



Course Outline

Chemistry Year 12

Inspiring excellence, empowering global minds

Overview

Edexcel AS Chemistry Syllabus at GEMS Wesgreen International Secondary School aims to provide the students an opportunity to develop attitudes relevant to chemistry such as synthesis, formulation, analysis and characteristic properties of substances and materials of all kinds. It will provide students the opportunity to study science courses like Engineering, Medicine etc.

Learning Outcomes

Students should be helped to appreciate the achievements of chemistry in showing how the complex and diverse phenomena of both the natural and man-made worlds can be described in terms of a number of key ideas which are of universal application, and which can be illustrated in the separate topics.

The aims of the Chemistry Syllabus are to:

- acquire knowledge and understanding and develop practical skills, including efficient, accurate and safe scientific practices
- learn to apply the scientific method, while developing an awareness of the limitations of scientific theories and models
- develop skills in data analysis, evaluation and drawing conclusions, cultivating attitudes relevant to science such as objectivity, integrity, enquiry, initiative and inventiveness
- develop effective scientific communication skills, using appropriate terminology and scientific conventions
- understand their responsibility to others/society and to care for the environment
- enjoy science and develop an informed interest in the subject that may lead to further study.

Ongoing Objectives

The objectives are to:

provide an enjoyable and worthwhile educational experience for all learners, whether or not they go on to study science beyond this level.

- enable learners to acquire sufficient knowledge and understanding to:

- ❖ become confident citizens in a technological world and develop an informed interest in scientific matters.
 - ❖ allow learners to recognise that science is evidence-based and understand the usefulness, and the limitations, of scientific method.
 - develop skills that:
 - ❖ are relevant to the study and practice of chemistry.
 - ❖ are useful in everyday life.
 - ❖ encourage a systematic approach to problem-solving.
 - ❖ encourage efficient and safe practice.
 - ❖ encourage effective communication through the language of science.
- To develop attitudes relevant to chemistry such as:
- ❖ concern for accuracy and precision
 - ❖ objectivity
 - ❖ integrity
 - ❖ enquiry
 - ❖ initiative
 - ❖ inventiveness

Enable learners to appreciate that:

- ❖ science is subject to social, economic, technological, ethical and cultural influences and limitations.
- ❖ the applications of science may be both beneficial and detrimental to the individual, the community and the environment.

Unit Overviews

Term 1

Topic 2 - Atomic Structure and Periodic Table

Approximate length: 15 lessons

In this topic student will learn about the relative atomic mass and calculating RAM using mass spectrometer. This topic also deals with ionization energies across periods and groups, factors affecting ionization energies. They also interpret the graphs and discuss the trend in periodicity.

Specific objectives with the Edexcel AS syllabus covered:

- Know the structure of an atom in terms of electrons, protons and neutrons
- Know the relative mass and charge of protons, neutrons and electrons
- Know what is meant by the terms 'atomic number' and 'mass number'
- Be able to use the atomic number and the mass number to determine the number of each type of subatomic particle in an atom or ion

- Understand the term 'isotope'
- Be able to define first, second and third ionisation energies and understand that all ionisation energies are endothermic
- Know that an orbital is a region within an atom that can hold up to two electrons with opposite spins
- Understand how ionisation energies are influenced by the number of protons in the nucleus, the electrons shielding and the sub-shell from which the electron is removed.
- Know that the ideas about electronic structure developed from: an understanding that successive ionisation energies provide evidence for the existence of quantum shells and the group to which the element belongs, an understanding that the first ionisation energy of successive elements provides evidence for electron sub-shells
- Be able to describe the shapes of s and p orbitals
- Know that orbitals in sub-shells: each take a single electron before pairing up, pair up with two electrons of opposite spin
- Be able to predict the electronic configuration of atoms of the elements from hydrogen to krypton inclusive and their ions, using s, p, d notation and electron-in-boxes notation
- Understand that electronic configuration determines the chemical properties of an element
- Know that the Periodic Table is divided into blocks, such as s, p and d, and know the number of electrons that can occupy s, p and d sub-shells in the first four quantum shells.
- Be able to represent data, in a graphical form (including logarithms of first ionisation energies on a graph) for elements 1 to 36 and hence explain the meaning of the term 'periodic properties'
- Be able to explain: the trends in melting and boiling temperatures of the elements of Periods 2 and 3 of the Periodic table in terms of the structure of element and the bonding between its atoms or molecules, the general increase and the specific trends in ionisation energy of the elements across Periods 2 and 3 of the Periodic table, the decrease in first ionisation energy down a group
- Understand the basic principles of a mass spectrometer and be able to analyse and interpret mass spectra to: deduce the isotopic composition of a sample of an element, calculate the relative atomic mass of an element from relative abundances of isotopes and vice versa, determine the relative molecular mass of a molecule, and hence identify molecules in a sample, understand that ions in a mass spectrometer may have a 2+ charge
- Be able to predict mass spectra, including relative peak heights, for diatomic molecules, including chlorine, given the isotopic abundances.

Topic 1: Formulae, Equations and Amount of Substance **Approximate length: 15 lessons**

In this topic student will learn about stoichiometric calculations using equations. They will also perform experiment to improve their understanding for paper 3 questions involving titrations. They will also learn about atom economy and gas constant.

Specific objectives with the Edexcel AS syllabus covered:

- Know the terms 'atom', 'element', 'ion', 'molecule', 'compound', 'empirical formula' and 'molecular formula'
- Know that the mole (mol) is the unit for the amount of a substance and be able to perform calculations using Avogadro's constant L ($6.02 \times 10^{23} \text{ mol}^{-1}$)
- Write balanced full and ionic equations, including state symbols for chemical reactions
- Understand the terms: 'relative atomic mass' based on the ^{12}C scale, 'relative molecular mass' and 'relative formula mass', including calculating these values from relative atomic masses, 'molar mass' as the mass per mole of a substance in g mol^{-1} , parts per million (ppm), including gases in the atmosphere
- Calculate the concentration of a solution in mol dm^{-3} and g dm^{-3}
- Be able to use experimental data to calculate empirical and molecular formulae
- Be able to use chemical equations to calculate reacting masses and vice versa, using the concepts of amount of substance and molar mass
- Be able to use chemical equations to calculate volumes of gases and vice versa using: the concepts of amount of substance, the molar volume of gases, the expression of $pV = nRT$ for gases and volatile liquids
- Be able to calculate percentage yields and percentage atom economies (by mass) in laboratory and industrial processes, using chemical equations and experimental results
- Be able to determine a formula or confirm an equation by experiment, including evaluation of the data
- Measurement of the molar volume of a gas
- Be able to relate ionic and full equations, with state symbols, to observations from simple test-tube experiments, to include: displacement reactions, typical reactions of acids, precipitation reactions

Topic 3: Bonding and Structure**Approximate length: 13 lessons**

In this topic students will learn about different types of bonding ionic, covalent and metallic using dot and cross diagram. The topic will also include shapes of molecules and polarity of molecules.

Specific objectives with the Edexcel AS syllabus covered:

- Know and be able to interpret evidence for the existence of ions, limited to physical properties of ionic compounds, electron density maps and the migration of ions
- Be able to describe the formation of ions in terms of loss or gain of electrons
- Be able to draw dot and cross diagrams to show electron in cations and anions
- Be able to describe ionic crystals as giant lattices of ions
- Know that ionic bonding is the result of strong net electrostatic attraction between ions
- Understand the effects of ionic radius and ionic charge on the strength of ionic bonding
- Understand reasons for trends in ionic radii down a group in the Periodic Table, and for a set of isoelectronic ions, including N^{3-} to Al^{3+}
- Understand the meaning of the term 'polarisation' as applied to ions
- Understand that the polarising power of a cation depends on its radius and charge, and the polarizability of an anion also depends on its radius and charge
- Understand that covalent bonding is the strong electrostatic attraction between two nuclei and the shared pair of electrons between them, based on evidence: the physical properties of giant atomic structures, electron density maps for simple molecules
- Be able to draw dot-and-cross diagrams to show electrons in covalent substances, including: molecules with single, double and triple bonds, species with dative covalent (coordinate) bonds, including Al_2Cl_6 and the ammonium ion
- Be able to describe the different structures formed by giant lattices of carbon atoms, including graphite, diamond and graphene and discuss applications of each
- Understand the meaning of the term 'electronegativity' as applied to atoms in a covalent bond
- Know that ionic and covalent bonding are the extremes of a continuum of bonding type and be able to explain this in terms of electronegativity difference, leading to bond polarity in bonds and molecules, and to ionic bonding if the electronegativity is large enough
- Be able to distinguish between polar bonds and polar molecules and predict whether or not a given molecule is likely to be polar
- Understand the principles of the electron-pair repulsion theory, used to interpret and predict the shapes of simple molecules and ions
- Understand the terms 'bond length' and 'bond angle'
- Know and be able to explain the shapes of, and bond angles in, BeCl_2 , BCl_3 , CH_4 , NH_3 , NH_4^+ , H_2O , CO_2 , gaseous PCl_5 , SF_6 and C_2H_4

- Be able to apply the electro-pair repulsion theory to predict the shapes of, and bond angles in, molecules and ions analogous to those above
- Understand that metals consist of giant lattices of metal ions in a sea of delocalised electrons
- Know that metallic bonding is the strong electrostatic attraction between metal ions and the delocalised electrons
- Be able to use the models in 3.20 and 3.21 to interpret simple properties of metals, including electrical conductivity and high melting temperature

Topic 4: Introductory Organic Chemistry and Alkanes

Approximate length: 6 lessons

In this topic student will learn about organic compounds including alkanes and alkenes. They will name the different compounds using IUPAC nomenclature. The topic will also cover mechanism of reaction using terms associated with the bond fission.

Specific objectives with the Edexcel AS syllabus covered:

- Understand the difference between hazard and risk
- Understand the hazards associated with organic compounds and why it is necessary to carry out risk assessments when dealing with potentially hazardous materials
- Be able to suggest ways in which risks can be reduced and reactions carried out safely, for example: working on a smaller scale, taking precautions specific to the hazard, using an alternative method that involves less hazardous substances
- Understand the concepts of homologous series and functional group
- Be able to apply the rules of IUPAC nomenclature to: name compounds relevant to this specification, draw these compounds, as they are encountered in the specification, using structural, displayed and skeletal formulae
- Be able to classify reactions as addition, substitution, oxidation, reduction or polymerisation
- Understand that bond breaking can be: homolytic, to produce free radicals, heterolytic, to produce ions
- Know key definitions of the terms 'free radical' and 'electrophile'
- Know the general formula of alkanes and cycloalkanes, and understand that they are hydrocarbons which are saturated
- Understand the term 'structural isomerism' and be able to draw the structural isomers of organic molecules, given their molecular formula
- Be able to draw and name the structural isomers of alkanes and cycloalkanes with up to six carbon atoms
- Know that alkanes are used as fuels and obtained from the fractional distillation, cracking and reforming of crude oil, and be able to write equations for these reactions

- Know that pollutants, including carbon monoxide, oxides of nitrogen and sulfur, carbon particulates and unburned hydrocarbons, are emitted during the combustion of alkane fuels
- Understand the problems arising from pollutants from combustion of alkane fuels, limited to toxicity of carbon monoxide and why it is toxic, and the acidity of oxides of nitrogen and sulfur
- Be able to discuss reasons for developing alternative fuels in terms of sustainability and reducing emissions, including emissions of CO₂ and its relationship to climate change
- Be able to apply the concept of carbon neutrality to different fuels, such as petrol, bioethanol and hydrogen
- Understand the reactions of alkanes with: oxygen in air (combustion) and halogens
- Understand the mechanism of the free radical substitution reaction between an alkane and hydrogen: using free radicals, which are species with an unpaired electron, represented by a single dot, showing the initiation step of the mechanism, with curly half arrows for free radical formation, showing the propagation and termination steps of the mechanism, having limited use in synthesis because of further substitution reactions

Term 2

Topic 5: Alkenes

Approximate length: 10 lessons

- Know the general formula of alkenes and understand that alkenes and cycloalkenes are hydrocarbons which are unsaturated (have a carbon-carbon double bond which consists of a σ and a π bond)
- Be able to explain geometric isomerism in terms of restricted rotation around a C=C double bond and the nature of the substituents on the carbon atoms
- Understand the E-Z naming system for geometric isomers and why it is necessary to use this when the cis- and trans- naming system breaks down
- Know the qualitative test for a C=C double bond using bromine or bromine water
- Be able to describe the reactions of alkenes, limited to: the addition of hydrogen, using a nickel catalyst to form an alkane, the addition of halogens to produce a di-substituted halogenoalkane, the addition of hydrogen halides to produce mono-substituted halogenoalkanes, the addition of steam, in the presence of an acid catalyst, to produce alcohols, oxidation of the double bond by acidified potassium manganate(VII) to produce a diol
- Know the qualitative test for a C=C double bond using bromine or bromine water
- Be able to describe the mechanism (including diagrams), giving evidence where possible of: the electrophilic addition of bromine and hydrogen bromide to ethene, the electrophilic addition of hydrogen bromide to propene

- Use of the curly arrow notation is expected, they should start from either a bond or from a lone pair of electrons
- Knowledge of the relative stability of primary, secondary and tertiary carbocation intermediates is expected
- Be able to describe the addition polymerisation of alkenes and draw the repeat unit given the monomer, and vice versa
- Understand how chemists limit the problems caused by polymer disposal by: developing biodegradable polymers, removing toxic waste gases produced by the incineration of polymers

Topic 6: Energetics

Approximate length: 10 lessons

This topic will cover various terms associated with standard enthalpies and calculate the energy changes during reaction. The unit will also cover Hess cycle and calculation of enthalpy using Hess cycle.

Specific objectives with the Edexcel AS syllabus covered:

- Know the enthalpy change, ΔH , is the heat energy change measured at constant pressure and that standard conditions are 100kPa and a specified temperature, usually 298K
- Know that, by convention, exothermic reactions have a negative enthalpy change and endothermic reactions have a positive enthalpy change
- Know the definition of standard enthalpy change of: reaction, $\Delta_r H$, formation, $\Delta_f H$, combustion, $\Delta_c H$, neutralisation, $\Delta_{neut} H$, atomisation, $\Delta_{at} H$
- Be able to use experimental data to calculate: energy transferred in a reaction recalling and using the expression: $E = mc\Delta t$ and enthalpy change of the reaction in kJ mol^{-1}
- Know Hess's Law and be able to apply it to: constructing enthalpy cycles, calculating enthalpy changes of reaction using data provided, or data selected from a table or obtained from experiments
- Be able to evaluate the results obtained from experiments and comment on sources of error and uncertainty and any assumptions made in experiments
- Students will need to consider experiments where substances are mixed in an insulated container and combustion experiments using, for example, a spirit burner and be able to draw suitable graphs and use cooling curve corrections.
- Understand the terms 'bond enthalpy' and 'mean bond enthalpy', and be able to use bond enthalpies to calculate enthalpy changes, understanding the limitations to this method
- Be able to calculate mean bond enthalpies from enthalpy change reactions

- Understand that bond enthalpy data gives some indication about which bond will break first in a reaction, how easy or difficult it is and therefore how rapidly a reaction will take place at room temperature

Topic 7: Intermolecular Forces**Approximate length: 7 lessons**

This topic covers the different forces existing between the molecules and explaining the physical properties of substance in terms of forces.

Specific objectives with the Edexcel AS syllabus covered:

- Understand the nature of the following: London forces (instantaneous dipole-induced dipole), permanent dipole-permanent dipole interactions, hydrogen bonds
- Understand the interactions in molecules, such as H₂O, liquid NH₃ and liquid HF, which give rise to hydrogen bonding
- Understand the following anomalous properties of water resulting from hydrogen bonding: its high melting and boiling temperature when compared with similar molecules, the density of ice compared to that of water
- Be able to predict the presence of hydrogen bonding in molecules analogous to those mentioned above
- Understand, in terms of intermolecular forces, physical properties shown by substances, including: the trends in boiling temperatures of alkanes with increasing chain length, the effect of branching in the carbon chain on the boiling temperature of alkanes, the relatively low volatility (higher boiling temperatures) of alcohols compared to alkanes with a similar number of electrons, the trends in boiling temperature of the hydrogen halides HF to HI
- Understand factors that influence the choice of solvents, including: water, to dissolve some ionic compounds, in terms of hydration of the ions, water, to dissolve simple alcohols, in terms of hydrogen bonding, water, as a poor solvent for compounds (to include polar molecules such as halogenoalkane), in terms of inability to form hydrogen bonds, non-aqueous solvents, for compounds that have similar intermolecular forces to those in the solvent

Topic 8: Redox chemistry and Groups 1, 2 and 7**Approximate length: 13 lessons**

This topic covers writing redox reactions in terms of oxidation number and balancing redox equation.

Specific objectives with the Edexcel AS syllabus covered:

- Know what is meant by the term 'oxidation number' and understand the rules for assigning oxidation numbers
- Be able to calculate the oxidation number of elements in compounds and ions, including in peroxides and metal hydrides
- Be able to indicate the oxidation number of an element in a compound or an ion, using a Roman numeral
- Be able to write formulae given oxidation numbers
- Understand oxidation and reduction in terms of electron transfer and changes in oxidation number, and the application of these ideas to reactions of s-block and p-block elements
- Know that oxidising agents gain electrons and reducing agents lose electrons
- Understand that a disproportionation reaction involves an element in a single species being simultaneously oxidised and reduced
- Know that oxidation number is a useful concept in terms of the classification of reactions as redox and as disproportionation
- Understand that metals, in general, form positive ions by loss of electrons with an increase in oxidation number whereas non-metals, in general, form negative ions by gain of electrons with a decrease in oxidation number
- Be able to write ionic half-equations and use them to construct full ionic equation
- Understand reasons for the trend in ionisation energy down Group 1 and 2
- Understand reasons for the trend in reactivity of the elements down Group 1 (Li to K) and Group 2 (Mg to Ba)
- Know the reactions of the elements of Group 1 (Li to K) and Group 2 (Mg to Ba) with oxygen, chlorine and water
- Know the reactions of: oxides of Group 1 and 2 elements with water and dilute acid, hydroxides of Group 1 and 2 elements with dilute acid
- Know the trends in solubility of the hydroxides and sulfates of Group 2 elements
- Understand the reasons for the trends in thermal stability of the nitrates and the carbonates of the elements in Groups 1 and 2 in terms of the size and charge of the cations involved
- Understand the formation of characteristic flame colours by Group 1 and 2 compounds in terms of electron transitions
- Students will be expected to know the flame colours for Group 1 and 2 compounds

- Know experimental procedures to show: patterns in the thermal decomposition of Group 1 and 2 nitrates and carbonates
- Students will be expected to know tests for CO_2 and O_2 ; and to recognise nitrogen dioxide by its colour and acidic pH and flame colours in compounds of Group 1 and 2 elements
- Know reactions, including ionic equations where appropriate, for identifying: CO_3^{2-} and HCO_3^- , using an aqueous acid to form CO_2 (and testing the gas with limewater), SO_4^{2-} using acidified barium chloride solution, NH_4^+ using sodium hydroxide solution and warming to form ammonia (and testing using litmus and HCl fumes)
- Understand reasons for the trends for Group 7 elements in: melting and boiling temperatures and physical state at room temperature, electronegativity, reactivity down the group
- Understand the trend in reactivity of Group 7 elements in terms of the redox reactions of Cl_2 , Br_2 and I_2 with halide ions in aqueous solution
- Students are expected to know the colours of the elements in standard conditions, in aqueous solution and in a non-polar organic solvent
- Understand, in terms of changes in oxidation number, the following reactions of the halogens: oxidation reactions with Group 1 and 2 metals, the disproportionation reaction of chlorine with water and the use of chlorine in water treatment, the disproportionation reaction of chlorine with cold, dilute aqueous sodium hydroxide to form bleach, the disproportionation reaction of chlorine with hot alkali, reactions analogous to those specified above
- Understand the following reactions: solid Group 1 halides with concentrated sulfuric acid, to illustrate the trend in reducing ability of the hydrogen halides, precipitation reactions of the aqueous anions Cl^- , Br^- and I^- with aqueous silver nitrate solution and nitric acid, and the solubility of the precipitates in aqueous ammonia solution, hydrogen halides with ammonia gas (to produce ammonium halides) and with water (to produce acids)
- Be able to make predictions about fluorine and astatine and their compounds, in terms of knowledge of trends in halogen chemistry

Topic 9: Introduction to Kinetics and Equilibria**Approximate length: 5 lessons**

This topic includes the collision theory explaining the rates of reaction. It also covers the energy profile diagram for catalysed and uncatalysed reaction. It also includes calculation of rates using graph.

Specific objectives with the Edexcel AS syllabus covered:

- Understand, in terms of the collision theory, the effect of changes in concentration, temperature, pressure and surface area on the rate of a chemical reaction

- Understand that reactions take place only when collisions have sufficient energy, known as the activation energy
- Be able to calculate the rate of a reaction from: the time taken for a reaction, using $\text{rate} = 1/\text{time}$, the gradient of suitable graph, by drawing a tangent, either for initial rate, or at a time, t
- Understand qualitatively, in terms of the Maxwell-Boltzmann distribution of molecular energies, how changes in temperature affect the rate of reaction
- Understand the role of catalysts in providing alternative reaction routes of lower activation energy
- Be able to draw the reaction profiles for uncatalysed and catalysed reactions, including the energy level of the intermediate formed with the catalyst
- Understand the use of catalysts in industry to make processes more sustainable by using less energy and/or higher atom economy
- Be able to interpret the action of a catalyst in terms of qualitative understanding of the Maxwell-Boltzmann distribution of molecular energies
- Know that many reactions are readily reversible and that they can reach a state of dynamic equilibrium in which: the rate of the forward reaction is equal to the rate of the backward reaction, the concentrations of the reactants and products remain constant
- Be able to predict and justify the qualitative effects of changes of temperature, pressure and concentration on the position of equilibrium in a homogeneous system
- Evaluate data to explain the necessity, for many industrial processes, to reach a compromise between the yield and rate of reaction

Topic 10: Organic Chemistry: Halogenoalkanes, Alcohols and Spectra

Approximate length: 15 lessons

In this topic we will learn about the reactions of haloalkanes and alcohols using mechanism as addition, elimination, substitution, oxidation, reduction, hydrolysis, or polymerisation. This topic will also cover NMR and mass spectra.

Specific objectives with the Edexcel AS syllabus covered:

- Be able to classify reactions as addition, elimination, substitution, oxidation, reduction, hydrolysis or polymerisation
- Understand the concept of a reaction mechanism
- Understand that heterolytic bond breaking results in species that are electrophiles or nucleophiles
- Know the definition of the term 'nucleophile'

- Understand the link between bond polarity and the type of reaction mechanism a compound will undergo
- Understand the reactions of halogenoalkanes with: aqueous alkali, including KOH(aq) to produce alcohols (where the hydroxide ion acts as a nucleophile, ethanolic potassium hydroxide to produce alkenes by an elimination reaction (where the hydroxide ion acts as a base), aqueous silver nitrate in ethanol (where water acts as a nucleophile), alcoholic ammonia under pressure to produce amines (where the ammonia acts as a nucleophile), alcoholic potassium cyanide to produce nitriles (where the cyanide ion acts as a nucleophile), students should know this is an example of increasing the length of the carbon chain
- Understand the mechanisms of the nucleophilic substitution reactions between primary halogenoalkanes and: aqueous potassium hydroxide and ammonia
- Understand that experimental observations and data can be used to compare the relative rates of hydrolysis of: primary, secondary and tertiary structural isomers of a halogenoalkane, primary chloro-, bromo- and iodoalkanes using aqueous silver nitrate in ethanol
- Know the trend in reactivity of primary, secondary and tertiary halogenoalkanes
- Understand in terms of bond enthalpy, the trend in reactivity of chloro-, bromo- and iodoalkanes
- Understand the nomenclature of alcohols and be able to draw their structural, displayed and skeletal formulae
- Understand the distinction between primary, secondary and tertiary alcohols
- Understand the reaction of alcohols with: oxygen in air (combustion), halogenating agents; PCl₅ to produce chloroalkanes (including its use as a qualitative test for the presence of the -OH group); 50% concentrated sulfuric acid and potassium bromide to produce bromoalkanes; red phosphorous and iodine to produce iodoalkanes, concentrated phosphoric acid to form alkenes by elimination
- Understand that potassium dichromate (VI) in dilute sulfuric acid can oxidise: primary alcohols to produce aldehydes (which give a positive result with Benedict's or Fehling's solution) if the product is distilled as it forms, primary alcohols to produce carboxylic acids (which give a positive result with sodium carbonate or sodium hydrogen carbonate) if the reagents are heated under reflux, secondary alcohols to produce ketones
- In equations, the oxidising agent can be represented by [O]
- Understand, the following techniques in the preparation and purification of a liquid organic compound: heating under reflux, extraction with a solvent using a separating funnel, distillation drying with an anhydrous salt, boiling temperature determination
- Be able to interpret data from mass spectra to suggest possible structures of simple organic compounds using the m/z of the molecular ion and fragmentation patterns

- Be able to use infrared spectra, or data from infrared spectra, to deduce functional groups present in organic compounds, and predict infrared absorptions, given wavenumber data, due to familiar functional groups including: C-H stretching absorptions in alkanes, alkenes and aldehydes, C=C stretching absorptions in alkenes, O-H stretching absorptions in alcohols and carboxylic acids, C=O stretching absorptions in aldehydes, ketones and carboxylic acids, C-X stretching absorptions in halogenoalkanes, N-H stretching absorption in amines

Term 3

Following the conclusion of topic 10, for the remainder of the academic year prior to the IAS examinations, students will be revising content from throughout the chemistry syllabus, the sequence will be determined by highlighting any gaps in knowledge and misconceptions identified during lessons and the mock examination series.

Textbook – Pearson Edexcel International A Level Chemistry

Assessment

Formative: Throughout the chapters, the students will complete end of chapter assessments, quizzes and problem-solving activities which will allow the teacher to assess the students' progress and inform their planning.

Summative: Students will be assessed on their understanding of each chapter with end of topic assessments. At the end of each term, we will complete internal assessments which will be based on certain chapters.