Meden School Curriculum Planning							
Subject	Chemistry	**Year Group**	13	**Sequence No.**		**Topic**	3.3.13 Amino Acids, Proteins and DNA

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 Biology B2 Enzyme activity GCSE Biology B6 DNA structure 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	**3.3.13.1 Amino Acids** Amino acids have both acidic and basic properties, including the formation of zwitterions. Students should be able to draw the structures of amino acids as zwitterions and the ions formed from amino acids: • in acid solution • in alkaline solution. **3.3.13.2 Proteins** Proteins are sequences of amino acids joined by peptide links. The importance of hydrogen bonding and sulfur–sulfur bonds in proteins. The primary, secondary (α-helix and β–pleated sheets) and tertiary structure of proteins. Hydrolysis of the peptide link produces the constituent amino acids. Amino acids can be separated and identified by thin-layer chromatography. Amino acids can be located on a chromatogram using developing agents such as ninhydrin or ultraviolet light and identified by their Rf values. Students should be able to:	

nomenclature and isomers A level 3.3.3.1 Nucleophiles and Nucleophilic Substitution Reactions A level 3.3.11.2 & 3 Base properties and amines as nucleophiles A level 3.3.12.1 Condensation Polymers	• draw the structure of a peptide formed from up to three amino acids • draw the structure of the amino acids formed by hydrolysis of a peptide • identify primary, secondary and tertiary structures in diagrams • explain how these structures are maintained by hydrogen bonding and S–S bonds • calculate Rf values from a chromatogram. **3.3.13.3 Enzymes** Enzymes are proteins. The action of enzymes as catalysts, including the concept of a stereospecific active site that binds to a substrate molecule. The principle of a drug acting as an enzyme inhibitor by blocking the active site. Computers can be used to help design such drugs. Students should be able to explain why a stereospecific active site can only bond to one enantiomeric form of a substrate or drug. **3.3.13.4 DNA** The structures of the phosphate ion, 2-deoxyribose (a pentose sugar) and the four bases adenine, cytosine, guanine and thymine are given in the Chemistry Data Booklet. A nucleotide is made up from a phosphate ion bonded to 2-deoxyribose which is in turn bonded to one of the four bases adenine, cytosine, guanine and thymine. A single strand of DNA (deoxyribonucleic acid) is a polymer of nucleotides linked by covalent bonds between the phosphate group of one nucleotide and the 2-deoxyribose of another nucleotide. This results in a sugar-phosphate- sugar-phosphate polymer chain with bases attached to the sugars in the chain. DNA exists as two complementary strands arranged in the form of a double helix. Students should be able to explain how hydrogen bonding between base pairs leads to the two complementary strands of DNA. **3.3.13.5 Action of Anticancer Drugs** The Pt(II) complex cisplatin is used as an anticancer drug.	Appreciate that society needs to assess the

	Cisplatin prevents DNA replication in cancer cells by a ligand replacement reaction with DNA in which a bond is formed between platinum and a nitrogen atom on guanine. Students should be able to: • explain why cisplatin prevents DNA replication • explain why such drugs can have adverse effects.	balance between the benefits and the adverse effects of drugs, such as the anticancer drug cisplatin.