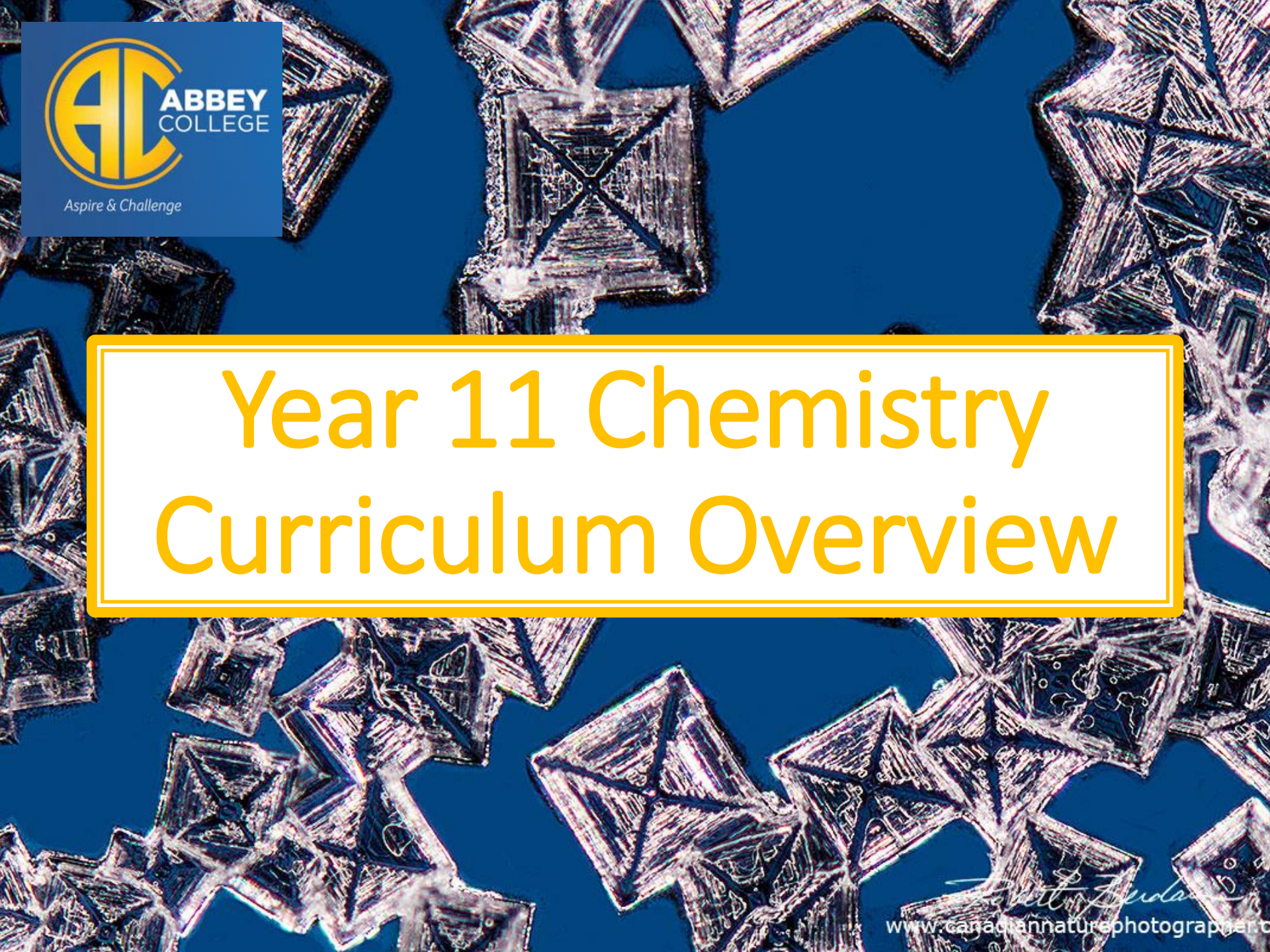
ABBEY COLLEGE

Aspire & Challenge

Year 11 Chemistry Curriculum Overview



Topic	Timing	Key knowledge and skills	Progression and links	SEND/ More able	Assessment & recording; factual recall checks
Organic Chemistry	Autumn Term, Half-term one	Students should: • Describe how to separate crude oil into fractions in a school laboratory. • Classify a hydrocarbon as an alkane. • State the names and describe the first four alkanes. • Describe how the trend in colour, viscosity, flammability, and boiling point changes as the length of the hydrocarbon chain changes. • Describe how the properties of a fraction of crude oil make it appropriate for its use. • Explain the differences between complete and incomplete combustion. • Write balanced symbol equations for the complete and incomplete combustion of hydrocarbons. • Explain how to test for the products of complete combustion. • Describe the process of cracking, including conditions. • Generate a balanced symbol equation to describe cracking. • Describe a chemical test to show an alkene is present. • 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. • 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.	Literacy • Use of tier three words • Extended writing opportunities	Challenge: • Explaining how fractional distillation and cracking work and why they are useful. • Higher level questions – explaining polymerisation. Scaffold: • Pre prepared results tables • Knowledge organisers • Scaffold for extended writing	• 5 questions to start – recall activity every lesson. • Close the gap questions • Self and peer feedback on tasks completed • Structure strip • Past paper exam Qs. • Summative assessment at the end of the unit

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Organic Chemistry	Autumn Term, Half-term one	• Draw the structural and displayed formulae for ethyl ethanoate. • 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. • 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. • Describe how monomers become polymers. • Draw the monomer for an addition polymer when the structure of the polymer is given. • Draw an addition polymer structure when the structure of the monomer is given. • Describe condensation polymerisation. • Draw a simplified structure of the monomers for a condensation polymer when the structure of the polymer is given. • Draw a simplified structure of a condensation polymer when the structure of the monomers are given. • Identify the monomer from the structural formula of a polymer. • Describe the structure of an amino acid. • Describe the main structure of DNA. • Describe the importance of DNA for living systems. • Sketch the shape of a DNA strand.			

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Chemical Analysis	Autumn Term, Half-term two	Students should: • Describe the difference between pure substances, impure substances, and formulations. • Explain how melting point and boiling point data can be used to determine the purity of a substance. • State uses of formulations. • Explain how chromatography separates solutes. • Calculate Rf values from given data. • Use a chromatogram to determine if a sample is pure or impure. • Explain why limewater turns milky when it reacts with carbon dioxide. • Interpret results to identify a gas that is present. • Explain why hydrogen 'pops' near a naked flame. • Identify a metal ion from the colour of a flame or the colour of the hydroxide precipitate. • Write balanced symbol equations, including state symbols, for the production of an insoluble metal hydroxide. • Explain why a flame test cannot be used to identify a mixture of metal solutions. • Identify the presence of carbonate, a specific halide, or sulfate ions from simple laboratory tests. • Write balanced symbol equations, including state symbols for reactions in the simple laboratory tests for carbonate, halide, or sulfate ions. • Explain why it can be difficult to identify halides using this method. • Compare and contrast instrumental techniques with simple laboratory tests. • Describe the main processes of flame emission spectroscopy. • Explain how flame emission spectroscopy is an improvement on flame tests.	Numeracy • Calculating Rf values Literacy • Use of tier three words • Extended writing opportunities	Challenge: • Explaining how to test and identify an unknown chemical Scaffold: • Pre-prepared results tables • Knowledge organisers • Scaffold for extended writing	• 5 questions to start – recall activity every lesson. • Close the gap questions • Self and peer feedback on tasks completed • Structure strip • Past paper exam Qs. • Summative assessment at the end of the unit

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Chemistry of the Atmosphere	Spring Term: Half-term one	Students should: • State the composition, including formulae, of the Earth's early atmosphere. • Describe a theory for the development of the Earth's atmosphere. • Explain, using word equations, how gases were formed in the atmosphere and oceans were formed. • Describe how the proportion of carbon dioxide in the early atmosphere was reduced. • State the composition of dry air. • Use word equations to show how carbon dioxide can form sedimentary rocks. • Explain the greenhouse effect. • Explain how greenhouse gases increase the temperature of the atmosphere. • Explain how human activity can change the proportion of greenhouse gases in the atmosphere. • Explain the possible effects of global climate change and why they are difficult to predict. • Explain possible methods to reduce greenhouse gas emissions. • Explain some of the problems in trying to reduce greenhouse gas emissions. • Explain how sulphur dioxide and nitrogen oxides are made when fossil fuels are combusted. • Describe the health impacts of atmospheric pollutants. • Use balanced symbol equations to show how atmospheric pollutants are formed.	Numeracy • Graph skills • Orders of magnitude Literacy • Use of tier three words • Extended writing opportunities	Challenge: • Explaining the causes of changes to the atmosphere. • Higher level questions – evaluating methods of mitigating climate change. • Order of magnitude calculations Scaffold: • Pre prepared axes • Knowledge organisers • Scaffold for extended writing	• 5 questions to start – recall activity every lesson. • Close the gap questions • Self and peer feedback on tasks completed • Structure strip • Past paper exam Qs. • Summative assessment at the end of the unit

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Using Resources	Spring Term: Half term one	Students should: • Describe and classify a resource as finite or renewable when information is given. • Explain the use of natural, sustainable, and finite resources. • Interpret information from different formats including graphs, charts, tables, and prose. • Explain the method of obtaining potable water depends on the local conditions. • Explain reasons for filtration and sterilisation in water treatment. • Describe and explain in detail how to safely distil salty water. • Explain why waste water should be treated before it is released into the environment. • Describe the main processes in sewage treatment. • Explain the uses of sewage slurry. • Describe the processes of phytomining and bioleaching. • Write balanced symbol equations to explain metal extraction techniques. • Explain the need for new ways of extracting metals (in particular copper). • Explain the importance of LCA and how it can be misused. • Carry out LCAs for different products when data is supplied.	Numeracy • Graphs • Yield calculations Literacy • Use of tier three words • Extended writing opportunities	Challenge: • Evaluating the use of different materials • Higher level questions – comparison of methods to make water fit to drink. Scaffold: • Pre prepared graph axes • Knowledge organisers • Scaffold for extended writing	• 5 questions to start – recall activity every lesson. • Close the gap questions • Self and peer feedback on tasks completed • Structure strip • Past paper exam Qs. • Summative assessment at the end of the unit

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Using Resources	Spring Term: Half term one	• Explain the importance of reusing and recycling products. • Explain why some recycling can be difficult. • Evaluate ways of reducing the use of limited resources when information is given. • Describe an experiment to investigate the conditions required for rusting to occur. • With the help of equations, describe the process of rusting. • Explain how different corrosion prevention techniques work. • Explain in detail why pure metals are often alloyed before they are used. • Describe how different amounts of carbon affect the properties of iron. • Identify an appropriate purpose for an alloy when given data on its properties. • Explain how thermosetting plastics and thermosoftening plastics are different in terms of structure and bonding. • Describe the different conditions used to make poly(ethene). • Explain how the structure of poly(ethene) affects its properties and therefore its uses. • Describe what a composite is. • Explain the difference between a composite and an advanced composite. • Compare quantitatively the physical properties of glass and clay ceramics, polymers, composites, and metals. • Describe how the raw materials are turned into the reactants for the Haber process. • Describe how the Haber process is a reversible reaction. • Describe the Haber process with the help of a balanced symbol equations including state symbols. • Explain the effect of changing temperature on yield of the Haber process. • Explain the effect of changing pressure on the yield of the Haber process. • Explain why the conditions used in the Haber process are a compromise. • Explain the importance of fertilisers for agriculture. • Describe in detail how fertilisers are produced in the laboratory. • Write balanced symbol equations for the reactions to make components of NPK fertilisers. • Describe production of fertilisers in industry. • Compare and contrast the industrial and laboratory production of fertilisers. • Write balanced symbol equations or the reactions to make components of NPK fertilisers.			.