Medium Term Planning - Topic: organic reactions

Curriculum Intent	**In addition to working further on objectives from Year __, pupils will be taught, following National Curriculum guidelines, the following this topic:**
Skills/National Curriculum Links	Reactions of alkenes: Aiming for Grade 4 LOs: • State a definition of an alkene. • Name the first four alkenes. • State the product of a combustion and an addition reaction of an alkene. Aiming for Grade 6 LOs: • Draw the displayed structural formulae for the first four alkenes. • Draw the displayed structural formulae for the products of the addition reactions between alkenes and hydrogen, water (steam), or a halogen. • Predict the word and balanced symbol equations for the complete combustion of an alkene when the number of carbon atoms is given. Aiming for Grade 8 LOs: • Predict the word and balanced symbol equations to describe reactions between alkenes and hydrogen, water (steam), or a halogen. • Compare and contrast the reactivity of alkanes and alkenes. • Predict the general formula of an alkene. Structures of alcohols, carboxylic acids and esters. Aiming for Grade 4 LOs: • Recognise the functional group in an alcohol and a carboxylic acid. • Name for the first four primary alcohols and the first four carboxylic acids. • Name ethyl ethanoate from its formula. Aiming for Grade 6 LOs: Classify an organic compound as an alcohol, a carboxylic acid, or • an ester. Draw the structural and displayed formulae for the first four primary • alcohols and the first four carboxylic acids. • Draw the structural and displayed formulae for ethyl ethanoate. Aiming for Grade 8 LOs: • Predict the structure for primary alcohols or carboxylic acids when the number of carbon atoms is given. • Suggest a general formula for a homologous series. • Suggest why an organic acid is not an alcohol even though it contains an –OH functional group. Reactions and uses of alcohols: Aiming for Grade 4 LOs: • State that fermentation can be used to make ethanol. • List some chemical properties of the first four alcohols. • Recognise the formula and structure of ethanol and state some of its uses. Aiming for Grade 6 LOs: • Describe fermentation to make aqueous solutions of ethanol, including a word equation. • Describe the reactions of alcohols, including using word equations. • Explain the relationship between ethanol and ethanoic acid. Aiming for Grade 8 LOs: • Explain why solutions of ethanol have a pH of 7. • Describe complete combustion reactions of a range of alcohols using balanced symbol equations. • Plan an investigation to determine the relative energy transferred to the surroundings by the combustion of different alcohols. Carboxylic acids and esters: Aiming for Grade 4 LOs: • Recognise a carboxylic acid from its name or formula. • List some chemical properties of carboxylic acids. • Describe an ester and state some uses of this class of compounds. Aiming for Grade 6 LOs: • Describe why carboxylic acids are acidic. • Use word equations to describe the reactions of carboxylic acids with metal carbonates and with alcohols. • Describe how to make an ester. Aiming for Grade 8 LOs: • Explain, using ionic equations, why carboxylic acids are weak acids. • Predict the products of the reactions of a range of carboxylic acids with metal carbonates and with alcohols. • Explain the term volatile in terms of molecular forces.

Spiritual, moral, social, and cultural development	**SMSC:** group work from practical activities in this section. Also pupils can work in groups to produce a timeline for the development of the periodic table. **PSHE/British Values:** The history of the is important development of the atom when learning about british values and world values. Students will complete teamwork, leadership and put science into everyday situations. They will show mutual respect during classwork. **Skills Builder:**Listening (Receiving, retaining and processing info), Speaking (The oral transmission of info and ideas), Problem solving (Find a solution to a situation or challenge), Creativity (imagination and generation of new ideas), Staying positive (The ability to use tactics and strategies to overcome setbacks), aiming high (Set clear and tangible goals), Leadership and teamwork
Numeracy	
Literacy	**Vocabulary Tier 2:** generate, catalyst, microbes. **Vocabulary Tier 3:** fermentation, functional group, homologous series. **Reading:** Following a written method and read risk assessments. Students may be directed to the textbook; this could be in lesson or at home on Kerboodle. **Writing:** Describing and explaining scientific phenomenon, free response writing for describing precautions taken, use of word mat to promote sentence formation. **Oracy:** inclusion of BEST resources which are research evidence on common misunderstandings in science, effective diagnostic questioning and formative assessment, constructivist approaches to building understanding, and effective sequencing of key concepts that promote metacognitive talk and dialogue.
Becoming future ready	**Careers/Employability:** Scientist Chemist Drug development Teacher Post-doctoral researcher
Adaptation **QFT/SEND Provision**	Throughout this topic, quality first teaching will provide differentiation: **By product:** Linear assessments and differentiated practical work. **By resource:** Lessons are differentiated per class and students, worksheets are available if support and assessments are linear. **By Intervention**: by providing different levels of supervision and support **By Progressive Questioning:** exploring pupils' understanding through interactive dialogue. **By Grouping:** according to prior attainment, gender, social preference, preferred learning style. **By Offering Optional Activities:** In class or as homework, to extend learning. This QFT/SEND provision will be explicit within the lesson-by-lesson schemes of work.
Implementation Curriculum Delivery Learning Outcomes **(Core Knowledge)**	To be able to: 7.2.1 **Alkenes are hydrocarbons with a double carbon-carbon bond**. **The general formula** for the homologous series of alkenes is **CnH2n**. Alkene molecules are unsaturated because they contain two fewer hydrogen atoms than the alkane with the same number of carbon atoms. The first four members of the homologous series of alkenes are ethene, propene, butane, and pentene. Students do not need to know the names of individual alkenes other than ethene, propene, butene, and pentene. 7.2.2 **Alkenes are hydrocarbons with the functional group C=C**. It is the generality of reactions of functional groups that determine the reactions of organic compounds. Alkenes react with oxygen in combustion reactions in the same way as other hydrocarbons, but they tend to burn in air with smoky flames because of incomplete combustion. Alkenes react with hydrogen, water, and the halogens, by the addition of atoms across the carbon-carbon double bond so that the double bond becomes a single carbon-carbon bond. Students should be able to: • describe the reactions and conditions for the addition of hydrogen, water, and halogens to alkenes • **draw fully displayed structural formulae of the first four members of the alkenes and the products of their addition reactions with hydrogen, water, chlorine, bromine, and iodine.** 7.2.3 **Alcohols contain the functional group –OH**. Methanol, ethanol, propanol, and butanol are the first four members of a homologous series of alcohols. 7.2.4 **Carboxylic acids have the functional group –COOH**. The first four members of a homologous series of carboxylic acids are methanoic acid, ethanoic acid, propanoic acid, and butanoic acid. Students should be able to **recognise carboxylic acids from their names or from given formulae**. Students do not need to know the names of individual carboxylic acids other than methanoic acid, ethanoic acid, propanoic acid, and butanoic acid. Students do not need to know the names of esters other than ethyl ethanoate 7.2.3 Students should be able to: • **describe what happens when any of the first four alcohols react with sodium, burn in air, are added to water, react with an oxidising agent** • recall the main uses of these alcohols. Aqueous solutions of ethanol are produced when sugar solutions are fermented using yeast. Students should **know the conditions used for fermentation of sugar using yeast**. Students should be able to **recognise alcohols from their names or from given formulae**. Students do not need to know the names of individual alcohols other than methanol, ethanol, propanol, and butanol. Students are not expected to write balanced chemical equations for the reactions of alcohols other than for combustion reactions.

	7.2.4 Students should be able to: • **describe what happens when any of the first four carboxylic acids reacts with carbonates, dissolves in water, reacts with alcohols** • H **explain why carboxylic acids are weak acids** in terms of ionisation and pH. Students are not expected to write balanced chemical equations for the reactions of carboxylic acids. Students do not need to know the names of esters other than ethyl ethanoate.
Current learning to be developed in the future within:	A level chemistry students will study organic chemistry as a whole section at A level. They recap the knowledge at \GCSE and then extend on this in detail.
Assessment	Refer to assessment maps for formative and summative assessment opportunities.
Impact	Attainment and Progress – Refer to assessment results / data review documentation.