

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	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.	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 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 <input type="checkbox"/> the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure <input type="checkbox"/> changes of state in terms of the particle model.	Atoms, elements and compounds <input type="checkbox"/> a simple (Dalton) atomic model <input type="checkbox"/> differences between atoms, elements and compounds <input type="checkbox"/> chemical symbols and formulae for elements and compounds	Chemical reactions <input type="checkbox"/> chemical reactions as the rearrangement of atoms <input type="checkbox"/> representing chemical reactions using formulae and using equations <input type="checkbox"/> combustion, thermal decomposition, oxidation and displacement reactions <input type="checkbox"/> conservation of mass changes of state and chemical reactions <input type="checkbox"/> energy changes on changes of state (qualitative) <input type="checkbox"/> exothermic and endothermic chemical reactions (qualitative).	Chemical reactions <input type="checkbox"/> chemical reactions as the rearrangement of atoms <input type="checkbox"/> representing chemical reactions using formulae and using equations <input type="checkbox"/> combustion, thermal decomposition, oxidation and displacement reactions <input type="checkbox"/> conservation of mass changes of state and chemical reactions <input type="checkbox"/> energy changes on changes of state (qualitative) <input type="checkbox"/> exothermic and endothermic chemical reactions (qualitative).	<input type="checkbox"/> defining acids and alkalis in terms of neutralisation reactions <input type="checkbox"/> the pH scale for measuring acidity/alkalinity; and indicators <input type="checkbox"/> reactions of acids with metals to produce a salt plus hydrogen <input type="checkbox"/> 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: 3.1-3.6	C1: 4.1-4.4
Additional Literacy Opportunities	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks. Key words for new equipment etc, Writing and interpretation of Lab rules Use of PLCs for Keywords	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks. Use of PLCs for Keywords	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks Use of PLCs for Keywords Create a poster and describe an element superhero	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks Use of PLCs for Keywords	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks Use of PLCs for Keywords	Use of keyword learning and practise of extended six mark questions and terminology in Going for Gold or Going Forward type tasks. Use of PLCs for Keywords Writing and recording experimental write ups for making copper sulphate
Additional Numeracy Opportunities	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. Maths Project and skills	Balancing equations, measuring temperature changes.		measuring and recording data for neutralisations, using pH scale.
STEM (working scientifically)	In the Lab Unit; WS unit; Asking scientific Q's; Planning 7 recording data skills.	Complete WS unit: Analysing data; Evaluating data; Scientific investigation. Writing a conclusion. Crest Awards begin	Maths Project and skills	Bio Crest Investigation	Chem Crest Investigation	Phys Crest investigation
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)	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.	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

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 <ul style="list-style-type: none"> 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. 	<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, evaporation, distillation and chromatography the identification of pure substances. 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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	C2.3.1-3.8	C2: 4.1-4.7	C4.2 a,b, d, f, g
Additional Literacy Opportunities	Key words for new equipment etc. Writing and interpretation of Lab rules (part of WS)	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks. Use of PLCs for Keywords	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks. Use of PLCs for Keywords Create you own composite	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks. Use of PLCs for Keywords Create you own composite	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks. Use of PLCs for Keywords Research Projects: Rock Cycle	
Additional Numeracy Opportunities		plotting graphs of recorded data, Lines of best fit, accurate measurements of substances etc.	Reading and measuring quantities of chemicals, taking reading from equipment, recording data Maths Project		Concepts of geological time, recording data, making measurements, understanding percentages	Reading scales, understanding temperature, making measurements, recording data
STEM (working scientifically)	Using numeracy to solve problems related to In the Lab Unit; Review unit; Asking scientific Q's; Planning ? recording data skills.	Complete WS unit: Analysing data; Evaluating data; Scientific investigation: Writing a conclusion. Crest Awards begin	Maths Project	Phys Investigation	Chem Investigation	Bio Investigation
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)	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.

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	C2.2 Bonding	C2.3 Properties of materials	Finish Types of chemical reactions. 6.2 Organic Chemistry 6.3 Forming and polluting the atmosphere.	C6.2.10 Fuels and Electricity in chemistry: What are cells: Key word vocabulary Making simple battery cells Comparing fuel cells with combustion engine Making simple fuel cells C1: New Technology
Rationale	Foundation 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.	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 apply 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.	Pupils have learnt about oxidation and combustion in Year 7 reactions and reactions of carbon in Year 9. This module builds on previous work covered.	C2.4.2.5 – Lesson from fossils Pupils have been learning about chemical reactions in Year 7 and are familiar with oxidation and combustion reactions. In the previous term, reactions of fuels have been studied, which links well to a comparison with new technologies for energy consumption.
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	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.	KS3- Earth and Atmosphere K3 - 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	KS3- Earth and Atmosphere K3 - 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
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, determine ionic structures and use dot-cross structures to represent the compounds. Describe purity and explain how materials can be separated using appropriate practical methods. Year 9 Elements compounds and mixtures	Looking at bonding and electronic structures, 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	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 formulae. 6 marker practice.	Pupils will learn about chemical cells: Key word vocabulary Describe and create their own simple battery cells Comparing and contrasting the use of fuel cells with that of the internal combustion engine. Explain how fuel cells work and suggest environmental impacts.
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: 2.2 i-h	C2: 2.3a-c	C6.2-o, C6.3a-g	C6.2p and C6.2q
Additional Literacy Opportunities	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks. Use of PLCs for Keywords Research reading / writing task on atomic models	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks. Use of PLCs for Keywords	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks. Use of PLCs for Keywords Research booklet - Fullerenes/Graphite/Diamond and Graphene (end of term)	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks. Use of PLCs for Keywords Research booklet - Fullerenes/Graphite/Diamond and Graphene (end of term)	Use of keyword learning and practise of six mark questions and terminology in Going for Gold or Going Forward type tasks. Use of PLCs for Keywords Research / Written tasks on pollutants and the atmosphere	Write a journalistic article comparing battery electric vehicles to hydrogen fuel cells
Additional Numeracy Opportunities	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	Understanding and interpreting trends in data, making measurements, graph skills	Interpreting and plotting graphs. Analysing data on materials to assess and explain properties	Analysis of climate data	Data handling
STEM (Working Scientifically 1 lesson per week)	Working scientifically WS1-WS8	Biol PAG 1 Microscopy Biol Pag 3 Enzymes Biol PAG 4 Photosynthesis	Chem Pag 3 Separation techniques 1.) Plan 2.) Do 3.) Review – Evaluate and PAG booklet tasks Chem Pag 2 Distillation 1.) Plan 2.) Do 3.) Review – Evaluate and PAG booklet tasks	Required Practicals: Physics PAG 1: Density and Materials 1.) Plan 2.) Do 3.) Review – Evaluate and PAG booklet tasks Required Practicals: Physics PAG 5: Specific Heat Capacity 1.) Plan 2.) Do 3.) Review – Evaluate and PAG booklet tasks	Required Practicals: Biology PAG 3 photosynthesis 1.) Plan 2.) Do 3.) Review – Evaluate and PAG booklet tasks Required Practicals: Biology PAG 8 Transport in/out cells 1.) Plan 2.) Do 3.) Review – Evaluate and PAG booklet tasks	Required Practicals: Physics PAG 3: Motion 1.) Plan 2.) Do 3.) Review – Evaluate and PAG booklet tasks Physics PAG 4 Forces 1.) Plan 2.) Do 3.) Review – Evaluate and PAG booklet tasks
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)	Design and Technology year 9.	Design and Technology/Art year 9.	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	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
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.	reactivity, periodicity, trends, density, displacement, ion, electron structure,	nanoparticles, state, melting point, boiling point, allotrope, diamond, graphite, fullerene, graphene, conductivity, condense, sublime, melt, lattice	Alkane, alkene, fractional distillation, cracking, combustion, addition, Climate change, pollutants, atmosphere, photosynthesis, particulates.	Fuel cell, chemical cells, potential difference