Year 10 Chemistry Curriculum

Students follow the Ark Curriculum + Science Mastery Scheme which is a 5 year programme of study commencing in year 7 and aligns to the AQA Exam board for final assessment in year 11. This is the first year that the course has been run, therefore some of the content for the Science Mastery topics has been covered previously. The content currently taught is identified in the sequence column. The switch to Science Mastery took place after the half term break in October.

Students either follow the combined science course or the separate 'triple' science course. Content that is separate science only is marked in bold as 'triple only.

Unit	Core knowledge/skill development	Sequence	Assessment	Literacy, numeracy, PSHE, FBV, other links	Key areas of ACP and VAA development	Home learning and enrichment
Ionic Bonding	Explain how ionic bonds are formed by the transfer of electrons between atoms to produce cations and anions, including the use of dot and cross diagrams. Recall that an ion is an atom or group of atoms with a positive or negative charge. Calculate the numbers of protons, neutrons and electrons in simple ions given the atomic number and mass number. Explain the formation of ions in ionic compounds from their atoms, limited to compounds of elements in groups 1, 2, 6 and 7. Recall the formulae of elements, simple compounds and ions. Explain the use of the endings –ide and –ate in the names of	SC5a Ionic Bonds SC5b Ionic Lattices SC5c Properties of ionic compounds	Starter questions Exam-type questions Hinge questions Use of web-based applications to assess knowledge in lesson (e.g. Isaac Physics, Educake, Active Learn etc.)	Literacy: key words, definitions, summary notes. Numeracy: summary notes, equation practice, General maths skills (e.g. rearranging equations, graph plotting, standards form , SI prefixes) Equations students are required to	Connection finding (linking) to use connections from past experiences (KS3) to seek generalisations in the topic VVAs Hard Working: Practice – Self-regulate and revise practice schedules in line with improvements. Set own goals and monitor progress towards them.	Homework: retrieval quizzing which will assess both current learning and learning from previous years. Home work will be set on Educake, Century Tech, Isaac Physics or Seneca Premium. Exam questions may

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	compounds. Recall the formulae of elements, simple compounds and ions. Deduce the formulae of ionic compounds (including oxides, hydroxides, halides, nitrates, carbonates and sulfates) given the formulae of the constituent ions. Explain the structure of an ionic compound as a lattice structure: a)consisting of a regular arrangement of ions b)held together by strong electrostatic forces (ionic bonds) between oppositely-charged ions. Explain the properties of ionic compounds limited to: a) high melting points and boiling points, in terms of forces between ions b) whether or not they conduct electricity as solids, when molten and in aqueous solution		End-of-topic tests. End of year exam (PPE). Mathematical skills will be assessed through examinations. The minimum level of mathematics in the foundation tier examination papers will be equivalent to Key Stage 3 mathematics. The minimum level of mathematics	recall and apply (list a) and which they are required to select from a list and apply (list b).	Actively seek ways to improve. Agile - Enquiring Independently identify questions and problems, justify their interest in them, and critically consider whether they are worth asking and solving. Use connections from across the curriculum to develop their enquiry, answering questions that are of real value to society both in and outside. ACP Analysing: Precision – Select appropriate skills	also be set as homework. There will be revision homework before each Census Assessment and Topic Test.

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			in the higher tier examination papers will be equivalent to foundation tier GCSE in Mathematics .		and conventions and use effectively to reach strong outcomes. Realising: Automaticity – Effortlessly use key facts, concepts and ideas relevant to the stage of learning. Draw upon a range of skills without the need to think or process	
Covalent Bonding	Explain how a covalent bond is formed when a pair of electrons is shared between two atoms. Recall that covalent bonding results in the formation of molecules. Explain the formation of simple molecular, covalent substances, using dot and cross diagrams, including a hydrogen	SC6a Covalent bonds			Connection finding (linking) to use connections from past experiences (KS3) Atoms into molecules into compounds and mixtures Self-regulation	Homework: retrieval quizzing which will assess both current learning and learning from

Unit:	Core knowledge/skill development:	Sequence:	Assessment:	Literacy, numeracy, PSHE, FBV, other links	Key areas of ACP and VAA development:	Home learning and enrichment
	b hydrogen chloride c water d methane e oxygen f carbon dioxide				to monitor, evaluate and self-correct as this topic	previous years. Home work will be set on Educake, Century Tech, Isaac Physics or Seneca Premium. Exam questions may also be set as homework. There will be revision homework before each Census Assessment and Topic Test.
Types of Substance	a)low melting points and boiling points, in terms of forces between molecules (intermolecular forces) b)poor conduction of electricity. Describe, using poly(ethene) as the example, that simple polymers consist of large molecules containing chains of carbon atoms. Recall that graphite and diamond are different forms of carbon and that they are examples of covalent giant molecular substances. Describe the structures of graphite and diamond. Explain, in terms of structure and bonding, why graphite is used to make electrodes and as a lubricant, whereas diamond is used in cutting tools. Explain the	SC7a Molecular compounds SC7b Allotropes of carbon SC7c Properties of metals SC7d Bonding models			**Complex and multi-step problem solving** to break down a task (e.g., equations), decide on a suitable approach, and then act. Start with a compound and break it down into its atoms. **Risk-taking** Being brave enough to work in unfamiliar contexts.	

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	properties of fullerenes including C60 and graphene in terms of their structures and bonding. Explain the properties of metals, including malleability and the ability to conduct electricity. Describe most metals as shiny solids which have high melting points, high density and are good conductors of electricity whereas most non-metals have low boiling points and are poor conductors. Describe the limitations of particular representations and models to include dot and cross, ball and stick models and two- and three-dimensional representations. Explain why elements and compounds can be classified as a)ionic b)covalent, simple molecular c)covalent, giant molecular d)metallic and how the structure and bonding of these types of substances results in different					

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	physical properties, including relative melting point and boiling point, relative solubility in water and ability to conduct electricity (as solids and in solution)					**Homework**: retrieval quizzing which will assess both current learning and learning from previous years. Home work will be set on Educake, Century Tech, Isaac Physics or Seneca Premium. Exam questions may

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						also be set as homework. There will be revision homework before each Census Assessment and Topic Test.
Switch to Ark Curriculum+ Science Mastery Course. Pearsons Active Learn and Science Mastery course were cross referenced to ensure all curriculum content was covered. This resulted in some Science Mastery topics being slightly shorter in length as the content may have already been covered.						
3.1 The Periodic Table	Students will study the structure of the periodic table, and the distinct properties of some of the groups within it, as well as the link between those properties and the electronic configurations of the elements. Finally students will look at the history of the periodic table and the contribution of Mendeleev. This unit falls under the big idea 'Structure Determines Properties'. Through this unit,	KS3: Students understand matter basics, including atoms, elements, compounds, mixtures, the particle model, physical vs. chemical changes, the Periodic Table, chemical symbols, and conservation of mass. As part of the active learning course, students have covered modern atomic structure, including subatomic particles, electronic configuration, and isotopes. 3.1.7 The Noble gases 3.1.8 The Alkali metals 3.1.9 The Halogens 3.1.10 Reactions of the halogens	Census point 1	Literacy: key words, definitions, summary notes. Numeracy: summary notes, equation practice, General maths skills (e.g. rearranging equations, graph plotting, standards form , SI prefixes)	**Connection finding (linking)** to use connections from past experiences (KS3) to seek generalisations in the topic **VVAs** **Hard Working: Practice** – Self-regulate and revise practice schedules	Homework is set on Seneca. Cognito can be used to support at home learning

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	students will be able to relate the atomic structure of an element to its chemical properties Key skills, like using standard form and order of magnitude calculations, are essential for interpreting large and small scales in science.	3.1.11 Transition Metals		Equations students are required to recall and apply and which they are required to select from a list and apply.	in line with improvements. Set own goals and monitor progress towards them. Actively seek ways to improve. Agile - Enquiring Independently identify questions and problems, justify their interest in them, and critically consider whether they are worth asking and solving. Use connections from across the curriculum to develop their enquiry, answering questions that are of real value to society both in and outside.	

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					ACP **Analysing: Precision** – Select appropriate skills and conventions and use effectively to reach strong outcomes. Realising: Automaticity – Effortlessly use key facts, concepts and ideas relevant to the stage of learning. Draw upon a range of skills without the need to think or process **Complex and multi-step problem solving** to break down a task (e.g., equations), decide on a suitable approach, and	

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					then act. Start with a compound and break it down into its atoms. **Risk-taking** Being brave enough to work in unfamiliar contexts.	
4.1 Structure and bonding	Students study the structure and bonding in metals and alloys. They will examine how the structure of a metal results in the typical metallic properties that they have learned about in Key Stage 3. Students will learn about the difference in structure between a pure metal and an alloy and be able to explain why this results in a difference in hardness.	This unit introduces students to a number of different kinds of substances, the bonding within these, their structures, and their resulting properties and uses. However, this has already been covered early in the year so the lessons listed below are the only aspect of the topic covered at this point. 4.1.2 Metals and Alloys **4.1.3 Alloys** 4.1.11 Nanoparticles **4.1.12 Nanoparticles**	Census point 1	Literacy: key words, definitions, summary notes. Numeracy: summary notes, equation practice, General maths skills (e.g. rearranging equations, graph plotting, standards form , SI prefixes)	**Connection finding (linking)** to use connections from past experiences (KS3) to seek generalisations in the topic **VVAs** **Hard Working: Practice** – Self-regulate and revise practice schedules in line with improvements.	Homework is set on Seneca. Cognito can be used to support at home learning

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				Equations students are required to recall and apply and which they are required to select from a list and apply.	Set own goals and monitor progress towards them. Actively seek ways to improve. Agile - Enquiring Independently identify questions and problems, justify their interest in them, and critically consider whether they are worth asking and solving. Use connections from across the curriculum to develop their enquiry, answering questions that are of real value to society both in and outside. ACP	

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					Analysing: **Precision** – Select appropriate skills and conventions and use effectively to reach strong outcomes. Realising: Automaticity – Effortlessly use key facts, concepts and ideas relevant to the stage of learning. Draw upon a range of skills without the need to think or process **Complex and multi-step problem solving** to break down a task (e.g., equations), decide on a suitable approach, and then act. Start	

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					with a compound and break it down into its atoms. Risk-taking Being brave enough to work in unfamiliar contexts.	
3.2 Introduction to quantitative chemistry	Students will begin with calculation of relative atomic mass and formula mass. The mole is introduced here, described in simple terms, and students will be taught to relate number of moles with the relative atomic and formula mass. Students will also be introduced to the term 'concentration' and will be able to calculate concentration given mass and volume. This will include the conversion between cm3 and dm3. The concept of uncertainly will be introduced for the first time here. Finally, students will study the process to prepare a soluble salt.	Prior to this unit, students have learned about conservation of mass and balancing equations. They should be familiar with the nature of chemical reactions, how we represent them as equations, and also have had practise balancing equations, which is a fundamental basis for this unit. 3.2.2 Relative formula mass 3.2.3 Percentage by mass 3.2.4 Conservation of water 3.2.5 Balancing equations 3.2.6 Uncertainty 3.2.7 Introducing concentration 3.2.8 Concentration calculations 3.2.9 Salts	Census point 1	Literacy: key words, definitions, summary notes. Numeracy: summary notes, equation practice, General maths skills (e.g. rearranging equations, graph plotting, standards form , SI prefixes)	Connection finding (linking) to use connections from past experiences (KS3) to seek generalisations in the topic VVAs Hard Working: Practice – Self-regulate and revise practice schedules in line with improvements.	Homework is set on Seneca. Cognito can be used to support at home learning

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		3.2.10 Making soluble salts		Equations students are required to recall and apply and which they are required to select from a list and apply.	Set own goals and monitor progress towards them. Actively seek ways to improve. Agile - Enquiring Independently identify questions and problems, justify their interest in them, and critically consider whether they are worth asking and solving. Use connections from across the curriculum to develop their enquiry, answering questions that are of real value to society both in and outside. ACP	

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					Analysing: **Precision** – Select appropriate skills and conventions and use effectively to reach strong outcomes. Realising: Automaticity – Effortlessly use key facts, concepts and ideas relevant to the stage of learning. Draw upon a range of skills without the need to think or process **Complex and multi-step problem solving** to break down a task (e.g., equations), decide on a suitable approach, and then act. Start	

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					with a compound and break it down into its atoms. Risk-taking Being brave enough to work in unfamiliar contexts.	
3.3 Using Resources	This unit covers how humans use different resources from the Earth, including metals, different materials and water, including the importance of water as a resource, how potable water is obtained, and how water can be tested. The second half of the unit introduces different resources that can be obtained from the Earth, with a particular focus on our responsibility to source these in a sustainable way. Students will be expected to be able to use life cycle assessments to determine the environmental impact of a	Before this unit, students studied separation techniques, wastewater treatment processes, and interactions between Earth systems and human impact. They explored nutrient recycling through decay, the water and rock cycles, weathering, erosion, metal properties, and reactions of metals with acids. 3.3.2 Treating water 3.3.2 Treating water required practical 3.3.4 Using materials 3.3.5 Life cycle assessments 3.3.6 Reduce reuse recycle 3.3.7 Evaluating impact 3.3.8 Sources of information	Census point 1	Literacy: key words, definitions, summary notes. Numeracy: summary notes, equation practice, General maths skills (e.g. rearranging equations, graph plotting, standards form , SI prefixes)	Connection finding (linking) to use connections from past experiences (KS3) to seek generalisations in the topic VVAs Hard Working: Practice – Self-regulate and revise practice schedules in line with improvements.	Homework is set on Seneca. Cognito can be used to support at home learning

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	material or product, and also to consider the advantages and disadvantages of various methods of disposal for waste.			Equations students are required to recall and apply and which they are required to select from a list and apply.	Set own goals and monitor progress towards them. Actively seek ways to improve. Agile - Enquiring Independently identify questions and problems, justify their interest in them, and critically consider whether they are worth asking and solving. Use connections from across the curriculum to develop their enquiry, answering questions that are of real value to society both in and outside. ACP	

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					Analysing: **Precision** – Select appropriate skills and conventions and use effectively to reach strong outcomes. Realising: Automaticity – Effortlessly use key facts, concepts and ideas relevant to the stage of learning. Draw upon a range of skills without the need to think or process **Complex and multi-step problem solving** to break down a task (e.g., equations), decide on a suitable approach, and then act. Start	

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					with a compound and break it down into its atoms. Risk-taking Being brave enough to work in unfamiliar contexts.	
4.2	This unit builds on prior knowledge of metal reactions, ions, ionic formulae, and bonding. Students will revisit displacement reactions and define oxidation and reduction in terms of both oxygen and electrons (for higher-tier students). They will be introduced to ionic and half equations, learning to write and interpret these outside the context of electrolysis to build confidence with the notation. Students will then explore electrolysis, starting with its principles and progressing to the electrolysis of molten ionic compounds and solutions, where competing ions are present. This includes the required practical, which reinforces the application of ionic and half equations.	In year 8 students will have encountered different types of chemical reaction, including oxidation reactions and acid and metal reactions. Later, in C3.2 Introduction to Quantitative Chemistry, students will have learned about writing balanced symbol equations and how to make soluble salts. Students have more recently learned about how ions are formed and the details of ionic bonding (in C4.1 Structure and Bonding). 4.2.1 The reactivity series review 4.2.2 Extraction of less reactive metals 4.2.3 ions and ionic bonding review 4.2.4 Ionic equations 4.2.5 Writing half equations 4.2.6 Writing half equations for the reactions of acids and metals	End of topic test	Literacy: key words, definitions, summary notes. Numeracy: summary notes, equation practice, General maths skills (e.g. rearranging equations, graph plotting, standards form , SI prefixes)	Connection finding (linking) to use connections from past experiences (KS3) to seek generalisations in the topic VVAs Hard Working: Practice – Self-regulate and revise practice schedules in line with improvements.	Homework is set on Seneca. Cognito can be used to support at home learning

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	The unit concludes with a focus on metals, examining corrosion and its prevention, alternative extraction methods, and the importance of recycling to conserve energy and resources. Students will connect this learning to prior knowledge of metal reactions and resource use, gaining an appreciation of sustainable practices in metal usage.	4.2.7 Introduction to electrolysis 4.2.8 Extraction of metals using electrolysis 4.2.9 Electrolysis of Molten ionic compounds 4.2.10 Electrolysis of solutions 4.2.11/12 Electrolysis of aqueous solutions practical 4.2.13 Corrosion and its prevention 4.2.14 Obtaining raw materials		Equations students are required to recall and apply and which they are required to select from a list and apply.	Set own goals and monitor progress towards them. Actively seek ways to improve. Agile - Enquiring Independently identify questions and problems, justify their interest in them, and critically consider whether they are worth asking and solving. Use connections from across the curriculum to develop their enquiry, answering questions that are of real value to society both in and outside. ACP	

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					with a compound and break it down into its atoms. **Risk-taking** Being brave enough to work in unfamiliar contexts.	
4.3 Quantitative Chemistry	This unit covers most of the key ideas about quantitative chemistry, including the mole and reacting masses calculations. It features a review of relative formula mass and percentage by mass and concentration, as well as the chemistry separate science concentration content. The unit also applies quantitative content to acids, alkalis and neutralisation reactions, with separate science students also looking at titrations and volumes of gases.	The key prior knowledge for this unit is from C3.2, where students were introduced to relative atomic mass, relative formula mass and percentage by mass. They should also be familiar with the preparation of a dry soluble salt from this unit, which will be revisited in acid and alkali reactions. They should also be familiar with concentration from C3.2 and be able to calculate concentration in g/dm3. 4.3.1 RFM review 4.3.4 Introducing the mole 4.3.3 mole calculations 4.3.4 Calculating concentrations review **4.3.5 Calculating concentration in moles** **4.3.6 Calculating unknown concentrations** 4.3.7 Amount of substances in equations 4.3.8 Limiting reactants	End of topic test	Literacy: key words, definitions, summary notes. Numeracy: summary notes, equation practice, General maths skills (e.g. rearranging equations, graph plotting, standards form , SI prefixes)	**Connection finding (linking)** to use connections from past experiences (KS3) to seek generalisations in the topic **VVAs** **Hard Working: Practice** – Self-regulate and revise practice schedules in line with improvements.	Homework is set on Seneca. Cognito can be used to support at home learning Homework is set on Seneca. Cognito can be used to support at home learning

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		4.3.9 Reactions of acids review 4.3.10 Acids, alkalis and neutralisation 4.3.11 Titrations practical 4.3.12 Analysis of titrations 4.3.13 Titration calculations 4.3.14 Strong and weak acids 4.3.15 Volume of gases		Equations students are required to recall and apply and which they are required to select from a list and apply.	Set own goals and monitor progress towards them. Actively seek ways to improve. Agile - Enquiring Independently identify questions and problems, justify their interest in them, and critically consider whether they are worth asking and solving. Use connections from across the curriculum to develop their enquiry, answering questions that are of real value to society both in and outside. ACP	

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4.4	This unit covers the topic of energy changes, including exothermic and endothermic reactions and the required practical of investigating temperature change. It also includes some chemistry only content, including the remaining quantitative topics of percentage yield and atom economy, and the chemistry of cells, batteries and fuel cells.	This unit includes prior knowledge from a number of different units within the big idea of reactions rearrange matter. Students should be clear on the differences between chemical reactions and physical 4.4.1 Chemical reactions review 4.4.2 Percentage yield 4.4.3 Atom economy 4.4.4 Exothermic and endothermic reactions 4.4.5 Energy in chemical reactions 4.4.6 Bond energies 4.4.7/8 Investigating temperature changes 4.4.9 Cells and batteries 4.4.10 Fuel cells	End of topic test	Literacy: key words, definitions, summary notes. Numeracy: summary notes, equation practice, General maths skills (e.g. rearranging equations, graph plotting, standards form , SI prefixes)	Connection finding (linking) to use connections from past experiences (KS3) to seek generalisations in the topic VVAs Hard Working: Practice – Self-regulate and revise practice schedules in line with improvements.	Homework is set on Seneca. Cognito can be used to support at home learning Homework is set on Seneca. Cognito can be used to support at home learning

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				Equations students are required to recall and apply and which they are required to select from a list and apply.	Set own goals and monitor progress towards them. Actively seek ways to improve. Agile - Enquiring Independently identify questions and problems, justify their interest in them, and critically consider whether they are worth asking and solving. Use connections from across the curriculum to develop their enquiry, answering questions that are of real value to society both in and outside. ACP	

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					Analysing: **Precision** – Select appropriate skills and conventions and use effectively to reach strong outcomes. Realising: Automaticity – Effortlessly use key facts, concepts and ideas relevant to the stage of learning. Draw upon a range of skills without the need to think or process **Complex and multi-step problem solving** to break down a task (e.g., equations), decide on a suitable approach, and then act. Start	

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					with a compound and break it down into its atoms. Risk-taking Being brave enough to work in unfamiliar contexts.	