



# Subject: Chemistry Y13

# NPCAT Curriculum Overview 2021-2022

Teacher 1	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
End point	To develop scientific knowledge and conceptual understanding of the following topics:					
Teaching focus	Module 5 – Physical chemistry and transition elements					
	Rates/ equilibrium	Acids, Bases & buffers	Enthalpy & entropy/ redox	Transition elements	Revision	Revision
Rationale	<p>The content within this module assumes knowledge and understanding of the chemical concepts developed in Module 2: Foundations in chemistry and Module 3: Periodic table and energy. This module extends the study of energy, reaction rates and equilibria, and the periodic table.</p> <p>Rates is a natural progression from the topic covered at the end of Year 12, the mathematical skills build in this topic.</p> <p>Acids, and buffers then builds on the acids and redox covered in Y12, again the mathematic skills step up a level.</p> <p>Enthalpy and redox builds on the enthalpy from Y12 and develops the students understanding of why a reaction happens at all.</p> <p>Transition elements naturally progress from the enthalpy and redox topic, you need to understand redox to be able to explain the various colours and oxidation states of the transition metals</p>					
Maths skills	Application & understanding that requires a choice of data or equation to be used . Problem solving involving use of mathematics from different areas of maths and decisions about direction to proceed. Using logarithmic scales					
	M3 - Graphs					
	M2 - Algebra	M2 - Algebra	M4 - Trigonometry	M1 - Handling data		
Practical skills	Pag 10 Rates – clock reactions	Pag 11- pH acids	Pag 12 redox titration	Pag 8 – Electrochemical cells	Catch up	



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Key Vocab	Exponential, Arrhenius, rate determining step, rate constant	Conjugate, monobasic, dibasic, tribasic, dissociation constant, buffers and equilibrium	Lattice enthalpy, Born Haber cycles, entropy, free energy, Gibbs equation, feasibility	Oxidation states, decomposition, ligand substitution, co-ordinate bonding, stereoisomerism, bidentate, multidentate, substitution		
Summative assessment		AP1 Rates & equilibrium & Y1 content Full AS paper 1hr 30		AP2 – Full A2 Paper 1 Physical chemistry 2 hr 15		Exams

Teacher 2	<b>Autumn 1</b>	<b>Autumn 2</b>	<b>Spring 1</b>	<b>Spring 2</b>	<b>Summer 1</b>	<b>Summer 2</b>
End point	To develop scientific knowledge and conceptual understanding of the following topics:					
Teaching focus	<b>Module 6 – Organic chemistry and analysis</b>					
	<b>Arenes</b>	<b>Carbonyls &amp; carboxylic acids</b>	<b>Amines &amp; amino acids</b>	<b>Organic synthesis</b>	<b>Analysis</b>	<b>Revision</b>



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Rationale	<p>The content within this module assumes knowledge and understanding of the chemical concepts developed in Module 2: Foundations in chemistry and Module 4: Core organic chemistry. This module introduces several new functional groups and emphasises the importance of organic synthesis.</p> <p>Arenes are picked back up from the end of Year 12 and developed with the reactions of phenols.</p> <p>Carbonyls and carboxylic acids build up the organic picture and delve into nucleophilic addition mechanisms.</p> <p>Amines and amino acids again strengthens understanding of mechanisms and students meet the final type of isomerism.</p> <p>Organic synthesis pulls all the organic reactions together and is ultimately a revision of all reaction, mechanisms and experiments met throughout the entire 2 year course.</p> <p>The final module adds NMR spectroscopy to the instrumentation techniques used in organic and forensic analysis building on analysis from Y12.</p>				
Maths skills	Application & understanding that requires a choice of data or equation to be used. Problem solving involving use of mathematics from different areas of maths and decisions about direction to proceed. Using logarithmic scales				
	M1 - Handling data	M1 - Handling data M4 - Geometry			
Practical skills	Pag 6 – Organic synthesis		Pag 7 – Organic unknowns		
	Aromatic Delocalised Electrophilic substitution Alkylation acylation	Nucleophilic Esterification Reduction Hydroxynitriles Condensation	Chirality Enantiomer Stereoisomerism Polymerisation hydrolysis	Mechanisms Electrophilic Nucleophilic Substitution addition	Chromatogram Component Nuclear magnetic resonance Spectroscopy Chemical shift
Summative assessment		AP1 – Full AS paper 1 hr 30		AP2 Full A2 Paper 2 Organic synthesis and analysis  2hr 15	Exams