

## Year 10 Chemistry Sequence

	Content Taught	Reference	Essential knowledge	Assessment	Rationale
<b>YEAR 10 CHEMISTRY</b>					
<p>In Year 10, students develop their understanding of all content studied in year 7 to 9 which provides them with essential knowledge for key stage 4. All topics build upon challenging concepts from KS3 as well as developing essential knowledge for KS4 Chemistry.</p>					
<b>HT1</b>	<p><b>Atoms 4</b></p> <p>Students understand the structure of the atom, how the model developed over time and how Rutherford discovered the current model of the atom. Then moving on to how the periodic table was arranged over time.</p>	<p><b>4.1 Atomic structure and the periodic table</b></p> <p>4.1.1.1 4.1.1.3 4.1.1.4 4.1.1.5  4.1.1.6 4.1.1.7 4.1.1.2</p>	<p>Atoms, elements and compounds</p> <p>The development of the model of the atom (common content with physics)</p> <p>Relative electrical charges of subatomic particles</p> <p>Size and mass of atoms Relative atomic mass</p>	<p><b>Formative Assessment:</b> Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge. Homework tests are completed approximately every 3 lessons. Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p> <p><b>Summative Assessment:</b> Assessment is taken in class and covers all topics studied up to this point. Questions are taken from past exam papers and graded using typical grade boundaries from GCSE Chemistry exams. Assessment is completed in class based on prior learning. Recall</p>	<p>During this unit, students learn about atomic structure, including the history of the model of the atom and the relative size and mass. As a fundamental concept, this is required to understand following concepts in chemistry. It has been reordered to build on from atomic structure, into how the periodic table is</p>

			<p>Electronic structure</p> <p>Mixtures</p> <p><b>Wider reading:</b> <b>Periodic Tales - Hugh Aldersey-Williams</b></p> <p><b>The Disappearing Spoon - Sam Kean</b></p>	<p>testing, homework testing and exam questions form the basis of assessment for this half term. Assessment is taken in class and covers all topics studied up to this point.</p> <p>Topics covered: Working scientifically Atomic structure Questions are taken from past exam papers and graded using typical grade boundaries from GCSE Chemistry exams.</p>	<p>ordered. It builds on students' understanding of Energy in Y7 Physics and Forces in Y8.</p> <p>Following this, the students revisit some separation techniques from KS3 which are relevant at KS4, considering the atomic structure and its implications.</p>
<b>HT2</b>	<p><b>Bonding 1</b></p> <p>Students look at how atoms form bonds, looking initially at properties of materials to provide concrete ideas, then moving to the atomic level, and the formation of ions. Sound foundation in bonding will allow students to access all future topics, and so a good foundation is necessary to allow access to all future understanding.</p> <p><b>Separating substances 3</b></p> <p>In the last part of the topic, students gain understanding of pure and impure substances</p>	<p>4.2.1 Chemical bonds, ionic, covalent and metallic</p> <p>4.2.2.1</p> <p>4.2.1.1</p> <p>4.2.2.3</p> <p>4.2.1.3</p> <p>4.2.2.6</p> <p>4.2.2.4</p>	<p>Chemical bonds</p> <p>Properties of ionic compounds</p> <p>Ionic compounds</p> <p>Giant covalent structures</p> <p>Properties of small molecules</p> <p>Solubility</p> <p><b>Consolidation reading:</b> <a href="https://www.science newsforstudents.org/article/ex">https://www.science newsforstudents.org/article/ex</a></p>	<p><b>Formative Assessment:</b> Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge. Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p> <p><b>Summative Assessment:</b> Assessment is taken in class and covers all topics studied up to this point. Topics covered: Working scientifically Atomic structure Chemical analysis Bonding Questions are taken from past exam papers and graded using typical grade</p>	<p>Chemical analysis then allows the students to view chemistry holistically, in context, considering how the subject is used in industrial settings and key tests, needed in Biology and throughout the remainder of the Chemistry course.</p> <p>Following this, bonding is briefly touched upon, looking primarily at structures and</p>

	and how the molecules could be separated using chromatography.		<a href="#">plainer-what-are-chemical-bonds</a>	boundaries from GCSE Chemistry exams.	properties, building concrete ideas before moving on to the abstract, to be taught at the start of year 10 with a subject specialist where it is revisited and linked to properties.
<b>HT3</b>	<p><b>Quantitative Chemistry 1</b></p> <p>Students understand the concept of conservation of mass, linking this to the convention of using moles as a measurement of a specific number of particles or molecules. This can then be used to calculate unknown masses and concentrations.</p> <p>Triple science: Students then consider yields from reactions and atom economy to evaluate chemical reactions efficiency.</p>	<p><b>4.3 Quantitative Chemistry</b></p> <p>4.3.1</p> <p>4.3.2</p> <p>4.3.3</p> <p>4.3.4</p> <p>4.3.5</p>	<p>Chemical measurements, conservation of mass and the quantitative interpretation of chemical equations</p> <p>Use of amount of substance in relation to masses of pure substances</p> <p>Yield and atom economy of chemical reactions</p> <p>Using concentrations of solutions in mol/dm<sup>3</sup></p> <p>Use of amount of substance in relation to volumes of gases</p>	<p><b>Formative Assessment:</b></p> <p>Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge.</p> <p>Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p> <p><b>Summative Assessment:</b></p> <p>Assessment is completed in class based on prior learning. Recall testing, homework testing and exam questions form the basis of assessment for this half term.</p>	<p>Students then consider calculations in chemistry, building on understanding from physics calculations and algebraic manipulation in maths to use formulae.</p> <p>Following this topic, students consider reactions of acids and the extraction of metals which they have been introduced to in technology Y8 in their use and pH and acids Y8 topic chemical reactions and in Y9 Biology in enzymes, part of the digestive system topic.</p>

			<b>Consolidation reading:</b> <a href="https://www.chemicals.co.uk/blog/gcse-revision-quantitative-chemistry">https://www.chemicals.co.uk/blog/gcse-revision-quantitative-chemistry</a>		Students who take separate science also complete titration calculations, further building on quantitative chemistry, physics' use of equations and algebraic manipulation in maths. This also incorporates the reading and use of graphs, first studied in Y8 and 9 Maths.
<b>HT4</b>	<b>Chemical changes 2</b> Students are introduced to reactivity and its' importance in the extraction of metals. This then leads the students to understand metals' reactions with acids, then oxides, hydroxides and carbonates.  Triple only: Students carry out titrations to calculate unknown concentrations of acids and bases.  Following this, all students then apply their knowledge from bonding to understand how electrolysis is used to split compounds and extract elements from compounds.	4.4 Chemical changes 4.4.1 4.4.2 4.4.3	<b>Chemical Changes</b> Reactivity of metals  Reactions of acids  Electrolysis  <b>Deeper reading:</b> <a href="https://docbrown.info/page04/Mextract.htm">https://docbrown.info/page04/Mextract.htm</a>	<b>Formative Assessment:</b> Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge. Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.  <b>Summative Assessment:</b> Assessment is taken in class and covers all topics studied up to this point. Topics covered: Working scientifically Atomic structure Chemical analysis Bonding Quantitative Chemistry Chemical changes Questions are taken from past exam papers and graded using typical grade boundaries from GCSE Chemistry exams.	The electrolysis section of this topic builds on students understanding of atomic structure, bonding and electricity from Y9 Physics to understand the process of separating compounds using electricity.  Graphs are further understood in energy changes, constructing graphs during
<b>HT5</b>	<b>Chemical changes 2</b>	4.4 Chemical changes	<b>Chemical Changes</b>	<b>Formative Assessment:</b>	Graphs are further understood in energy changes, constructing graphs during

	<p>Leading on from electrolysis previously, students understand how aqueous solutions are separated in electrolysis, relating back to the reactivity series.</p> <p><b>Energy changes 2</b> Students understand how reactions are either exothermic or endothermic, and understand how these reactions can be shown with energy profiles. Students then calculate enthalpy change from bond energy data.</p> <p>Triple: students understand fuel cells, how they work and applications in single-use, rechargeable and hydrogen fuel cells.</p>	<p>4.4.3</p> <p>4.5 Energy changes</p> <p>4.5.1</p> <p>4.5.2</p>	<p>Electrolysis</p> <p>Exothermic and endothermic reactions</p> <p>Chemical cells and fuel cells</p> <p><b>Wider reading:</b> <a href="https://www.britannica.com/science/chemical-reaction/Precipitation-reactions">https://www.britannica.com/science/chemical-reaction/Precipitation-reactions</a></p> <p><a href="https://letstalkscience.ca/educational-resources/stem-in-context/cold-pack-a-chilly-example-endothermic-reaction">https://letstalkscience.ca/educational-resources/stem-in-context/cold-pack-a-chilly-example-endothermic-reaction</a></p>	<p>Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge. H</p> <p>Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p> <p><b>Summative Assessment:</b> Assessment is completed in class based on prior learning. Recall testing, homework testing and exam questions form the basis of assessment for this half term.</p>	<p>experiments and sketch graphs of energy changes.</p> <p>Chemical and fuel cells, covered only by separate science builds on students understanding of electricity and electrolysis to understand the concept of fuel cells.</p> <p>The students then look at rates of reaction, using graph skills from Maths and speed in Physics. Following this, equilibria is covered, to be further understood at A Level.</p>
HT6	<p><b>Rate of reaction 2</b> Students look at how the speed of chemical reactions can be measured and calculated. Then, how reaction speed can be altered by changing the conditions.</p>	<p>4.6 The rate and extent of chemical change</p> <p>4.6.1</p> <p>4.6.2</p>	<p>Rate of reactions</p> <p>Reversible reactions and dynamic equilibrium</p>	<p><b>Formative Assessment:</b> Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge.</p> <p>Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p>	

	<p>Students learn to define a system at equilibria, and how they can be manipulated to change the yield of a reaction.</p>		<p><b>Deeper reading:</b>  <a href="https://www.birmingham.ac.uk/teachers/study-resources/stem/chemistry/reaction-rates.aspx">https://www.birmingham.ac.uk/teachers/study-resources/stem/chemistry/reaction-rates.aspx</a></p> <p><b>Consolidation reading:</b>  <a href="https://www.poundchem.com/2017/05/08/equilibria/">https://www.poundchem.com/2017/05/08/equilibria/</a></p>	<p><b>Summative Assessment:</b>  Assessment is taken in class and covers all topics studied up to this point.  Topics covered:  Working scientifically  Atomic structure  Chemical analysis  Bonding  Quantitative Chemistry  Chemical changes  Rate of chemical change  Questions are taken from past exam papers and graded using typical grade boundaries from GCSE Chemistry exams.</p>	
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