

KS5 Science - Chemistry

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Curriculum Intent:

Chemistry has massive impact on society and is vital to the world's future prosperity. At Forge Valley all pupils are taught to appreciate the achievements of chemistry and to develop their curiosity and excitement about the natural world.

We aim to provide all pupils with a high challenge, high-quality chemistry education that provides the foundations for understanding the world through the specific disciplines of chemistry. We will do this by embedding a culture of confidence and mastery underpinned by scientific enquiry and by building up a body of key foundational knowledge and concepts.

Pupils will be encouraged to understand how chemistry can be used to explain what is occurring, predict how things will behave, analyse causes, as well as to develop their ability to see connections between science subject areas. Our pupils will develop an in depth understanding of the world around them and will appreciate how major scientific ideas have played a vital role in society, preparing them for life in an increasingly scientific and technological world.

	Core Knowledge	Procedural Knowledge
	Topic	Pupils will
Autumn Half-Term 1	Y12 Chemistry: - Atomic Structure - Amount of Substance Y13 Chemistry: - Thermodynamics - Acids and Bases - Carbonyl Chemistry	- Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures. - Apply knowledge and understanding of scientific ideas, processes, techniques and procedures: - in a theoretical context - in a practical context - when handling qualitative data - when handling quantitative data. - Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to: - make judgements and reach conclusions - develop and refine practical design and procedures
Autumn Half-Term 2	Y12 Chemistry - Structure and Bonding - Kinetics - Energetics - Redox Y13 Chemistry - Standard Electrode Potentials - Aromatic Chemistry - Amines	
Spring Half-Term 1	Y12 Chemistry: - Introduction to Organic Chemistry - Alkanes - The Halogens - Group 2	

	Y13 Chemistry • Transition Metals • Amino Acids, Proteins and DNA	
Spring Half-Term 2	Y12 Chemistry: • Haloalkanes • Equilibria Y13 Chemistry: • Inorganic Compounds in Aqueous Solutions • Periodicity • Structure Determination • Organic Synthetic Routes	
Summer Half-Term 1	Y12 Chemistry: • Alkenes • Alcohols • Spectra and Analysis Y13 Chemistry: • Revision and exam preparation	
Summer Half-Term 2	Y12 Chemistry: • K_p • Thermodynamics • Kinetics	

Main Syllabus:

AS and A-Level Chemistry will inspire students, nurture their passion for chemistry and lay the foundations for further study. It covers the three main areas of chemistry: physical, inorganic and organic. Subjects in **bold** are studied at A-Level

Physical chemistry:

- Atomic structure
- Amount of substance
- Bonding
- Energetics
- Kinetics
- Chemical equilibria and Le Chatelier's principle
- Oxidation, reduction and redox equations
- **Thermodynamics**
- **Rate Equations**
- **Equilibrium constant K_p for homogeneous systems**
- **Electrode potentials and electrochemical cells**

Organic chemistry

- Introduction to organic chemistry
- Alkanes
- Halogenoalkanes
- Alkenes
- Alcohols
- Organic analysis
- Optical isomerism
- Aldehydes and ketones
- **Carboxylic acids and derivatives**
- **Aromatic chemistry**
- **Amines • Polymers**
- **Amino acids, proteins and DNA**
- **Organic synthesis**
- **Nuclear magnetic resonance spectroscopy**
- **Chromatography**

• Acids and bases	
<u>Inorganic Chemistry:</u> • Periodicity • Group 2, the alkaline earth metals • Group 7, the halogens • Properties of Period 3 elements and their oxides • Transition metals • Reactions of ions in aqueous solution	
Homework: Weekly homework will be set that will take a total of 5 hours per week. Each teacher will set approximately 2 hours of homework per week. This will usually be a booklet of exam questions on topics recently covered to consolidate understanding and to develop exam technique, or preparation/write ups for a required practical. The other hour per week is dedicated to independent work where individual students decide which topic areas they need to consolidate by identifying gaps in understanding.	
Assessment: We study the AQA A-level course: • Paper 1 assesses Inorganic Chemistry and Physical Chemistry • Paper 2 assesses Organic Chemistry and Physical Chemistry • Paper 3 is synoptic so assesses any aspect of the course with a greater focus on Required Practical questions Practical competencies are assessed through 6 required practicals in Y12 and 6 required practicals in Y13. A broad range of skills will be assessed which will lead to an additional practical endorsement alongside their subject grade.	
AQA AS Chemistry - Paper 1 - 1.5 hours - 50% - Paper 2 - 1.5 hours - 50%	AQA A-Level Chemistry - Paper 1 - 2 hours - 35% - Paper 2 - 2 hours - 35% - Paper 3 - 2 hours - 30%
Links to Personal Development: • Risk assessments: Enabling students to recognise risks to their own wellbeing. • Social development: Practise using a range of social skills in different situations. • Teamwork and communication: Completing some tasks in pairs/groups such as creating organic reaction pathways whereby students will need to work together and communicate their knowledge • Problem-solving and critical thinking: Completing multi-step calculations from a range of topic areas and using information to determine unknowns and determining organic mechanisms for unfamiliar reactions • Diversity: Opportunities to recognise the contributions that chemists from a range of backgrounds have contributed to the knowledge base that we use today • Careers: Linking topic areas to the wide range of careers and academic pathways that Chemistry can lead towards	
How is my knowledge further developed post-KS5?	

The AQA A-level Chemistry course is designed not only to help students succeed in examinations, but also to provide the knowledge, practical skills and analytical thinking needed for university study. The specification was developed in consultation with universities so that students develop the skills expected in higher education and are well prepared for degree courses such as chemistry, medicine and pharmacy.

We place practical work at the heart of the course, requiring students to complete a range of practical activities and develop competence in laboratory techniques. Students learn to:

- Use scientific equipment safely and accurately
- Collect and process experimental data
- Evaluate methods and sources of error
- Draw evidence-based conclusions

These skills are essential for university laboratory courses and research projects.

Students are regularly required to:

- Apply knowledge to unfamiliar situations
- Analyse experimental data
- Interpret complex chemical information
- Construct logical explanations and arguments

These higher-order thinking skills mirror the style of learning and assessment found at university, where students must often solve problems independently rather than simply recall facts.

The breadth and depth of the A-level encourage students to:

- Manage their own revision and study time
- Read beyond the specification
- Link concepts across different areas of chemistry
- Develop resilience when tackling challenging material

These habits help students adapt to the greater independence expected in higher education.