

Year 7 Chemistry						
Term	1	2	3	4	5	6
Topic Title	In the Lab!	Particle model and their behaviour	Elements, atoms and compounds	Chemical Reactions		Acids and Alkalis
Rationale	The Year 7 pupils are in a new environment and must learn new techniques and how to use new apparatus safely. Hence it is essential that they learn about the necessary safety and actions scientists use in the laboratory before practicals are undertaken.	Particular nature of systems and changes of state are taught initially in Year 7 as a core principle to all topics taught later at KS3. Pupils will be expected to apply the core principles and properties of matter as they study chemical reactions, physical changes and elements, atoms and compounds.	Elements, atoms and compounds build upon the particular nature of systems where they meet the types of atomic particles, elements and compounds. Again the knowledge of key of these terms and examples of elements and use of the periodic table will form a major part of subsequent topics and builds on the materials topic at KS2.	Having met chemical symbols in the previous part of the course, the pupils start to study types of chemical reactions. As a consequence they have knowledge of using symbols and ideas about elements and compounds which are important for this topic, as they will start to meet chemical equations and be able to recognise symbols and formulae.		This follows up on the topic studied on chemical reactions, where pupils apply some of the reactions studied. They start to focus on types of chemicals and writing word equations for specific reactions. Hence a knowledge of chemical symbols, elements, compounds and particular nature is important before covering this work.
Prior knowledge	Safety is important in a laboratory, be able to state precautions scientist take to reduce hazards and accidents.	Different materials have different properties. Changes of state are reversible. Many materials exist as solids, liquids and gases. The state of a materials depends on temperature.	Different materials have different properties. The different properties of different materials make them suitable for different uses.	Changes of state are reversible. Melting, freezing, evaporating, boiling and condensing are changes of state. Changes that form new materials are not reversible.		Changes that form new materials are not reversible. Changes that are not reversible include burning, oxidation and reactions of acids.
Key knowledge/skills development	Writing chemical formulae of ionic compounds, using equations, writing balanced symbol equations, molar calculations	The particulate nature of matter <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. 	Atoms, elements and compounds <ul style="list-style-type: none"> a simple (Dalton) atomic model differences between atoms, elements and compounds chemical symbols and formulae for elements and compounds 	Chemical reactions <ul style="list-style-type: none"> chemical reactions as the rearrangement of atoms representing chemical reactions using formulae and using equations combustion, thermal decomposition, oxidation and displacement reactions conservation of mass changes of state and chemical reactions energy changes on changes of state (qualitative) exothermic and endothermic chemical reactions (qualitative). 		<ul style="list-style-type: none"> defining acids and alkalis in terms of neutralisation reactions the pH scale for measuring acidity/alkalinity; and indicators reactions of acids with metals to produce a salt plus hydrogen reactions of acids with alkalis to produce a salt plus water
National Curriculum/specification links	N/A	C1:1.1-1.7	C1: 2.1-2.4	C1: 3.1-3.6		C1: 4.1-4.4
Literacy	Key words for new equipment etc. Writing and interpretation of Lab rules	Chemistry SLG literacy homework	Chemistry molecules literacy homework	Scientific literacy chemical reactions		Chemistry acids and alkalis literacy homework
Numeracy	Using data tables record experimental data	plotting graphs of recorded data, Lines of best fit.	Recording data for energy in exothermic and endothermic reactions, Calculating masses during conservation of mass.	Balancing equations, measuring temperature changes.		measuring and recording data for neutralisations, using pH scale.
STEM	Developing scientific knowledge of basic equipment and uses. Collaboration Critical thinking Analytical Rationalise	particle theory STEM tasks - A variety of different STEM activities with particle theory as its base, include work on diffusion, changing states of matter and gas pressure. Problem Solving Communication Collaboration Critical thinking Reflectivity Quantitative Analytical Rationalise	Atoms and elements Stem tasks - a range of task with a specific focus on exploring different elements and their properties. Involves research tasks, video exercise and stem bingo games. Problem Solving Communication Collaboration Critical thinking Reflectivity Analytical	Chemical reaction STEM tasks - huge range of different stem activities from exciting fireworks demonstrations, burning hands, whoosh bottle as well as engineering challenges such as designing effective fire extinguishers. Problem Solving Communication Collaboration Critical thinking Reflectivity Analytical Rationalise		pH and indicators stem task - Tasks involve students discovering what natural substances can be used as indicators, investigating what will happen to shelled creatures if ocean pHs fall and how to treat different stings using knowledge of pH. Problem Solving Communication Collaboration Critical thinking Reflectivity Quantitative Analytical Rationalise
Cross curricular links	In the lab (Development of vocab for science, equipment and practical skills and safety) - graph plotting, terminology, how science works, research (Year 7 Maths T1+2) (Technology T1) (Year 8 Maths T1,2,4 and 6) (Year 8 Geog T1,3,5) (Year 8 History T1) (Year 8 Tech T3) (Year 9 Maths T4,5) (Year 9 Geog T2) (Year 9 Tech T2)	D&T: working characteristics of materials Mathematical skills,- graph plotting, best fit lines, analysis, observation and inference (Year 8 Geog T4) (Year 9 Geog T4) (Year 8 Hist T2)	History: impact of science. Extracting data, use of periodic table, writing formulae and using symbolic notation (Year 8 RE T6) (Year 9 Hist T5)	Practical skills and analytical skills (Year 7 Tech T3) (Year 8 History - T3) (Year 9 History - T1)		Acids and Alkalis (pH, indicators and making salts) - observation, inference (Year 7 Tech T4)
Key vocabulary	Bunsen burner, hazard, hazard symbol, corrosive, apparatus, flammable, irritant, test tube, beaker, safety, conical flask, thermometer, boiling point, melting point, heat, balance, measuring cylinder,	Material, particle, mixture, substance, property, solid, liquid, gas, state of matter, melting, change of state, freezing, melting point, boiling, boiling point, conserve, evaporation, condensation, sublimation, diffusion, collide, gas pressure	Element, Periodic table, chemical symbol, compound, molecule, chemical formula, atom.	Chemical reaction, physical change, catalyst, reactant, product, word equation, hazard, risk, fuel, combustion, fossil fuel, non-renewable, oxidation, decomposition, thermal decomposition, discrete, conservation of mass, balance symbol equation, endothermic change, exothermic change.		acid, alkali, alkaline solution, acidic, solution, corrosive, concentrated, dilute, indicator, pH scale, neutral, neutralisation, base, salt
Catch up Plan / Closing the gaps	<p>KS2 curric usually covered in most primary schools before Christmas, usually intervention to prepare for KS2 SAT's continues after this point. Full use of labs for practical activities resumed.</p> <p>How are you identifying gaps in your subject? Quick starters; retrieval tasks; quick 10 etc... during lessons. Teaching all topics from the ground up, assuming relevant knowledge from KS2 has been missed.</p> <p>We review learning from previous topics as much as possible and refer to Y7 materials. Most of these topics are re-taught in Y9/10 at a higher standard, but will include basic information now as well, from Y7 & 8.</p> <p>How are you and your team capturing evidence so that you as HOF can be confident we are aware of all pupils gaps? Faculty Tracker (detailed) SENECA – topic specific assessments , Q&A sessions, Starters, H/W</p>					

Year 8 Chemistry						
Term	1	2	3	4	5	6
Topic Title	The periodic table	Separation techniques	Separation techniques and Metals and Acids	Metals and Acids	Metals and Acids and the earth	The Earth
Rationale	Pupils met the term elements in Year 7 and the fact they are arranged in a periodic table. The learning expands on the periodic table where they begin to use and interpret the groupings and start to look at the trends.	The pupils have already learnt about mixing, dissolving and separation of mixtures at KS2 (Year 5). In this topic they expand on learning to meet some techniques practically and some new separation techniques. They also learn what materials they are used to separate.	The pupils have already learnt about mixing, dissolving and separation of mixtures at KS2 (Year 5). In this topic they expand on learning to meet some techniques practically and some new separation techniques. They also learn what materials they are used to separate. The pupils worked on topics about chemical reactions, physical changes and acids and alkalis in Year 7. This module progresses further where they begin to study types of chemical reactions and begin to formulate equations to represent reactions.	The pupils worked on topics about chemical reactions, physical changes and acids and alkalis in Year 7. This module progresses further where they begin to study types of chemical reactions and begin to formulate equations to represent reactions.	The pupils worked on topics about chemical reactions, physical changes and acids and alkalis in Year 7. This module progresses further where they begin to study types of chemical reactions and begin to formulate equations to represent reactions.	A comprehensive study of all chemical reactions has been made, pupils have also been able to develop improved analytical skills. They have prior knowledge of using ions throughout the whole year and have studied these in Year 8.
Prior knowledge	All Materials are made up of one or more elements (Year 7) There are 92 naturally occurring elements (Year 7)	Dissolving, mixing, and changes of state are reversible changes (Year 7 / KS2) Techniques such as filtering, sieving and evaporating can be used to separate mixtures.	Dissolving, mixing, and changes of state are reversible changes (Year 7 / KS2) Techniques such as filtering, sieving and evaporating can be used to separate mixtures. Some changes result in the formation of new materials and are not reversible (Year 7)	Some changes result in the formation of new materials and are not reversible (Year 7)	Some changes result in the formation of new materials and are not reversible (Year 7) You can classify rocks according to their properties (KS2) Different materials have different properties.	You can classify rocks according to their properties (KS2) Different materials have different properties.
Key knowledge/skills development	The Periodic Table the varying physical and chemical properties of different elements the principles underpinning the Mendeleev Periodic Table the Periodic Table: periods and groups; metals and non-metals how patterns in reactions can be predicted with reference to the Periodic Table the properties of metals and non-metals the chemical properties of metal and non-metal oxides with respect to acidity.	the concept of a pure substance mixtures, including dissolving diffusion in terms of the particle model simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography the identification of pure substances.	Reactions of acids with metals to produce a salt plus hydrogen Combustion, thermal decomposition, oxidation and displacement reactions The order of metals and carbon in the reactivity series the use of carbon in obtaining metals from metal oxides		Properties of ceramics, polymers and composites (qualitative). Earth and atmosphere the composition of the Earth the structure of the Earth the rock cycle and the formation of igneous, sedimentary and metamorphic rocks Earth as a source of limited resources and the efficacy of recycling the carbon cycle the composition of the atmosphere the production of carbon dioxide by human activity and the impact on climate.	Earth and atmosphere the composition of the Earth the structure of the Earth the rock cycle and the formation of igneous, sedimentary and metamorphic rocks Earth as a source of limited resources and the efficacy of recycling the carbon cycle the composition of the atmosphere the production of carbon dioxide by human activity and the impact on climate.
National Curriculum/specification links	C2:1.1-1.5	C2:2.1-2.6	C2:3.1-3.8	C2: 4.1-4.7	C4:2.1-2.6	C4:2.1-2.6
Literacy	Periodic table of elements	Separation techniques, comprehension	Acids & alkalis	Sedimentary Rocks	Igneous Rocks	
Numeracy	Using numeracy to solve problems related to the periodic table	plotting graphs of recorded data, Lines of best fit, accurate measurements of substances etc.	Reading of the pH scale, measuring quantities of chemicals, taking reading from equipment, recording data	Concepts of geological time, recording data, making measurements, understanding percentages	Reading scales, understanding temperature, making measurements, recording data	
STEM	Periodic table STEM resources - tasks involve games such as element bingo as well as practical tasks looking at groups within the periodic table. There is also a research task where students discover more about their favourite element. Communication Collaboration Critical thinking Reflectivity Analytical Rationalise	Separation of salt from rock salt experiment Measuring Communication Collaboration Rationalise	Acids and Alkalis STEM resources - research tasks looking at Acid bath Murderer, understanding how shells are affected by pH and how this can affect ocean ecosystems. Problem Solving Communication Collaboration Critical thinking Quantitative Analytical Rationalise	Recycling and using resources STEM resources - a range of activities looking how our waste is managed, why recycling is important and what we can do to help the situation. Problem Solving Communication Collaboration Critical thinking Reflectivity Quantitative Analytical Rationalise	Rocks and rock cycle STEM resources - A range of practical activities looking how erosion affects rocks, how the rock cycle works and Earthquakes. Problem Solving Critical thinking Quantitative Analytical	
Cross curricular links	Mathematical skills, using symbols, identifying trends, extracting information and using and plotting data, writing equations - repeating data, use of significant figures (Year 8 Maths T1)	Mathematical skills, practical skills - planning, implementation and analysis e.g. graph plotting, accuracy, repeatability and uncertainty (Year 7 Geog T3) (Year 7 Art T3.4)(Year 8 Tech T2.4) (Year 9 Tech T3)	Oxidation and reactivity, extraction of metals from ores (practical skills - planning, implementation and analysis) - writing word and symbol equations, data analysis) (Year 7 Hist T6) (Year 7 Tech T6) (Year 8 Hist T2) (Year 9 Tech T6)	Atmosphere - Geography (Year 8 T4) Water and Volcanoes (Year 7 T2/3)	N/A	
Key vocabulary	Metal, non-metal, metalloid, physical property, chemical property, acid rain, group, density, period, reactive, halogen, displace, displacement reaction, noble gas, unreactive	Mixture, pure, impure, solution, dissolve, solvent, solute, saturated solution, solubility, soluble, insoluble, filtration, filter, filtrate, residue, distillation, chromatography	Acid, metal, state symbol, reactive, reactivity series, displace, displacement reaction, ore, ceramic, polymer, composite, carbon fibre	Acid, metal, state symbol, reactive, reactivity series, displace, displacement reaction, ore, ceramic, polymer, composite, carbon fibre	Crust, mantle, core, outer core, inner core, atmosphere, troposphere, sedimentary, igneous, metamorphic, porous, weathering, sediment, freeze thaw, chemical weathering, physical weathering, biological weathering, erosion, transport, deposition, compaction, cementation, durable, magma, lava, rock cycle, uplift, respiration, combustion, photosynthesis, dissolving, carbon cycle, carbon store, climate change, deforestation, radiation, greenhouse effect, greenhouse gas, global warming, recycling	Flame test, limewater, lighted and glowing splint, molecular ion, mass spectrometer, retention time.
Catch up Plan / Closing the gaps	<p style="text-align: center;">Acids and alkalis Full use of labs for practical activities resumed.</p> <p>How are you identifying gaps in your subject? Retrieval starters; SENECA; Assessment AP1; Use end of Y7 AP3 test Catch up methods , Homework – based on content missed , Retrieval type questioning starters , Going for Gold, PLC Booklets review</p> <p>We review learning from previous topics as much as possible and refer to Y7 materials. Most of these topics are re-taught in Y9/10 at a higher standard, but will include basic information now as well, from Y7 & 8.</p> <p>How are you and your team capturing evidence so that you as HOF can be confident we are aware of all pupils gaps? Faculty Tracker (detailed) , SENECA – topic specific assessments , Q&A sessions, Starters, HW</p>					

Year 9 Chemistry						
Term	1	2	3	4	5	6
Topic Title	Particles, the particle model and atomic structure	Formula, elements compounds and mixtures and Purity and separation techniques	C3.3 Types of Chemical Reactions	Finish Types of chemical reactions. 6.2 Organic Chemistry 6.3 Forming and polluting the atmosphere.	C2.2 Bonding	C2.3 Properties of materials
Rationale	Foundations skills for chemical reactions and structure and properties of materials. The discovery and development of the periodic table KS3 National curriculum - evidence for atoms, looking at atoms and discovering the periodic table	Following on from the particle model understanding how atoms combine. Forming compounds or mixtures. Having studied elements, compounds and mixtures, and explained the properties of solids liquids and gases. Use this knowledge to describe and explain an appropriate method of separating materials KS3 National curriculum - Activate - Break in, Message in a bottle, Blood alcohol, Clues in the carper, A week in court.	Pupils have been learning the foundations of equation writing and key terminology. They can identify heat changes and characteristics of changes such that they can now apply, analyze, explain and evaluate specific chemical reactions. The range of reactivity in metals with acids and water KS3 National Curriculum Activate 3 - Body! and Smelly problem	Pupils have learnt about oxidation reactions and reactions of carbon in Year. Organic Chemistry and Environmental chemistry link well together. The pupils learn about the earth and atmosphere in Year 8. The students have also covered all major pollutant gases in other topics across and this can be studied in conjunction with the organic chemistry topic.	This builds on work completed on atomic structure at the start of year 9 and uses the ideas of states of matter, compounds and mixtures which is focused on in Year7. They will need to have knowledge of these ideas as they move to year 10/11 as the properties of bonding to materials, developing ideas about processing and designing materials for specific uses in Year 11	This builds on the bonding topic previously studied in term 5, but also prepares the pupils for work to be completed in Year 11 when they will study the processing, choice and recycling of materials products for specific uses.
Prior knowledge	Year 7 and 8. States of matter, changes of state, diffusion and gas pressure.	Year 7 and 8. Elements atoms and compounds. Conservation of mass. Chemical formula. Year 7 and 8. Mixtures, solutions, solubility, evaporation and distillation. Chromatography. Year 9 Elements compounds and mixtures	KS3- acids and alkalis, pH, chemicals that are acidic or alkaline, particle model. KS4 - ions, writing and balancing chemical and ionic equations	KS3- Earth and Atmosphere KS3 - Chemical reactions KS3 - the pupils cover climate change and water extensively in Geography in Year 8/9 and at the beginning of Year 11 which allows cross curricular links at similar stage of development	This builds on work completed on atomic structure at the start of year 9 and uses the ideas of states of matter, compounds and mixtures which is focused on in Year7.	In Year 7 and 8 pupils will have studied the properties and states of matter. They will also have studied the differences between compounds, elements and mixtures and be able and know their differences in chemical and physical properties.
Key knowledge/skills development	Describe the particle model. Use the knowledge to explain properties of solids liquids and gases. Describe the structure of an atom and isotopes. Describe the development of the atomic model through time. Study of relative size and nanoparticles. Recognise developments in the periodic table by Mendeleev.	Describe how atoms combine to form compounds and write formula. Explain the difference between elements, compounds and mixtures. Describe purity and explain how materials can be separated using appropriate practical methods.	Define an acid, base and alkali. Recognise the particles responsible for acidity and alkalinity. Describe what happened during neutralisation and how to prepare a salt. To learn about reactions of acids, the difference between strong and weak acids and use the terms dilute and concentrated correctly.	Explain the term homologous series and draw structures and predict alkane and alkene structures. Describe and explain the separation of crude oil by fractional distillation. Explain why crude oil is a finite resource. Describe the cracking of crude oil into fractions. Drawing organic molecules, using a general formulae, chemical formulas. 6 marker practice.	Looking at bonding and electronic structure, determine ionic structures and use dot-cross structures to represent the compounds. Understand that atoms with full outer shells are stable and are used as a basis for working out ions. Recognise and construct covalent molecules and draw dot-cross diagrams as representations. Covalent bonding is the attraction of nuclei for bonding electrons. Recognise and explain the properties of covalent and ionic structures. Describe differences between thermosetting and thermosoftening polymers.	Understanding the properties of key materials based on carbon and describe and explain the properties in terms of their structure and bonding. Understand that materials are chosen for a particular function and relate the properties and uses to their structure. Students are introduced to nanoparticles focusing on their uses and the risks associated with their uses. They should understand their size and properties and calculate a surface to volume ratio
National Curriculum/specification links	C3: 2.1-2.4 C1.1, C1.2 C2.2.9, C2.2.10	C3: 3.4 C3: 1.2-3.4	C3.3 a-k	C6.2j-o, C6.3a-g	C3: 2.2 i-h	C2: 2.3a-c
Literacy	electrons literacy task	Humphrey Davy	Journalist article about Svante Arrhenius and hydrogen ions or how the pH Scale was derived: https://www.nobelprize.org/prizes/chemistry/1903/arrhenius/biographical/	Research task on pollutants or fractional distillation. Pupils to research and develop a booklet on the effect of atmospheric pollutants	JL19E1L 2 (Chemical giant, Prediction & Inference)	
Numeracy	Calculations involving protons, neutrons and electrons. Using the atomic model to predict electron configurations	Using numeracy to describe the features of an atom, using scale to represent the relative size of sub-atomic particles making measurements, calculations involving percentages and averages, recording data	Use of pH Meters - discussion of Hydrogen ion concentration on logarithmic scale	Organic sudoku https://edu.rsc.org/resources/28-chemistry-puzzles-for-14-16-years/878/article Analysis of climate data	Understanding and interpreting trends in data, making measurements, graph skills	Interpreting and plotting graphs. Analysing data on materials to assess and explain properties
STEM	Atomic structure Stem resources - A range of activities looking sub atomic particles and their discoveries Problem Solving Communication Collaboration Quantitative Analytical Rationalise		Purification STEM task - Activity based around forensic techniques and CSI investigations. Problem Solving Communication Collaboration Quantitative Analytical Rationalise	Where is the best place to dig for oil (Page 16) or Greenhouse effect: what is it? Students produce the greenhouse gas CO2 through a simple chemical reaction, measure the effect of the gas on air temperature, and relate their conclusions to the greenhouse effect in our atmosphere.? Problem Solving Communication Collaboration Quantitative Analytical Rationalise	STEM task - Chemical giants Communication Collaboration Quantitative Analytical Rationalise	Nanoparticles or materials for design Communication Quantitative Analytical Rationalise
Cross curricular links	physics year 9	Mathematical skills, use of formulae and problem solving (Yr. 7 - T1.T6, Y8 - T1.T4, T6 Y9- T1, T2.T4, Y10 - T2.T4)	Technology / Cookery - acidity in foods. (Year 7 T2.3.4 / Year 8 T1.2.3)	Engineering (Year 10 T1.4). Geography - environmental effects of crude oil extraction Geography - climate change. Y9 T4/5, Y11 T1/3: Atmosphere Y8 T3.4 Geography - climate change. Y9 T4/5, Y11 T1/3: Atmosphere Y8 T3.4	Design and Technology year 9.	Design and Technology/Art year 9.
Key vocabulary	atom, atomic radius, electron, element, ion, isotope, molecule, neutron, proton, nucleus, sub atomic, electrostatic force,	alloy, compound, mixture, pure, empirical formula, element, compound, separation. solute, solvent, solubility, distillation, chromatography, vaporization, residue, retention factor, fraction, insoluble, saturated, vapour filtrate.	Redox oxidation, reduction, acid, alkali, pH, neutralisation, titration, weak acid, strong acid, dilute, concentrated	Alkane, alkene, fractional distillation, cracking, combustion, addition. Climate change, pollutants, atmosphere, photosynthesis, particulates.	reactivity, periodicity, trends, density, displacement, ion, electron structure,	nanoparticles, state, melting point, boiling point, allotrope, diamond, graphite, fullerene, graphene, conductivity, condense, sublime, melt, lattice
Catch up Plan / Closing the gaps	What are the Key skills/concepts/knowledge that each child should have learned (not covered) since march? Metals and their reactions Full use of labs for practical activities resumed. How are you identifying gaps in your subject? Retrieval starters; SENECA; Assessment AP1; Use of end of Y8 AP3 test Catch up methods, Homework – based on content missed, Review type questioning starters, Questions-in-a-month, Going for Gold, 6 mark Q sheets, PLC Booklets review, SENECA Revision materials: Talking ppt, Get-its and Know-its ppt, "Summary" A3 broadsheet learning mats How are you and your team capturing evidence so that you as HOF can be confident we are aware of all pupils gaps? Faculty Tracker (detailed), SENECA – topic specific assessments, Q&A sessions, Starters, H/W					