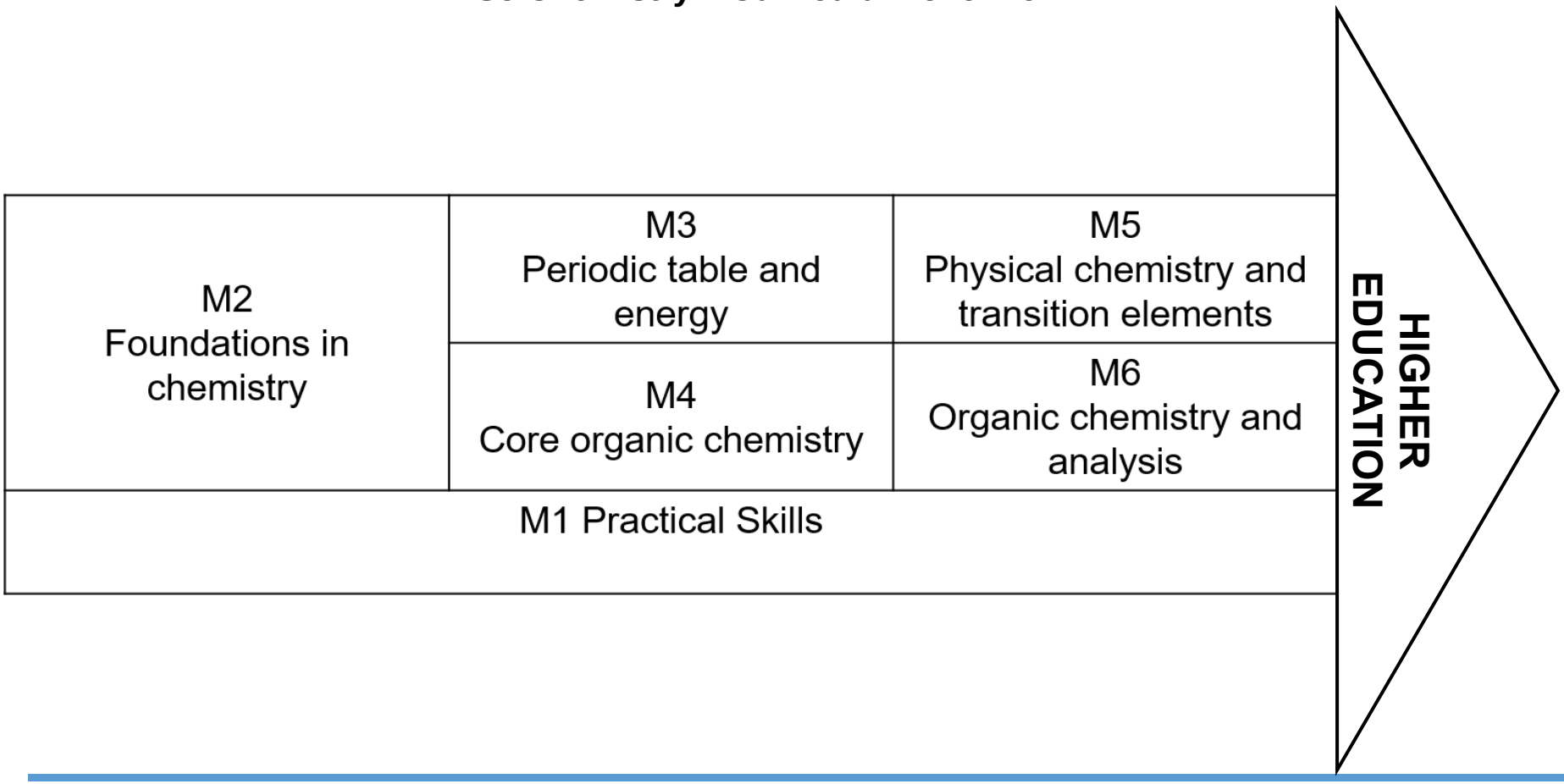
KS5 Chemistry – Curriculum overview



The above arrow shows the progression of chemistry topics across Key Stage 5. It shows how substantive knowledge is built upon in a sequential nature to prepare learners for Higher Education. Running alongside and integrated throughout is the thread of working scientifically whereby students develop their knowledge of scientific methods, apparatus and data analysis.

KS5 Chemistry – Curriculum intent

<table>
<tr><th>Intent</th><th></th><th colspan="3">What new knowledge/content do we introduce?</th><th></th></tr>
<tr><th>By the end of KS5 students are able to…</th><th></th><th colspan="2">Year 12</th><th>Year 13</th><th>Choices</th><th>How does this curriculum incorporate the National Curriculum and go beyond? How does going beyond the NC ensure challenge?</th></tr>
<tr><td rowspan="3">Develop a strong understanding of physical, organic and inorganic chemistry.

Conduct and perform a variety of experiments including utilising data analysis.</td><td>Autumn</td><td colspan="2">Foundations of Chemistry
Atoms, compounds, molecules and equations

Amount of substance PAG 1.2, PAG 2.1

Acid-base and redox reactions

The periodic table and periodicity

Basic concepts

Hydrocarbons</td><td rowspan="2">Physical chemistry and transition elements
pH and buffers PAG 11.2

Enthalpy, entropy and free energy

Carbonyl compounds

Carboxylic acids and esters

Nitrogen compounds</td><td rowspan="2">Organic chemistry and analysis
Redox and electrode potentials PAG 8.2

Transition elements

Polymers

Organic synthesis

Chromatography and spectroscopy (NMR)</td><td rowspan="3">With students potentially arriving from multiple schools of diverse science provisions, we begin the course with a prolonged foundation in chemistry topic. This ensures all learners are equipped with the necessary substantive knowledge to access the following content and acts as a springboard for the subsequent modules.</td><td rowspan="3">A-level Chemistry goes beyond the national curriculum by providing opportunity for additional challenge and extension within each scheme of work. This often bridges the content between A-level and Higher Education and permits students the opportunity to uncover potential career pathways within the scientific fields.

Further, there are also opportunities to enrich learning beyond the curriculum through the use of trips in the local area (e.g. treasure trails around Cambridge) or visiting guest speakers.</td></tr>
<tr><td>Spring</td><td>Periodic table and energy
Electrons, bonding and structure

Group 2 and the halogens PAG 4.1

Qualitative analysis PAG 7.1

Enthalpy changes PAG 3.2</td><td>Core organic chemistry
Analytical techniques (IR and MS)

Reaction rates and equilibrium (quantitative) PAG 10.1

Aromatic compounds</td></tr>
<tr><td>Summer</td><td colspan="3">Revision and examination</td></tr>
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		Reaction rates and equilibrium (qualitative) PAG 9.3 Alcohols and halo alkanes Organic synthesis				

	Rationale for this sequence	Students arrive with diverse prior knowledge of relevant substantive knowledge. The content here underpins much of the requisite content needed to access subsequent modules. This includes the periodic table and periodicity as well as atoms, compounds, molecules and equations. It also includes practical activities and embeds the skills of data recording, graphing and interpretation of data. Then, these skills and the substantive knowledge is applied in next contexts and alongside new content in the remaining two modules of the year. For example core organic chemistry entails both new content and much greater detail that expands on prior learning.	The topics chosen within Year 13 directly follow from those taught in Year 12. For example physical chemistry/transition elements builds upon the knowledge of periodic table and periodicity, for example by using standard enthalpies in Hess cycles and applying equilibria mathematically. Similarly, organic chemistry and analysis naturally follows from core organic chemistry and allows for connections to form as knowledge is gradually developed.		
	How does the KS5 Curriculum build on previous learning at KS4?	In each case, A level chemistry develops substantive knowledge in specific domains and invites students to make connections and links with existing knowledge. Some examples are below. - GCSE knowledge from atomic structure and the periodic table is built upon in module 1. - GCSE knowledge from quantitative chemistry is built upon through use of mole calculations, titrations and concept of limiting reactants.			