Meden School Curriculum Planning							
Subject	Chemistry	**Year Group**	12	**Sequence No.**		**Topic**	3.3.3 & 3.3.4 Halogenoalkanes and Alkenes

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 C7 Organic Chemistry A Level Bonding, polar bonds and electronegative elements. A Level 3.3.1-3.3.2 Sections on nomenclature and isomers and products of cracking	**3.3.3.1 Nucleophilic Substitution of Halogenoalkanes** Halogenoalkanes contain polar bonds. Halogenoalkanes undergo substitution reactions with the nucleophiles OH–, CN– and NH3 Students should be able to: • outline the nucleophilic substitution mechanisms of these reactions • explain why the carbon–halogen bond enthalpy influences the rate of reaction. Students could follow instructions when carrying out test-tube hydrolysis of halogenoalkanes to show their relative rates of reaction. Students could prepare a chloroalkane, purifying the product using a separating funnel and distillation. **3.3.3.2 Elimination** The concurrent substitution and elimination reactions of a halogenoalkane (eg 2-bromopropane with potassium hydroxide). Students should be able to: • explain the role of the reagent as both nucleophile and base • outline the mechanisms of these reactions.	

	3.3.3.3 Ozone Depletion Ozone, formed naturally in the upper atmosphere, is beneficial because it absorbs ultraviolet radiation. Chlorine atoms are formed in the upper atmosphere when ultraviolet radiation causes C–Cl bonds in chlorofluorocarbons (CFCs) to break. Chlorine atoms catalyse the decomposition of ozone and contribute to the hole in the ozone layer. Appreciate that results of research by different groups in the scientific community provided evidence for legislation to ban the use of CFCs as solvents and refrigerants. Chemists have now developed alternative chlorine-free compounds. Students should be able to use equations, such as the following, to explain how chlorine atoms catalyse decomposition of ozone: Cl• + O3 → ClO• + O2 and ClO• + O3 → 2O2 + Cl• **3.3.4.1 Alkenes: Structure, Bonding and Reactivity** Alkenes are unsaturated hydrocarbons. Bonding in alkenes involves a double covalent bond, a centre of high electron density. **3.3.4.2 Addition Reactions of Alkenes** Electrophilic addition reactions of alkenes with HBr, H2SO4 and Br2 The use of bromine to test for unsaturation. The formation of major and minor products in addition reactions of unsymmetrical alkenes. Students should be able to: • outline the mechanisms for these reactions • explain the formation of major and minor products by reference to the relative stabilities of primary, secondary and tertiary carbocation intermediates. Students could test organic compounds for unsaturation using bromine water and record their observations. **3.3.4.3 Addition Polymers** Addition polymers are formed from alkenes and substituted alkenes. The repeating unit of addition polymers.	**Research opportunity** Students could investigate the role of chemists in the introduction of legislation to ban the use of CFCs and in finding replacements.

	IUPAC rules for naming addition polymers. Addition polymers are unreactive. Appreciate that knowledge and understanding of the production and properties of polymers has developed over time. Typical uses of poly(chloroethene), commonly known as PVC, and how its properties can be modified using a plasticiser. Students should be able to: • draw the repeating unit from a monomer structure • draw the repeating unit from a section of the polymer chain • draw the structure of the monomer from a section of the polymer • explain why addition polymers are unreactive • explain the nature of intermolecular forces between molecules of polyalkenes. Students could make poly(phenylethene) from phenylethene.	