



Chemistry

Curriculum Intent

Key Stage 4

To understand that Chemistry is the science of change, whose remit is to explain the properties of substances and, in doing so, to empower Chemists to create new substances with specific properties.

To explain and contextualise the learning objectives of the AQA GCSE Chemistry Specification, which cover a diverse range of Organic, Inorganic and Physical concepts, as well as giving extensive opportunities for practical investigation (including the completion of 8 Required Practicals).

To build upon the concepts introduced at KS3, including atomic structure and the balancing of chemical equations.

To convey a genuine understanding of Chemistry, alongside any required rote learning.

To allow students to see common threads that facilitate all learning in Chemistry, rather than to see the subject as isolated topics.

To present practical investigation as an integral part of scientific endeavour and of testing models.

To view Chemistry as an holistic discipline, despite the inevitable linear, topic-based teaching.

To instil the holistic and inquisitive approach needed to make progress at A Level.

Key Stage 5

As a concept, Chemistry underpins the nature of all that is around us and, by virtue of that, links to all that we materially experience. As a discipline Chemistry requires a wide range of skills, encompassing observation (both qualitative and quantitative), factual recall and clear communication. It follows that as a subject Chemistry has the power and potential to engage students with a variety of attributes but it is not forgiving in what it demands from those seeking to understand its intricacies. We aim to enlighten, support and challenge in appropriate measure, so that learners can appreciate the enormity of what is opening up for them, without being intimidated by it and so that they can build a realistically confident relationship with Chemistry.

To explain and contextualise the learning objectives of the OCR Chemistry A Specification, including the development of key laboratory and practical skills, as required by the PAG component of the qualification.

As the predominant prerequisite A-Level for many courses (including Medicine, Vet Med & Dentistry), to support suitable candidates to achieve their Target Grades and fulfil realistic career ambitions.

To use the principles of Chemistry, Physics and Mathematics to provide students with an understanding of the fundamental driving forces in the Universe; why do things happen?

To instil a culture of academic curiosity, inquisitiveness and independence that allows students to drive their own learning in this holistic subject, whilst ensuring they have frequent access to vital, individual discussion with staff.

To provide context, both for learning objectives and for potential careers involving Chemistry. This includes visiting speakers, promoting external talks, apprenticeship opportunities, The Cambridge Chemistry Challenge and the RSC Olympiad.

Curriculum Implementation

Key Stage 3

Year 9

After October half term in Year 9, students cover the following modules from the AQA GCSE Chemistry course:

4.1 – (Part 1) Atomic Theory and Separation Techniques

The nature and history of the atomic model. Separation techniques which link nicely to separating compounds and molecules in the air studied in the 'Chemistry of the Atmosphere' topic.

4.9 – Chemistry of the Atmosphere

The changing composition of the atmosphere, pollution and climate change

Key Stage 4: GCSE (AQA)

Year 10

In Year 10, students cover the modules that are examined in Paper 1 of the GCSE examination. In chronological order:

4.1 (Part 2) The Periodic Table

A study of the History of the Periodic Table, modern and reactions of groups 1, 7, 8 and transition metals

4.2 – Bonding, Structure & the Properties of Matter

How matter is held together and how this affects its properties.

4.4 – Chemical Changes (Part 1)

The reactivity of metals and electrolysis.

4.3 – Quantitative Chemistry

Chemical calculations. How much will we make?

4.4 – Chemical Changes (Part 2)

The reactions of acids.

4.5 – Energy Changes

The transfer of energy during reactions and electrochemical cells.

Year 11

In Year 11, students cover the remaining modules that are examined in Paper 2 of the GCSE examination. In chronological order:

4.6 – The Rate & Extent of Chemical Change

The rate of reactions and chemical equilibrium.

4.7 – Organic Chemistry (Part 1)

Chemicals from crude oil, alkanes, alkenes & addition polymers.

4.8 – Chemical Analysis

Identifying substances by practical testing and instrumental methods.

4.7 – Organic Chemistry (Part 2)

Alcohols, carboxylic acids, esters & condensation polymers.

4.10 – Using Resources

How we use the Earth's resources and produce potable water. Composite materials, ceramics & plastics.

Over both years, students complete a series of eight 'Required Practicals' to demonstrate experimental skills.

Key Stage 5: A Level (OCR)

Year 12

A Level content is split into six teaching modules. In Year 12, students cover:

1 - Development of Practical Skills in Chemistry

2 - Foundations in Chemistry

3 - Periodic Table and Energy

4 - Core Organic Chemistry

Following the Mock assessment, students cover 'Enthalpy & Entropy' and 'Aromatic Chemistry' from Module 5.

Year 13

In Year 13, students cover:

1 - Development of Practical Skills in Chemistry

5- Physical Chemistry and Transition Elements

6- Organic Chemistry and Analysis

Over both years, students complete a series of practicals (PAGs) to demonstrate experimental skills. Completion of these is needed for the practical aspect of the A-level to be endorsed, though they have no influence on the final grade.

Impact

Key Stage 3

Scientific knowledge and conceptual understanding:

Developed through the specific disciplines of biology, chemistry and physics. Our schemes of work aim to give students an understanding of the key big ideas in science: the links between structure and function in living organisms, the particulate model as the key to understanding the properties and interactions of matter in all its forms, and the resources and means of transfer of energy as key determinants of all of these interactions.

Nature, processes and methods of science:

Different types of investigative techniques that help them to answer scientific questions about the world around them. Students are taught about Working Scientifically through a range of practical investigations that are always clearly related to the science content in the programme of study. Students develop key practical skills such as use of microscopes, safe handling of chemicals and basic equipment to carry out simple chemical reactions and measurements of time, distance and forces in different contexts.

Uses and implications:

Ensuring students are equipped with the scientific knowledge required to understand of science, today and for the future. Evaluation and critical analysis of information is encouraged especially on behaviours that could have an impact on the environment. In recent years we have taken opportunities to incorporate topical issues into our teaching; our teaching of sustainability and the environment links directly to our SOW's.

Booklets help EAL students and templates are also provided. Glossaries are used as a tool to encourage the learning of scientific vocabulary.

We also provide a science lunchtime club for KS3 students to provide a more holistic approach to the teaching of science.

Key Stage 4

Our curriculum at AHS goes far beyond what is taught in lessons, for whilst we want students to achieve the very best examination results possible, we believe our curriculum goes beyond what is examinable. As a department we provide a lunchtime science club for the younger students and a Chemistry clinic for those in year 10 and above. Enthusiastic and motivated teachers and Chemistry Ambassadors give up their own time to go above and beyond for students.

Creative teachers produce quizzes, logic problems, projects, practical sessions and interactive lessons with hands-on tasks. We have recently introduced links to careers related to topics being taught and further links to the impact the processes being studied has on the environment.

Our topic booklets ensure that students can spend more time applying knowledge rather than copying notes. They also provide a detailed checklist of the content for that particular part of the course. We also ensure that progress is monitored with frequent end of topic tests.

The department, including the technical support staff, is co-operative and works as a team with discussions every day sharing ideas and offering each other help and advice. As a knowledge engaged curriculum we believe that knowledge underpins and enables the application of skills.

The AQA separate science course provides students with a firm foundation from which to progress on to their A Level studies. The mix of Inorganic, Organic and Physical topics gives them an insight into the A Level course which builds on the knowledge and skills acquired at KS4

Investigative and practical skills acquired in KS3 are built on with students using the Required Practicals as an important tool for linking practical and theoretical work

Key Stage 5

As a department we provide a lunchtime science club for the younger students, lunchtime drop-in sessions for older students, lunchtime sessions to help Year 10 -Year 12 students who are struggling with the demands of the course.

We enter year 12 students for the Cambridge Chemistry Challenge competition and Year 13 students for the RSC Chemistry Olympiad. We also provide personalised mock interviews for those applying to universities where interviews play an important role in the application process. Year 13 students, with the support of the Biology Department, provide a lunchtime meeting for those wishing to study Medicine at university where Year 12 students can go along and gain information about the application process from Year 13 students. Our Chemistry Ambassadors are key in helping with the running of our lunchtime Chemistry clinics but will also help our year 10 and 11 students on a 1 to 1 basis.

The OCR course provides a solid foundation on which students can move on to Chemical Sciences, Medical Sciences and Biological Sciences. The PAG's questioning with the practical skills required to move on to studying a Science subject at a higher level and the provision adopted by OCR encourages students to apply knowledge and to 'think outside the box'. The reintroduction of Organic, Physical and Inorganic Chemistry topics which have been met in KS4 are built on in year 12 and again in year 13 hence the basic understanding at KS4 is vital for the smooth transition from GCSE to A Level. We have a detailed Transition Programme which starts at the end of year 11 and consists of 14 lessons to help gain the key skills and knowledge to ease the transfer from GCSE to A Level.

As a knowledge engaged curriculum we believe that knowledge underpins and enables the application of skills; both are entwined. As a department we define the powerful knowledge our students need and help them recall it by providing detailed checklists the topics we teach. Weekly quick quizzes helps the students to recall key knowledge from previous topics as well as from the previous lesson. Each student from Year 9 upwards has a login for Kerboodle and many of our homework assignments are set on Kerboodle, where tasks are set involving interactive quizzes, crosswords, drag and drop exercises which are intellectually demanding enough to challenge out A/A* students. End of topic tests are set frequently and provide a tool to monitor progress. Introduction of a more synoptic element to tests later in the course has helped student make those intrinsic lateral links across topics, vital if they are to gain a high grade at A Level.