



Science KS4 Long Term Map CHEMISTRY y9

Subject Intent/Aims

Expose all students to a broad range of learning opportunities to deepen their knowledge and understanding of themselves and the world around them and to build a solid foundation of Science knowledge and skills. We believe in developing curiosity and understand that science is an active process with many questions to be answered and still to be asked. We provide an understanding of how knowledge was derived, discovered and came to be accepted by the scientific community. By focusing on thinking, interpreting and evaluating rather than simply memorising scientific fact we intend to enable our students to use the skills that they need to answer their own scientific questions.

Our focus on the scientific process as a way of thinking and working will allow our students to develop their own ideas, attitudes and interpretations.

Atomic Structure and the periodic table

NATIONAL CURRICULUM: Atomic structure and the Periodic Table • a simple model of the atom consisting of the nucleus and electrons, relative atomic mass, electronic charge and isotopes • the number of particles in a given mass of a substance • the modern Periodic Table, showing elements arranged in order of atomic number • position of elements in the Periodic Table in relation to their atomic structure and arrangement of outer electrons • properties and trends in properties of elements in the same group • characteristic properties of metals and non-metals • chemical reactivity of elements in relation to their position in the Periodic Table. • separation techniques for mixtures of substances: filtration, crystallisation, chromatography, simple and fractional distillation

[GCSE Chemistry Specification Specification for first teaching in 2016 \(aqa.org.uk\)](https://www.aqa.org.uk/qualifications/gcse/science/specification)

composition

Understand Atomic structure and the Periodic table.

Understand the usefulness of different separating techniques

Structure bonding and the properties of matter

NATIONAL CURRICULUM: Structure, bonding and the properties of matter • changes of state of matter in terms of particle kinetics, energy transfers and the relative strength of chemical bonds and intermolecular forces • types of chemical bonding: ionic, covalent, and metallic • bulk properties of materials related to bonding and intermolecular forces • bonding of carbon leading to the vast array of natural and synthetic organic compounds that occur due to the ability of carbon to form families of similar compounds, chains and rings • structures, bonding and properties of diamond, graphite, fullerenes and graphene.

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composition

Apply an understanding of bonding and structures and be able to relate those structures to the properties of matter



<p>Component 1: know the term atom and the arrangement of subatomic particles.</p> <p>Component 2: know how and why elements are arranged in the PT</p> <p>Component 3: know group properties</p> <p>Component 4: Know methods to separate a mixture (filtration, evaporation, crystallisation, distillation) and the principles behind each method.</p>	<p>Component 1: Know the different types of bonding; ionic, covalent and metallic.</p> <p>Component 2: Know how to represent both ionic and covalent bonding using dot and cross diagrams.</p> <p>Component 3: Know suitable diagrams to show metallic bonding and delocalised electrons.</p> <p>Component 4: Know how to calculate the charge on the ions in an ionic compound.</p> <p>Component 5: Know the types of structures produced by the different types of bonding.</p> <p>Component 6: Know properties of each substance type, concentrating on the explanations</p> <p>Component 7: Know specific examples of bonding types</p>
composites	composites
<p>Draw and label the first 20 elements of the periodic table</p> <p>Explain why elements are in certain groups and periods</p> <p>Construct a timeline to show development of theories of atomic structure</p> <p>Compare models of the Periodic Table</p> <p>Select appropriate separation techniques for a range of mixtures</p>	<p>Describe the bonding in covalent and ionic compounds and metallic substances</p> <p>Determine the charges of ions from electronic structure</p> <p>Describe the properties of ionic, covalent and metallic substances</p> <p>Compare the structures and properties of graphite and diamond</p>
Higher Order Knowledge	Higher Order Knowledge
<p>Know the models of the atom developed over time</p> <p>Compare and contrast the ideas of the PT</p> <p>Know the reasons for using appropriate separation techniques</p>	<p>Know and explain the properties of specific examples based on structure and bonding.</p> <p>Know the new developments of graphene, fullerenes and nanoparticles</p>
<u>Key terms</u>	<u>Key terms</u>



Aqueous solution Atomic number Balanced symbol equation Electronic structure Law of conservation of mass Mass number Noble gases Periodic table State symbol Symbol equation Word equation Alkali metals Atom Chromatography Compound Electron Element Group Halogens Ion Isotope Neutron Nucleus (of an atom) Product Proton	Giant Lattice Ionic Bonding Covalent Bond Molecule Polymer Thermosoftening Polymer Delocalised Metallic Bonding Malleable Alloy States of Matter Nanoscience Nanoparticles Fullerenes
Final Composition/Deliberate Practice	Final Composition/Deliberate Practice
Modelling atomic structure Identifying suitable separation technique Undertake the required practical	Modelling different structures Identifying and comparing different structures of unknown materials
Summative/Formative assessment	Summative/Formative assessment



<p>Core questions RRR to recall prior knowledge will be tested at the beginning of each lesson and self-assessed by the student.</p> <p>Century nuggets</p> <p>LC for atomic structure and the PT</p> <p>End of unit assessment will be marked with personalised feedback</p>		<p>Core questions RRR to recall prior knowledgewill be tested at the beginning of each lesson and self-assessed by the student.</p> <p>Century nuggets</p> <p>LC for types of bonding and giant molecules</p> <p>End of unit assessment will be marked with personalised feedback</p> <p><i>End of year assessment will test recall and application of synoptic content</i></p>	
Numeracy	Literacy	Numeracy	Literacy
Maths skills – graphs, calculations	English – literacy skills – focusing on keywords, tier 3 vocabulary, connectives, SPAG, synonyms,	Maths skills – graphs, calculations	English – literacy skills – focusing on keywords, tier 3 vocabulary, connectives, SPAG, synonyms,
Cross curricular links		Cross curricular links	
<p>History: timelines of development</p> <p>MFL: origins of element names</p>		<p>Engineering: properties of pure metals and alloys</p> <p>Art: diagrams and modelling</p> <p>CS: use of graphene</p> <p>History the development of new technology</p>	
SMSC	British Value	RSHE	
<p><i>There will be multiple opportunities for students develop spiritually; being creative in their learning with the different activities they are asked to undertake</i></p> <p><i>The high expectations placed on the student from the school and department mean that pupils will regularly be made aware of the right and wrong</i></p> <p><i>Pupils are expected to share their views morally on the different topics but also show respect and appreciate others in the classroom.</i></p> <p><i>The topics will give the students opportunity to develop their social skills, from presenting work to collaborating in group tasks.</i></p>	<p><i>Students will be taught the legal implications of using the internet</i></p> <p><i>Students will be taught to fully appreciate other students' viewpoints and the importance of being respectful when sharing ideas</i></p> <p><i>Students will be taught the importance of selecting valid information from reliable sources for any presentation tasks that they do.</i></p> <p><i>Students are taught how to contribute to life in modern Britain by learning about the history of scientific progress</i></p> <p><i>Students will learn how to display British Values when working together in science lessons</i></p>	<p><i>The students will be taught about how to be safe online</i></p> <p><i>The students will be made aware of the importance of respecting other people's views</i></p>	



<p><u>Adapted Curriculum Content:</u></p> <p>This is a fundamental building block unit so all needs to be covered by all pupils. Wooden model atom boards are available to help visualise although it must be remembered that these still only represent 2D</p> <p>Separation techniques are limited to filtration, simple distillation and chromatography for all. Fractional distillation theory for higher only.</p>	<p><u>Adapted Curriculum Content:</u></p> <p>Nanoparticles are separate only</p>
<p><u>Adaptive Implementation Practices:</u></p> <p>Coloured paper/pens Differentiated worksheets Differentiated tasks Seating plans to maximise concentration allowing for visual/hearing impairments etc Appropriate use of IWB Dual coding Spare equipment Modelling experimental detail Pre drawn tables/graphs/diagrams to be labelled</p>	<p><u>Adaptive Implementation Practices:</u></p> <p>Coloured paper/pens Differentiated worksheets Differentiated tasks Seating plans to maximise concentration allowing for visual/hearing impairments etc Appropriate use of IWB Dual coding Spare equipment Modelling experimental detail Pre drawn tables/graphs/diagrams to be labelled</p>



St Philip Howard Catholic Voluntary Academy



Department Planning 2024





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