelop spiritually; being creat the school and department n d wrong morally the different topics but also s tunity to develop their social	tive in their Students we hear that Students we hear that Students we how respect sources for Students of Students	will be taught the legal implie will be taught to fully apprec are of being respectful will be taught the importance or any presentation tasks that are taught how to contribute scientific discovery will learn how to display Briti	cations of using the internet iate other students viewpoir e of selecting valid informati t they do. • to life in modern Britain by ish Values to use the interne	nts and the ion from reliable learning about the t	The students will be taught a The students will be made av may arise. The students will be regularly issues arise within topics They will be taught about the	bout how to be safe online a vare of online relationships a v conversed on their physical e need for tolerance of other	nd the dangers. nd the sexual issues that and mental health when people'sviewpoints









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dapted curriculum content:

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