

## Year 12

### Organic chemistry

This is an introduction to organic chemistry, looking at the following functional groups, Alkanes, Halogenoalkanes, Alkenes Alcohols and Organic analysis

### Inorganic chemistry

Explaining trends in Periodicity and properties in Group 2, The Alkali metals and Group 7, The Halogens

### Physical Chemistry

Developing ways to measure and calculate energy changes in reactions, the kinetics of reactions and the position of equilibrium reactions

### Physical Chemistry

Developing the ideas of the structure of the atom and furthering our understanding of electronic configurations linking it to trends in the periodic table



Knowledge	Attributes / Character	Skills	Experiences
<p>Physical Chemistry</p> <ul style="list-style-type: none"> <li>Atomic structure</li> <li>Amount of substance</li> <li>Bonding</li> <li>Energetics</li> <li>Kinetics</li> <li>Chemical equilibria, Le Chatelier's principle and K<sub>c</sub></li> <li>Oxidation, reduction and redox equations</li> </ul> <p>Inorganic chemistry</p> <ul style="list-style-type: none"> <li>Periodicity</li> <li>Group 2, the alkaline earth metals</li> <li>Group 7(17), the halogens</li> </ul> <p>Organic chemistry</p> <ul style="list-style-type: none"> <li>Introduction to organic chemistry</li> <li>Alkanes</li> <li>Halogenoalkanes</li> <li>Alkenes</li> <li>Alcohols</li> <li>Organic analysis</li> </ul>	<p><b>Confidence</b> The A-Level Chemistry curriculum builds confidence by encouraging students to tackle complex concepts and challenging problems. Mastery of topics like atomic structure, thermodynamics, and organic synthesis requires critical thinking and a deep understanding of scientific principles. As students navigate through difficult subjects and successfully solve problems, they gain a sense of accomplishment and self-assurance in their abilities. Practical laboratory work further boosts confidence as students learn to conduct experiments, analyze results, and draw conclusions independently, reinforcing their competence in scientific inquiry.</p> <p><b>Organisation</b> Studying A-Level Chemistry necessitates a high level of organisation. Students must manage a substantial amount of information, ranging from physical and inorganic chemistry to detailed organic chemistry topics. This requires systematic note-taking, effective time management, and the ability to prioritize tasks, especially when balancing theoretical learning with practical laboratory work. Structured revision and methodical preparation for exams cultivate strong organizational skills, which are essential not only in academics but also in everyday life and future careers.</p> <p><b>Resilience</b> The rigorous nature of the A-Level Chemistry curriculum fosters resilience in students. The complexity of subjects such as kinetics, chemical equilibria, and electrode potentials can present significant challenges. Students learn to persevere through difficult concepts and recover from setbacks, such as experimental errors or initial misunderstandings of complicated topics. This persistence and the ability to overcome academic obstacles are key components of resilience. Through continuous effort and improvement, students develop a robust mindset that equips them to face future challenges with determination and grit.</p> <p><b>Empathy</b> Chemistry education can also enhance empathy, particularly through collaborative projects and group experiments. Working together on laboratory tasks and discussing theoretical concepts with peers encourages students to appreciate different perspectives and support one another's learning journeys. Understanding the real-world applications of chemistry, such as environmental issues and the role of chemicals in health and medicine, helps students develop a broader awareness of societal impacts and the importance of scientific advancements in improving human well-being. This awareness fosters a sense of empathy towards global challenges and the people affected by them.</p>	<p><b>Recognizing Potential Errors and Calculating Uncertainties:</b> Analysing experimental data from topics such as rate equations and equilibrium constants develops skills in identifying errors and calculating uncertainties, crucial for accurate scientific analysis.</p> <p><b>Mathematical techniques:</b> Applying mathematical principles, such as using proportionality in thermodynamics and kinetics, enhances quantitative skills and understanding of relationships between variables.</p> <p><b>Independent Practical Skills:</b> Conducting experiments independently in organic analysis and electrochemical cells fosters practical skills, including accuracy in measurements and proficiency in using specialised equipment.</p> <p><b>Collaborative Work:</b> Engaging in group experiments and projects, particularly in transition metal chemistry and organic synthesis, cultivates teamwork skills and respect for diverse perspectives.</p> <p><b>Written and Oral Communication:</b> Writing detailed scientific reports on topics like chemical equilibria and presenting findings in oral assessments enhances clarity and precision in scientific communication, both written and oral.</p> <p><b>Research and Presentation:</b> Investigating topics such as nuclear magnetic resonance spectroscopy and presenting findings on chromatography develops research skills and the ability to convey complex scientific concepts effectively.</p> <p><b>Critical Thinking and Problem Solving:</b> Analysing data from oxidation-reduction equations and applying concepts like Le Chatelier's principle in chemical equilibria fosters critical thinking and problem-solving abilities necessary for scientific inquiry.</p>	<ul style="list-style-type: none"> <li>Oxford University visit</li> <li>Alton Towers visit</li> <li>Scientific literacy (using the language of science)</li> <li>Relevance to everyday life</li> <li>Links to science in the media</li> </ul>