

Department: Chemistry



Our Curriculum Aims:

Chemistry is THE central Scientific discipline. At AGSB, our aim is that students enjoy their study of Chemistry as only by this measure can we hope to: -

Inspire students with a sense of curiosity and wonder about the fundamental nature of the world around them by presenting ideas and concepts in an interesting and entertaining manner.

We have developed our curriculum around four key themes -

- Working Scientifically
- Atomic Structure
- Atmosphere/Sustainability
- Numeracy

We then develop a teaching order that allows knowledge to build as we move through KS3 → GCSE → A level.

This allows to develop a series of pillars on which to hang more detailed knowledge

Empower students to make decisions about their own lives and critically evaluate scientific and technological developments that impact society by providing the skills needed to function in a fast-changing world.

Key Stage Three Curriculum Overview

Year 9	Name of topic	Key Content of the Topic	Assessment points
HT 1	Acids, alkalis, salts and precipitates	Students learn techniques that develop accuracy and precision. They extend their use of word and symbol equations.	
HT 2	General chemical techniques, eg thermal	Knowledge of acids is applied to environmental issues such as acid rain. Students are given a topic on reaction rate that allows the teaching of planning, risk assessment and which develops the skills needed to properly analyse and evaluate practical work.	End of term exam
HT 3	Study of foundation Chemistry. The Periodic Table.	In January of Y9 we begin the GCSE course as we have finished the relevant Key Stage 3 requirements. In this term we study Unit 1 of the AQA Separate Chemistry GCSE. This allows us to review and extend the work originally done in Y7 and Y8. Being a selective school, our students cope well with the KS3 content, and we get through it quite fast. There is no point marking time when we can use the extra time generated in Y10 and 11 to extend practical tasks to include and develop analytical and evaluation skills	
HT 4		Throughout Year 9 teaching, we ensure that the content covered is common to both the Separate and 'Dual Award' science GCSE courses	

HT 5	The Periodic Table; its development and use.	We finish the study of unit 1 before the Y9 exam. Following feedback from the exam, we teach Unit 9 on the 'Chemistry of the Atmosphere'.	Trial Exam
HT 6	Atmosphere	Should any time allow, teachers will focus on practical skills to interest and extend knowledge.	Assessment of GCSE topics covered so far.

GCSE Course Followed: Chemistry

Specification: [AQA \(Syllabus code 8462\)](#)

Why Choose GCSE

All students will study:

- Atomic Structure and Periodic Table
- Bonding, Structure and the Properties of Matter
- Quantitative Chemistry
- Chemical Changes
- Energy Changes
- The Rate and Extent of Chemical Change
- Organic Chemistry
- Chemical Analysis
- Chemistry of the Atmosphere
- Using Resources

Separate Chemistry students study the same or similar areas of study, but most topics will be explored in greater detail.

Key Stage Four Curriculum Overview

Year 10

	Name of topic	Key Content of the Topic	Assessment points
HT 1	Ionic compounds and bonding	Following revision of unit 1, we teach the ionic bonding content of unit 2. We also teach Electrolysis that is found later in the syllabus to give some practical and investigative work.	
HT 2	Electrolysis, covalent compounds and bonding and metals	Following completion of electrolysis topic, we look at covalent compounds and giant covalent lattices. The study of metals involves structure, reactivity, extraction and alloying. Teachers also consider environmental issues.	End of term assessment prior to Christmas grades
HT 3	Analysis and energy	In this term we are aiming to complete units 8 and 5. Details in syllabus.	
HT 4	Energy and Y10 Revision	Finish this terms content and move onto revision for the Y10 exams at the end of term.	
HT 5	Reaction rate	Factors affecting the rate of reactions	Trial Exam

HT 6	Equilibrium The Haber Process Environmental impact and Life cycle analysis	Study of reversible reactions Industrial application of equilibrium It's a big topic with ample opportunity for students to revise unit 9 and consider wider environmental issues associated with combustion, production and disposal of materials.	End of year assessment
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Year 11

	Name of topic	Key Content of the Topic	Assessment points
HT 1	Organic Chemistry	Study of carbon compounds	
HT 2	The mole	Calculations based around relative Mass	Y11 mock
HT 3	The Mole Acids	Finish Calculations and then a topic on acids. This is then all tied together by studying titrations	
HT 4	Tidy up	Staff use these last weeks to link ideas across the syllabus and tidy up any loose ends that are not covered within the larger topics such as water, fertilisers and others	
HT 5	Finish tidy up and revision	A good deal of time is spent going over exam technique, past papers and the skills necessary to reach their potential.	
HT 6	NA	Staff are always available to give Chemistry help and support.	GCSE exams

Recommended Revision Guides for GCSE

Pupils have access to the online textbook through Kerboodle. We now sell CGP revision guides for AQA chemistry at £2.80 via Parentpay. We buy in bulk and pass the savings onto you.

Also, do not forget to check the resources available in the STU Chemistry folder on Office 365 or to download a copy of the AQA Chemistry specification.

Support available for GCSE Students

Staff are available to help between 8.00 and 16.30.

KeyStage 5 – A Level Chemistry

A Level Course followed – AQA Chemistry (7405)

Why choose Chemistry?

Chemistry is second only to Maths as a student choice at A level. A small majority of students have ambitions to study a university course associated with healthcare, but many others choose because they have enjoyed their studies at GCSE.

The course begins with about 12 weeks study of Foundation Chemistry topics that are used throughout the course. After that we have chosen a teaching order that hopefully allows a good balance between theory and practical. We have also decided to interleave topics from the Physical, Organic and Inorganic strands of the syllabus.

The Teaching Order is liable to change depending upon timetabling restrictions and teacher availability. If you treat the following as more a guideline than a rule:

Y12 TEACHING ORDER WITH REQ'D PRACTICALS

Topic	Likely Time Scale	Practical opportunities
Atomic Structure Fundamental Particles Mass number/Isotopes Electron Config	3 weeks	
Amount of Substance Mr and Ar Ideal Gas equation Moles of solids and solutions Empirical/Molecular formula Balanced Eqns and associated calcs	5 weeks (could be 6 depending on practical work)	Make standard solution Titration(s) Find conc of unknown acid Find Mr of unknown bicarbonate et., etc Req'd practical 1
Bonding Ionic bonding Covalent and Dative bonding Metallic bonding Bonding & physical properties Bond polarity Shapes of molecules Intermolecular forces	4 weeks	Carry on doing titrations to minimise the grind and break up the theory End of Half term assessment
Energetics Enthalpy change Calorimetry Hess's Law and associated calcs Bond enthalpies	3 weeks	Enthalpy of neut practicals Enthalpy of CuSO ₄ /Fe filings Required Practical 2
Kinetics Collision Theory Maxwell Boltzmann Curves Temp and rate Conc/Pressure and rate Catalysts and rate	2 weeks	Disappearing cross Acid/carbonate (we have a LOT of marble chips) Required Practical 3 End of term assessment

Topic	Likely Time scale	Practical opportunities
Chemical equilibria and Le Chatelier Chemical equilibria and Le Chatelier Equilibrium constant Kc	2 weeks	There is an expt. To determine Kc for an esterification reaction. This adds to likely teaching time.
Organic Chemistry		
Introduction to Organic Chemistry Nomenclature Isomerism	2 weeks	

Alkanes Fract Dist of Crude Oil Cracking Combustion Chlorination (with mech)	2 weeks	You could demo this with our 'crude oil'. You might wish to use Quick Fit to separate a water fluorescein mix
Halo Alkanes Nuc Subs mech Elimination with mech Ozone depletion	1.5 weeks	Relative rates of hydrolysis of haloalkanes
Alkenes Structure bonding and reactivity Addition reactions with mech. Addition Polymers	1.5 weeks	Use of bromine water to identify End of half term assessment
Alcohols Production Oxidation of alcohols Elimination	1.5 weeks	Required Practical 5b
Organic analysis Identification of functional groups by test tube reactions Mass Spec IR Spec	1.5 weeks	Required prac 6
Redox Oxidation/Reduction half equations	1.5 weeks	Feel free to do some redox titrations if time allows
Group 7 Oxidising power Reducing power Displacement Tests for halides	2.5 weeks	Required Prac 4
Chlorine Chemistry Reactions with NaOH Reactions with water	0.6 weeks	
Y12 Exam		

Electrode Potentials and Cells Electrode Potentials Electrochemical cells Commercial applications of electrochemical cells	4 weeks	Required Prac 8
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Thermodynamics Born-Haber cycles Gibbs Free energy	3 weeks	
Year 1 Revision	I would use any remaining time to consolidate areas of the Y1 course that were highlighted as weakness in the Y12 exam.	Easter End of Y12 assessment

Y13 TEACHING ORDER

TOPIC	LIKELY TIME SCALE	OPPORTUNITY FOR PRACTICAL
Transition metals General Properties Substitution reactions Complex shapes Formation of coloured ions Variable oxidation states <hr/> CATALYSTS	3.0 WEEKS	<i>REQUIRED PRACTICAL 11</i>
<hr/> Ions in aqueous Solution	2.0 WEEKS WITH PRACTICAL	
ORGANIC REVISION	1.0 WEEK	END OF HALF TERM ASSESSMENT
OPTICAL ISOMERISM	0.2 WEEKS	
HALF	TERM	WEEK
ALDEHYDES AND KETONES	1.0 WEEK	
CARBOXYLIC ACIDS AND DERIVATIVES	1.8 WEEKS DUE TO PRACTICAL	<hr/> Esterification MAKING BIODIESEL <i>Required Practical 5b Making an ester</i>
ACYLATION	1.0 WEEK DUE TO PRACTICAL	<i>Required Practical 10</i> Making and purifying an organic solid <hr/> MAKING ASPIRIN
<hr/> Aromatic Chemistry ELECTROPHILIC SUBSTITUTION	0.8 WEEKS	

Amines Preparation Base Properties Nucleophilic properties	1.0 WEEK	
Polymers Condensation Biodegradability/disposal	0.6 WEEKS	
Amino acids Proteins Enzymes DNA Action of anti-cancer drugs	0.8 WEEKS	
Christmas	HOLIDAY	
Hydrogen-1 NMR Carbon-13 NMR Chromatography	1.6 WEEKS	Required Practical 12 TLC
Organic Synthesis	0.6 WEEKS	
Properties of group 3 metals and their oxides	0.6 WEEKS	
Rate Equations Include order of reaction, rate equation and Arrhenius equation Plot graphs and determine gradient Determination of a rate equation	3.0 WEEKS WITH PRACTICALS	Required Practical 7a and b. Measuring reaction rate by Initial rate method Continuous monitoring method
Revise	FOR Y13	Mock exam
K _p – Mole Fractions Partial pressures K _p expression and units Effects of catalyst on K _p Calculations	1.5 WEEKS	May wish to do esterification practical to determine K _c if you've not already done this.
Acids Bronsted Lowry acids and bases pH of strong acids K _w pH of strong bases pH of strong acid base mixtures	1.4 WEEKS	
Titration curves Indicators	0.6 WEEKS	Required Practical 9 Using a pH meter to plot a titration curve.
K _a pH of weak acids pH of weak acid/strong base mixtures	1.0 Weeks	
Buffers Theory Calculations	1.5 weeks	
Revision	For	A level