

Year 7 Chemistry Curriculum – 2020-21

Year 7 Chemistry Curriculum – 2020-21						
	Autumn Term		Spring Term		Summer Term	
	1	2	1	2	1	2
Key Concepts	The particulate nature of matter		Chemical reactions		Earth and atmosphere	
National Curriculum Knowledge & Understanding	<p>Particle Model</p> <ul style="list-style-type: none"> * The properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure * Changes of state in terms of the particle model. * Conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving * Similarities and differences, including density differences, 	<p>Pure and Impure substances</p> <ul style="list-style-type: none"> * The concept of a pure substance * Mixtures, including dissolving * Diffusion in terms of the particle model * Simple techniques for separating mixtures: filtration, distillation and chromatography * The identification of pure substances. 	<p>Acids and Alkalis</p> <ul style="list-style-type: none"> * Defining acids and alkalis in terms of neutralisation reactions * The pH scale for measuring acidity/alkalinity; and indicators * Chemical reactions as the rearrangement of atoms * Representing chemical reactions using equations 	<p>Metals and Non-Metals</p> <ul style="list-style-type: none"> * The Periodic Table * The properties of metals and non-metals * Chemical reactions as the rearrangement of atoms * Representing chemical reactions using equations * The chemical properties of metal and non-metal oxides with respect to acidity * Reactions of acids with metals to produce a salt plus hydrogen * Reactions of acids with alkalis to 	<p>Earths Structure</p> <ul style="list-style-type: none"> * The composition of the Earth * The structure of the Earth * The rock cycle and the formation of igneous, sedimentary and metamorphic rocks * Properties of ceramics. 	<p>Beyond the Atmosphere</p> <ul style="list-style-type: none"> * Our Sun as a star, other stars in our galaxy, other galaxies * The seasons and the Earth's tilt, day length at different times of year, in different hemispheres * The light year as a unit of astronomical distance * Use and derive simple equations and carry out appropriate calculations * Undertake basic data analysis including simple statistical techniques.

	<p>between solids, liquids and gases</p> <ul style="list-style-type: none"> * Brownian motion in gases * Diffusion in liquids and gases driven by differences in concentration * The difference between chemical and physical changes 			produce a salt plus water		
Assessment	<p>End of Unit Assessment</p> <p>Badger Assessment</p>	<p>End of Unit Assessment</p> <p>Badger Assessment</p> <p>End of term Summative Assessment</p>	<p>End of Unit Assessment</p> <p>Badger Assessment</p>	<p>End of Unit Assessment</p> <p>Badger Assessment</p> <p>End of term Summative Assessment</p>	<p>End of Unit Assessment</p> <p>Badger Assessment</p>	<p>End of Unit Assessment</p> <p>Badger Assessment</p> <p>End of term Summative Assessment</p>
Why this? Why now?	<p>A basic understanding of the particle model is the heart of all branches of chemistry which is why it is the first module to be taught in year 7 chemistry. This must be studied at this point as the module Pure and</p>	<p>Pupils have prior knowledge of solutions from KS2. This will be built on enabling pupils to explain how separation techniques work. Pure and Impure substances is taught early in year 7 as it develops aspects of the</p>	<p>Acids and Alkalis is taught at this point as pupils now know all substances are made up of particles, but an understanding of neutralisation has to be addressed before pupils can begin to study the Metals and Non-metals topic, when</p>	<p>This learning module is at this point as it takes concepts from each of the previous modules i.e particles, solutions, and neutralisation and sews them together, while still opening opportunities for continual learning</p>	<p>From KS2 pupils will already know fossils are found in rocks. This unit is taught later in the year as pupils needed to previously learn about mixtures in Pure and Impure Substances and the concept of acids before chemical</p>	<p>This topic links to KS2 as pupils were taught about Earth and Space. This now triangulates making ties with the previous topic of Earths Structure and the Particle Model, as pupils will discover that the outer planets are made from gas,</p>

	<p>Impure Substances involves the movement of particles. It references links to aspects of cell transport i.e diffusion in Year 7 Biology; in physics pupils need to be able to apply this model to the Sound module which is taught later in the term when pupils need to be able to explain why sound travels at different speeds in solids, liquids and gases. Pupils will also use the particle model to help access changes in state in the module Heating and Cooling later in year 8.</p>	<p>Particle Model module such as substances are made from particles and these can be a mixture or pure substances. It is a prerequisite for the topic Acids and Alkalis, as separation techniques are studied, which need to be used to separate a salt from solution. Metals and Non-metals which comes later in the term as pupils will learn that these substances are pure and that their reactions can produce solutions. In year 8 pupils will study Climate and need to be aware that air is a mixture and there is a cross curricular link to Biology, where in the module Gas</p>	<p>different types of neutralisation reactions are investigated. They will be introduced to the concept of chemical equations which will continue throughout their studies of chemistry. Further application of Acids and Alkalis is needed for study in year 9 where pupils will build on prior knowledge that some gases are acidic and damage the environment in the topic of New Technology. Further cross curricular links are made to develop the use of word equation in Cellular Respiration in year 8 enabling pupils to complete equations to represent</p>	<p>in subsequent modules. For example, in Types of Reaction in year 8, where conservation of mass is covered. It introduces the basic periodic table leading to a more detailed study early on in Year 8 in the module The Periodic Table.</p>	<p>weathering in the rock cycle could be understood. This unit will explore rock classification and the abstract notion that rock recycling can produce different types of rocks, leading to how materials can have different properties, which will be developed in more detail in year 8 when pupils study polymers in the early topic of Atoms, Elements and Compounds.</p>	<p>whereas the inner planets are made from rock, like the Earth.</p>
--	--	--	---	--	--	--

		Exchange Systems in year 8 pupils will learn air is breathed in, challenging the misconception that only oxygen is inhaled.	photosynthesis and respiration.			
Skills & Characteristics	Attributes of this topic will develop opportunities for collaborative learning as pupils will work together on practical group work investigating for e.g. melting and boiling points. They will build resilience when their own misconceptions are challenged. Creative thinking skills are applied as pupils will apply their knowledge to predicting states when looking at melting and boiling points.	This topic is at the forefront for building collaborative skills as pupils will work together carrying out various separation techniques. They will also be creative when applying the results of the investigations e.g. chromatography to scientific reasoning.	Pupils will continue with collaborative laboratory skills, where they will work in groups investigating indicators and the pH scale. New gained knowledge will be applied creatively as they explain how acids and alkalis can be used in the body or by how acidic lakes can be neutralised.	Practical work in this module will allow collaborative learners to look at patterns in the reactions studied, for e.g. metals and water and acid. Pupils will then apply their understanding to their findings, for example why some metals need more than just water to make them react. Pupils will use a range of laboratory skills, such as measuring, observing and recording data.	Pupils will foster a creative approach as they analyse the results of practical work and make connections with how of different types of rocks can be formed, but also how their physical properties are dependent on this.	Pupils will understand that being a scientist requires a high degree of resilience. They will see that models to explain the solar system have changed over time and that in collaborative learning discussion between colleagues is important. For e.g. how the heliocentric model of the solar system has come about. They should then apply this to their own learning.

<p>Aspirations & Careers</p>	<p>The science involved in this area correlates with:- * Particle physicist * Coffee manufacturing CDI: 4, 5, 6</p>	<p>The science involved in this area correlates with:- * Vaccine production * Food technology * Testing beverages CDI: 4, 5, 6</p>	<p>The science involved in this area correlates with:- * Pharmaceuticals * Pottery * Production of paints CDI: 4, 5, 6</p>	<p>The science involved in this area correlates with:- * Chemical technician * Medicines CDI: 4, 5, 6</p>	<p>The science involved in this area correlates with:- * Geologist * Geophysics * Volcanologist CDI: 4, 5, 6</p>	<p>The science involved in this area correlates with:- * Cosmology * Astrobiology * Travel and Tourism CDI: 4, 5, 6</p>
----------------------------------	--	--	--	--	--	---

Year 8 Chemistry Curriculum – 2021-2022

	Autumn Term		Spring Term		Summer Term	
	1	2	1	2	1	2
Key Concepts	Matter		Chemical reactions		Earth and atmosphere	
National Curriculum Knowledge & Understanding	Atoms, Elements and Compounds * A simple (Dalton) atomic model * Differences between atoms, elements and compounds * Chemical symbols and formulae for elements and compounds * Representing chemical reactions using formulae and using equations * Polymers and composites	The Periodic Table * The varying physical and chemical properties of different elements * The principles underpinning the Mendeleev Periodic Table * Periods and groups; metals and non-metals * How patterns in reactions can be predicted with reference to the Periodic Table	Types of reaction * Chemical reactions as the rearrangement of atoms * Combustion, thermal decomposition and displacement reactions * Conservation of mass changes of state and chemical reactions.	Chemical Energy * Energy changes on changes of state (qualitative) * Exothermic and endothermic chemical reactions (qualitative) * What catalysts do.	Climate * The carbon cycle * The composition of the atmosphere * The production of carbon dioxide by human activity and the impact on climate	Earth's Resources * The order of metals and carbon in the reactivity series * The use of carbon in obtaining metals from metal oxides * Earth as a source of limited resources and the efficacy of recycling
Assessment	End of Unit Assessment Badger Assessment	End of Unit Assessment Badger Assessment End of term Summative Assessment	End of Unit Assessment Badger Assessment	End of Unit Assessment Badger Assessment End of term Summative Assessment	End of Unit Assessment Badger Assessment	End of Unit Assessment Badger Assessment End of term Summative Assessment

<p>Why this? Why now?</p>	<p>Atoms, Elements and Compounds is taught at this point as pupils now understand that all substances are made from particles. This will now be developed further to relate to the atom as well as making prior links with concepts from Metals and Non-metals and the basic structure of the periodic table. Further links are made back to the Earths Structure module, where pupils were introduced to the notion of properties of compounds. Pupils have previously studied word equations in the topic Acids and Alkalis, Metals and Non-metals, which will now increase in</p>	<p>Pupils have met several concepts underpinning the big picture of this Periodic Table topic of learning. For example, atoms and elements from the previous module, Pure and Impure Substances at the beginning of year 7 and Metals and Non-metals from later in year 7. Conclusions can be drawn, while opening new areas of learning in year 9, where pupils will investigate how the Periodic Table was developed.</p>	<p>This topic builds on knowledge from the Year 7 overarching modules from Chemical Reactions in terms of Acids and Alkalis. It further practices chemical equations and from Metals and Non-metals where the reactions of metals with acids was studied. This will now develop the rearrangement of atoms linking it to the conservation of mass, while also being an introduction to studying reactions and changes in energy in the following topic of Chemical Energy.</p>	<p>This topic is taught later in year 8 as concepts within are becoming increasingly more complex to include energy level diagrams, of which an understanding of energy from the year 7 Physics topic of Energy is drawn i.e. Energy as a quantity that can be quantified and calculated where they will link this to endothermic and exothermic reactions by making calculations is needed. It introduces the definition of a catalyst and how a catalytic converter works which will then be linked to the later topic of Climate when will see how this equipment can be used to reduce the</p>	<p>By this point, pupils will know from the Periodic Table earlier in the year that carbon is a non-metal element and from the Atoms, Elements and Compounds topic that it is also a constituent of the compound carbon dioxide. In year 7 Interdependence module pupils studied food chains and this is a precursor for the understanding of the carbon cycle. Earlier in year 8 from the biology topic of Cellular Respiration pupils will know that carbon dioxide is produced in respiration, and from the topic Photosynthesis that it is a reactant for the process of photosynthesis.</p>	<p>The final topic is taught at this point as it has prior links to year 7 Metals and Non-metals such as properties of metals also to Earth's Structure in year 7, where pupils met the concept of recycling rocks. This was the starting point for discovering where these metals originate from i.e. in the Earths crust. As pupils now comprehend chemical reactions, they can now apply this to understand how metal extraction depends on chemical reactions. Further to this they will make links back to the previous topic of Climate to explain that the recycling of metals</p>
-------------------------------	--	---	--	--	--	---

	<p>complexity as they are introduced to chemical formulae to represent elements, compounds and molecules. This will be carried across to the biology topic Cellular Respiration which is taught later in year 8 so pupils can build on the word equation and can subsequently challenge their knowledge to use chemical formulae to show the relevant equations, rather than just using word equations.</p>			<p>impact humans have on the environment.</p>	<p>This module will draw on these cross curricular key themes so that the processes behind the recycling of carbon can be studied. It also incorporates knowledge of radiation from the earlier topic in Year 8, Heating and Cooling in Physics.</p>	<p>is more advantageous to the environment in terms of reducing carbon footprint.</p>
<p>Skills & Characteristics</p>	<p>Pupils will be creative in their thinking as they apply knowledge of atoms and compounds to the</p>	<p>Pupils will continue developing collaborative skills as they carry out and discuss results of investigations such as</p>	<p>Pupils will be exposed to many opportunities to collaborative skills as they continue working in groups during practical</p>	<p>In this section pupils will further enhance creativity by being able to apply science to the outside world and for e.g. how</p>	<p>The main characteristics of the Climate module encompass creativity as pupils have to make links between different</p>	<p>Skills available for pupils to develop within this topic include resilience as they will look at the results of their experiments;</p>

	rearrangement of them.	displacement reactions of group 7.	lessons for e.g. when studying combustion and thermal decomposition enhancing communication skills as they do so. In turn this will lead to opportunities for creativity as they apply scientific understanding to the conclusion of the investigation.	energy changes can be harnessed to benefit us in sport packs for injuries.	topics e.g. the carbon cycle with respiration and photosynthesis.	collaboration skills as they will work together on group work for example when extracting metals from their ores; creativity as they will need to justify the choice of metal extraction and apply understanding as to why it is important to recycle the Earth's resources.
Aspirations & Careers	The science involved in this area correlates with:- * Chemical engineer * Energy manager * Production manager CDI: 4, 5, 6	The science involved in this area correlates with:- * Furniture designer * Chemical metallurgist * Chemist CDI: 4, 5, 6	The science involved in this area correlates with:- * Chemical technician * Teacher of chemistry * Forensic scientist CDI: 4, 5, 6	The science involved in this area correlates with:- * Product design * Chemical engineer * Research scientist CDI: 4, 5, 6	The science involved in this area correlates with:- * Gardener * Farmer * Environmental scientist CDI: 4, 5, 6	The science involved in this area correlates with:- * Recycling operative * Chartered engineer * Mining CDI: 4, 5, 6

Year 9 Curriculum Chemistry – 2022-23

	Autumn Term		Spring Term		Summer Term	
	1	2	1	2	1	2
Key Concepts	New Technology in Chemistry		Turning Points in Chemistry		Detection in Chemistry	
National Curriculum Knowledge & Understanding	<p>Nanoparticles</p> <p>In this topic pupils will look at the applications of chemistry and learn about nanoparticles. They will be able to describe what a nanoparticle is, investigate their uses and what future problems they might impose by examining data and evidence. Pupils will carry out supporting practical work by investigating sunscreens.</p>	<p>Cars and the future</p> <p>In this topic pupils will build on their existing knowledge to deepen their understanding of air pollution, combustion, and alternatives to fossil fuels. Pupils will continue to incorporate aspects of chemistry such as chemical equations and types of chemical reactions such as combustion. They will use data sources to be able to make comparisons between advantages and disadvantages of</p>	<p>Changes in theories</p> <p>This topic is essential for pupils to understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review as they will be presented with historical evidence in the development of the structure of the atom while building on understanding of atoms, elements and compounds</p>	<p>Changes in theories</p> <p>This topic will continue with the themes of working scientifically while incorporating strands of chemistry such as the particle nature of matter, atoms, elements and compounds and the Periodic Table. There will be links to the Earth and its structure through the investigation of fossils to help pupils present reasoned explanations, including explaining data in relation to</p>	<p>Forensics</p> <p>Pupils will build on their previous knowledge of the particulate nature of matter and pure and impure substances and apply this to problem solving, whereby pupils will select, plan and carry out the most appropriate types of scientific enquires to test their predictions on separating substances. This will demonstrate to pupils how scientific techniques are incorporated into different careers</p>	<p>Forensics</p> <p>This topic will continue with the application of chemistry techniques to careers, while making links to chemical reactions and materials. Pupils will continue to deepen and embed understanding of natural and man-made polymers and their effects on the environment.</p>

		different fuels and types of cars.	from earlier KS3. They will also interpret observations and data to identify patterns, use observations and measurements to draw conclusions.	predictions and hypotheses.	such as forensics and laboratory work.	
Assessment	Assessed project comprising of unit test, practical assessment of skills in while investigating how well sunscreens work.	Assessed project comprising of an end of unit test, practical assessment of skills while investigating the combustion of different fuels.	Mid topic assessment	Assessed project comprising of an end of unit test, practical assessment of skills while investigating the formation of fossils.	Assessed project comprising of a unit test, practical assessment of skills while investigating separation techniques.	Assessed project comprising of an end of unit test, practical assessment of skills while investigating the reactivity series and properties of polymers.
Why this? Why now?	At this point pupils should already understand the particulate nature of matter from year 7 and atoms, elements, and compounds from year 8. They will now build on this by learning about nanoparticles and how they can	Prior to this, pupils have studied chemical reactions, such as combustion, energetics in physics, materials and the Earth and the atmosphere. This unit will incorporate strands of each of these units and	Pupils should have a good understanding of atoms as they have previously studied them in year 7 in the particle model; in year 8 in atoms, elements, and compounds. However, they have not considered how we know	This topic will continue embedding how and why chemistry models have changed over time. This time, pupils will examine the historical development of the periodic table. They have basic knowledge of the	By now pupils should have a secure understanding of pure and impure substances and methods of separation. Pupils will now be given the opportunity to apply this understanding to make predictions,	This topic uses different aspects of chemistry from year 7 and 8. It depends on knowledge from atoms, elements and compounds and recycling in year 8 and nanoparticles from earlier in year 9. Pupils will continue

	<p>change the properties of materials. Pupils mathematical skills should be developed enough by this stage to complete relevant calculations and conversions of units.</p>	<p>intertwine them so that pupils can apply the science to the modern world, while also applying concepts such as hybrid cars to the future.</p>	<p>about the structure of atoms and the subatomic parts of the atom. This module will focus on how scientific theories change. By this point pupils' skills should be developed enough for them to objectively evaluate what makes a good model and realise when newer models need to be proposed. This will enable them to study the history of the atom in more depth at KS4.</p>	<p>structure of the Periodic Table from year 8, but now they will learn the stages of its development. This knowledge will then be utilised and developed in greater depth at KS4. Pupils have previously studied fossils at KS2 and cross curricular links will be forged with inheritance and evolution in biology to show how explanations are modified to take into account new evidence.</p>	<p>while selecting which method to use. This will then be applied to modern day careers. Good practical planning and investigative skills are important to develop before progress in to KS4</p>	<p>developing their planning and investigative skills to allow them to progress further at KS4.</p>
<p>Skills & Characteristics</p>	<p>Resilience Being able to look at practical results, identify anomalies and carrying out repeats are all essential skills to build resilience</p> <p>Collaboration Lessons involve practical group work to improve lab skills and communication. Pupils understand the importance of discussion and peer review in the scientific community.</p> <p>Creativity Application of knowledge and logical thinking skills are integral to scientific investigation</p>					

Aspirations & Careers	<p>CEIAG</p> <p>Medical Experience days: These events link with scientific content and bring 'real-life', everyday experiences into the classroom which specifically link to new technology in chemistry and working scientifically in the curriculum. CDI: 4, 5, 6, 7</p> <p>Careers Fairs: Provides an opportunity to students to practice presenting themselves in front of potential employers. This is also a great way for students to compare employers, and find out what area of science/ scientific skills they need to focus on in the classroom in order to be considered for future posts. CDI: 4, 5, 6, 7</p> <p>Work Experience: Students are introduced to different scientific skills by work colleagues during work experience which includes; the ability to problem solve, handling/ analysing data and communicate effectively. All skills which are used daily during day – to day lessons. CDI: 11, 12</p> <p>Cultural Capital</p> <p>Pupils are encouraged to make links between current events, like using hybrid vehicles and climate change and our Chemistry learning in the classroom.</p> <p>All pupils take advantage of our excellent links with the RSC and Newcastle University for off site visits and in school activities.</p> <p>Extracurricular</p> <p>Stem Club: Help to inspire, attract and develop STEM talents during school. The purpose of a STEM club is to raise student's engagement and achievement in these subject areas.</p>
-----------------------	--