Meden School Curriculum Planning							
Subject	Chemistry	**Year Group**	13	**Sequence No.**		**Topic**	3.3.14 Synthesis 3.3.15 NMR 3.3.16 Chromatography

Retrieval	Core Knowledge	Student Thinking
What do teachers need to **retrieve** from students before they start teaching **new content**?	What **specific ambitious knowledge** do teachers need to teach students in this sequence of learning?	What real life examples can be applied to this sequence of learning to **development of our students thinking, encouraging them to see the inequalities around them** and 'do something about them!'
GCSE Chemistry C8 Chromatography and Rf values A Level Bonding, polar bonds and electronegative elements. A Level 3.3.1-3.3.2 Sections on nomenclature and isomers A level 3.3. Organic Chemistry.. All reactions and mechanisms	**3.3.14 Organic Synthesis** The synthesis of an organic compound can involve several steps. Students should be able to: • explain why chemists aim to design processes that do not require a solvent and that use non-hazardous starting materials • explain why chemists aim to design production methods with fewer steps that have a high percentage atom economy • use reactions in this specification to devise a synthesis, with up to four steps, for an organic compound. **3.3.15 NMR** Appreciation that scientists have developed a range of analytical techniques which together enable the structures of new compounds to be confirmed. Nuclear magnetic resonance (NMR) gives information about the position of 13C or 1H atoms in a molecule. 13C NMR gives simpler spectra than 1H NMR. The use of the δ scale for recording chemical shift. Chemical shift depends on the molecular environment. Integrated spectra indicate the relative numbers of 1H atoms in different environments. 1H NMR spectra are obtained using samples dissolved in deuterated solvents or CCl4 The use of tetramethylsilane (TMS) as a standard. Students should be able to:	Constant need to improve the manufacturing processes used to make chemicals. The introduction of LCA's has forced companies to consider the impact of production from"cradle to grave" Research in "Green Chemistry" Chemistry, Green Principles and

	• explain why TMS is a suitable substance to use as a standard • use 1H NMR and 13C NMR spectra and chemical shift data from the Chemistry Data Booklet to suggest possible structures or part structures for molecules • use integration data from 1H NMR spectra to determine the relative numbers of equivalent protons in the molecule • use the n+1 rule to deduce the spin–spin splitting patterns of adjacent, non-equivalent protons, limited to doublet, triplet and quartet formation in aliphatic compounds. **3.3.16 Chromatography** Chromatography can be used to separate and identify the components in a mixture. Types of chromatography include: • thin-layer chromatography (TLC) – a plate is coated with a solid and a solvent moves up the plate • column chromatography (CC) – a column is packed with a solid and a solvent moves down the column • gas chromatography (GC) – a column is packed with a solid or with a solid coated by a liquid, and a gas is passed through the column under pressure at high temperature. Separation depends on the balance between solubility in the moving phase and retention by the stationary phase. Retention times and Rf values are used to identify different substances. The use of mass spectrometry to analyse the components separated by GC. Students should be able to: • calculate Rf values from a chromatogram • compare retention times and Rf values with standards to identify different substances. Students could use thin-layer chromatography to identify analgesics. Students could use thin-layer chromatography to identify transition metal ions in a solution. Required practical 12 Separation of species by thin-layer chromatography.	Sustainable Processes (BSc) - Undergraduate, University of York