**Personalised Learning Checklist**

Subject: Chemistry

Year group: Year 12

Dear Student,

During the academy closure you have been set a number of tasks. The list below is the learning you should have completed. Your teacher will use the list to check your progress during this time. It may be used for short quizzes, mini assessments or homework. Where there are gaps your lessons will focus on improving your knowledge and understanding.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Objective | My personal RAG rating (Red- do not understand, Amber- some understanding, Green- I am confident | | | Teacher RAG rating |
| Understand that organic compounds can be represented by: empirical formula, molecular formula, general formula, structural formula, displayed formula, skeletal formula | RED | AMBER | GREEN |  |
| Describe the characteristics of a homologous series | RED | AMBER | GREEN |  |
| Draw structural, displayed and skeletal formulas for given organic compounds | RED | AMBER | GREEN |  |
| Apply IUPAC rules for nomenlature to name organic compounds limited to chains and rings with up to six carbon atoms each | RED | AMBER | GREEN |  |
| Appy IUPAC rules for nomenclature to draw the structure of an organic compound from the IUPAC name limited to chains and rings with up to six carbons | RED | AMBER | GREEN |  |
| Write balanced equations for the steps in a free-radical mechanism (unpaired electrons represented by a dot) | RED | AMBER | GREEN |  |
| Outline mechanisms by drawing the structures of the species involved and curly arrows to represent the movement of electron pairs (ensuring curly arrows start/ stop at the bond) | RED | AMBER | GREEN |  |
| Define the term structural isomer | RED | AMBER | GREEN |  |
| Draw the structures of chain, position and functional group isomers | RED | AMBER | GREEN |  |
| Define the term stereoisomer | RED | AMBER | GREEN |  |
| Draw the structural formulas of E and Z isomers | RED | AMBER | GREEN |  |
| Appy the CIP (Cahn-Ingold-Prelog) priority rules to E and Z isomers | RED | AMBER | GREEN |  |
| Alkanes | RED | AMBER | GREEN |  |
| State that alkanes are saturated hydrocarbons | RED | AMBER | GREEN |  |
| Describe how the alkanes in petroleum can be separated | RED | AMBER | GREEN |  |
| State that cracking involves breaking C-C bonds in alkanes | RED | AMBER | GREEN |  |
| Describe the processes of thermal cracking and catalytic cracking including the types of products formed | RED | AMBER | GREEN |  |
| Explain the economic reasons for cracking alkanes | RED | AMBER | GREEN |  |
| State alkanes are used as fuels and that combustion can be complete or incomplete | RED | AMBER | GREEN |  |
| Describe the pollutants produces by the internal combustion engine and how they can be removed using a catalytic convertor | RED | AMBER | GREEN |  |
| Describe the impact sulfur dioxide has on the atmosphere and explain why it can be removed from flue gases using calcium oxide or calcium carbonate. | RED | AMBER | GREEN |  |
| Explain the reaction of methane with chlorine as a free-radical substitution mechanism involving initiation, propagation and termination steps. | RED | AMBER | GREEN |  |
| State that halogenoalkanes contain polar bonds | RED | AMBER | GREEN |  |
| Outline the nucleophilic substitution mechanisms of the reactions between halogenoalkanes with the nucleophiles OH-, CN- and NH3 | RED | AMBER | GREEN |  |
| Explain why the carbon-halogen bond enthalpy influences the rate of reaction. | RED | AMBER | GREEN |  |
| Explain the role of the reagent as both nucleophile and base (concurrent substitution and elimination reactions of halogenoalkane e.g. 2-bromopropane with potassium hydroxide). | RED | AMBER | GREEN |  |
| Describe ozone as naturally forming in the atmosphere and being beneficial because it absorbs UV radiation | RED | AMBER | GREEN |  |
| Use equations to explain how chlorine atoms catalyse the decomposition of ozone | RED | AMBER | GREEN |  |
| Understand how results of research groups provided evidence for banning the use of CFCs as solvents and refridgerants; as well as the development of chlorine-free compounds. | RED | AMBER | GREEN |  |
| State that alkenes are unsaturated hydrocarbons with a double covalent bond, a centre of high electron density. | RED | AMBER | GREEN |  |
| State that alkenes are unsaturated hydrocarbons with a double covalent bond, a centre of high electron density | RED | AMBER | GREEN |  |
| Outline the mechanisms for the electrophilic additions of alkenes with HBr, H2SO4 and Br2 | RED | AMBER | GREEN |  |
| Describe the use of bromine to test for saturation | RED | AMBER | GREEN |  |
| Explain the formation of major and minor products in addition reactions by reference to the relative stabilities of primary, secondary and tertiary carbocation intermediates | RED | AMBER | GREEN |  |
| State that addition polymers are formed from alkenes and substituted alkenes | RED | AMBER | GREEN |  |
| Draw the: repeating unit from a monomers structure; repeating unit from a section of the polymer chain and the structure of the monomer from a section of the polymer | RED | AMBER | GREEN |  |
| Explain why addition polymers are unreactive | RED | AMBER | GREEN |  |
| Explain the nature of intermolecular forces between molecules or polyalkenes | RED | AMBER | GREEN |  |
| Explain the meaning of the term biofuel | RED | AMBER | GREEN |  |
| Justify the conditions used in the production of ethanol by fermentation of glucose | RED | AMBER | GREEN |  |
| Write equations to support the statement that ethanol produced by fermentation is a carbon-neutral fuel and give reasons why this statement is not valid | RED | AMBER | GREEN |  |
| Outline the mechanism for the formation of alcohol by the reaction of an alkene with steam in the presence of an acid catalyst | RED | AMBER | GREEN |  |
| Discuss the environmental (including ethical) issues linked to decision making about biofuel use. | RED | AMBER | GREEN |  |
| State that alcohols are classified as primary, secondary and tertiary | RED | AMBER | GREEN |  |
| Write equations to show how: primary alcohols can be oxidised to aldehydes and further oxidised to carboxylic acids; secondary alcohols to ketones; tertiary alcohols are not easily oxidised | RED | AMBER | GREEN |  |
| Understand acidified potassium dichromate(VI) I a suitable oxidising agent [O] | RED | AMBER | GREEN |  |
| Explain how the method to oxidise a primary alcohol determines whether an aldehyde or carboxylic acid is obtained | RED | AMBER | GREEN |  |
| Use chemical tests to distinguish between aldehydes and ketones including Fehling's solution and Tollen's' reagent | RED | AMBER | GREEN |  |
| Outline the mechanism for the acid-catalysed elimination of water from alcohols to form alkenes | RED | AMBER | GREEN |  |
| Understand that alkenes produced by this method can be used to produce additional polymers without using monomers derived from crude oil | RED | AMBER | GREEN |  |
| Identify the functional groups using the reactions in the specification | RED | AMBER | GREEN |  |
| Use precise atomic masses and precise molecular mass from mass spectrometry to determine the molecular formula of a compound | RED | AMBER | GREEN |  |
| State that bonds in a molecule absorb infrared radiation at characteristic wavenumbers | RED | AMBER | GREEN |  |
| Use infrared spectra and the Chemistry Data sheet to identify particular bonds and therefore functional groups, and also identify impurities | RED | AMBER | GREEN |  |