

Science Department - Chemistry

Department Overview:

Year 7			
Topic	Time Allocated	Skills	End Point
Solids, liquids and gases	7	The development of scientific thinking - Use the particle model to explain states of matter, changes of state and diffusion. - Recognise that particle models are simplified representations used to explain observable phenomena. - Understand that scientific ideas are based on evidence from experiments and observations.	Use the particle model to explain the properties and behaviour of solids, liquids and gases, including changes of state, diffusion, and energy changes, and apply this model to interpret observations and simple data.
Mixtures and solutions	8	Experimental skills and strategies - Use and describe simple separation techniques. - Follow practical procedures safely and systematically. - Identify equipment required for each technique. - Make and record observations.	Explain the difference between pure substances and mixtures, describe and apply methods for separating mixtures, and use observations and evidence to identify purity.
Acids and bases	7	Experimental skills and strategies - Use indicators to test substances. - Observe and record colour changes and pH values. - Carry out neutralisation experiments safely. - Identify hazards in experiments.	Explain acids and alkalis in terms of neutralisation, use the pH scale and indicators to classify solutions, and describe reactions between acids and bases to produce salts and water using evidence from observations.
Earth's atmosphere	4	Mathematical skills and quantitative reasoning	Describe the composition of the Earth's atmosphere and use evidence and

		• Interpret percentages in charts and graphs of atmospheric composition • Compare proportions of gases • Translate between pie charts and written descriptions • Use simple numerical data to describe atmospheric composition	data to explain the relative proportions of gases and their importance for life on Earth.
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Year 8			
Topic	Time Allocated	Skills	End Point
Atoms and elements	4	The development of scientific thinking • Understand Dalton's model of the atom as solid, indivisible spheres • Recognise that scientific models are simplified representations used to explain matter. • Appreciate that matter is made from tiny particles called atoms.	Use a simple atomic (Dalton) model to describe atoms, distinguish between elements and compounds, and correctly use chemical symbols and formulae to represent substances.
Chemical and physical changes	6	Analysis and evaluation • Analyse observations to identify exothermic and endothermic reactions. • Compare substances before and after reactions. • Evaluate experimental results, considering measurement accuracy.	Explain chemical reactions as the rearrangement of atoms, apply the principle of conservation of mass, use chemical formulae to represent compounds, and describe energy changes in both state changes and chemical reactions.

The periodic table	5	Analysis and evaluation - Interpret the arrangement of elements in periods and groups. - Identify trends within groups. - Classify elements as metals or non-metals based on position. - Compare the properties of metals and non-metals.	Describe the organisation of the periodic table in terms of periods and groups, classify elements as metals and non-metals, and explain differences in their properties using observational evidence and simple models.
Combustion	6	Using scientific terminology and communication - Use key terminology accurately, including combustion and oxide. - Write simple word equations for combustion reactions.	Describe combustion as a chemical reaction with oxygen, and explain the formation and properties of metal and non-metal oxides.
Metals and their uses	7	Analysis and evaluation - Interpret results to order metals by reactivity - Analyse reactions to identify products. - Evaluate the environmental impact of recycling and extracting metals. - Use evidence to justify conclusions about resource use.	Explain the properties and reactivity of metals, use the reactivity series to predict their behaviour (including reactions with acids), and evaluate how metals are obtained and used as limited resources, including the role of recycling.

Year 9			
Topic	Time Allocated	Skills	End Point
States of matter	4	The development of scientific thinking Use the particle model as a scientific model to explain properties of matter.	Explain the particle model of matter to describe and predict the behaviour of solids, liquids, and gases, including changes of state, and apply this understanding to interpret

		- Recognize that models help explain observable phenomena. - Understand that particle behaviour is inferred from evidence, not directly observed.	diagrams, data, and real-world conditions.
Separating techniques	10	Experimental skills and strategies - Describe and carry out (conceptually or practically) techniques including filtration, simple distillation, fractional distillation, and paper chromatography. - Select an appropriate based on solubility, boiling point, and particle size. - Understand procedures used in water purification.	Explain how mixtures and pure substances differ, select and justify appropriate separation techniques based on properties, and analyse experimental data (including chromatography) to identify substances and assess purity.
Atomic structure	4	Analysis and evaluation - Calculate subatomic particles of elements. - Interpret information about isotopes and atomic structure.	Explain and apply the atomic model by describing the structure of atoms, the properties of subatomic particles, and using this knowledge to calculate the number of subatomic particles and relative atomic mass of atoms and isotopes.
The periodic table	5	The development of scientific thinking - Describe how the periodic table changed over time. - Understand that scientific ideas are based on evidence available at the time and can be revised with new discoveries. - Recognise the role of patterns and anomalies in developing scientific theories.	Explain the development and structure of the periodic table, using atomic number and electronic configuration to classify elements, predict their properties, and justify patterns in groups and periods.

Ionic bonding	5	The development of scientific thinking - Explain how the ionic bonding model is used to describe electron transfer between atoms. - Recognize that bonding models are simplified representations of real structures. - Understand that scientific models (e.g. dot and cross diagrams) help visualise unseen processes.	Explain how ionic bonds form through electron transfer, represent ions and ionic compounds using diagrams and formulae, and use this understanding to deduce ionic formulae.
The pH scale	9 (+2 for higher)	Experimental skills and strategies - Carry out or describe methods to measure pH using indicators or probes. - Describe colour changes of indicators, including litmus, methyl orange and phenolphthalein. - Understand procedures in neutralisation practicals, including how to monitor pH.	Explain the properties and reactions of acids, bases and alkalis using particle and ion models, apply pH and concentration concepts quantitatively, and interpret experimental evidence to describe neutralisation and acid reactions.

Year 10			
Topic	Time Allocated	Skills	End Points
Earth and atmosphere	5	The development of scientific thinking - Describe how theories about Earth's early atmosphere are based on indirect evidence. - Explain how scientific understanding of the atmosphere has developed over time. - Recognise that scientific conclusions depend on available	Explain how Earth's atmosphere has changed over time using evidence, describe the processes that led to its current composition, and evaluate scientific data on climate change and human impacts using quantitative and critical analysis skills.

		evidence and interpretation of data. Understand how processes led to atmospheric change.	
Groups of the periodic table	5	Analysis and evaluation - Identify and interpret trends in reactivity and physical properties. - Use displacement reactions to determine relative reactivity. - Predict properties of unfamiliar elements using known trends.	Explain and predict the physical and chemical properties of elements in Groups 1, 7, and 0 using their position in the periodic table and electronic configuration, and apply this understanding to analyse trends, reactions, and reactivity patterns.
Bonding (covalent and metallic)	6	The development of scientific thinking - Recognise that models are used to represent bonding. - Understand that different bonding models explain differences in physical properties. - Recognise the limitations of models in representing real structures.	Explain how bonding leads to the formation of different types of substances, use models to represent bonding and structure, and apply this understanding to predict and explain physical properties based on structure and bonding.
Rates of reaction	9 (+2 for higher)	Experimental skills and strategies - Carry out practical investigations measuring rate by gas production and colour change. - Suggest suitable methods for measuring reaction rates, including gas production, loss of mass and colour changes. - Identify independent, dependent and control variables.	Explain and investigate the factors affecting the rate of chemical reactions using collision theory, analyse experimental data (including graphs), and apply mathematical skills to determine and compare reaction rates.

		Make and record observations accurately.	
Energy changes	4	Analysis and evaluation - Interpret temperature changes to determine whether a reaction is exothermic or endothermic. - Evaluate accuracy of measurements and sources of error, such as heat loss.	Explain energy changes in chemical reactions using ideas about bond breaking and bond making, represent these changes using reaction profiles, and analyse experimental data to identify exothermic and endothermic processes.
Fuels	7	Analysis and evaluation - Interpret data about boiling points of fractions and trends in hydrocarbon properties. - Evaluate the advantages and disadvantages of hydrogen as a fuel, along with the impacts of fossil fuel use.	Explain the properties, uses, and environmental impacts of hydrocarbon fuels, apply understanding of fractional distillation and cracking, and evaluate evidence to make informed judgments about fuel use and sustainability.

Year 11			
Topic	Time Allocated	Skills	End Points
Salt preparations	6	Experimental skills and strategies - Describe and carry out preparation of soluble salts from insoluble bases. - Describe and carry out acid-alkali titrations. - Prepare insoluble salts by precipitation reactions.	Explain and carry out methods for preparing soluble and insoluble salts, apply solubility rules to predict reactions, and use titration and practical techniques to obtain pure products.
Obtaining and using metals	6	Analysis and evaluation - Deduce reactivity order from experimental data.	Explain and apply the reactivity series to predict reactions and extraction methods of metals and

		- Analyse displacement reactions to determine which metal is more reactive. - Evaluate advantages of recycling materials. - Evaluate the environmental impacts using life cycle assessments.	evaluate the environmental and economic impacts of metal extraction, use, and recycling.
Electrolysis	6 (+1 for higher)	Analysis and evaluation - Interpret observations from electrolysis to identify the products at electrodes. - Analyse experimental results to confirm predicted products.	Explain electrolysis as a process involving the movement of ions, predict and justify the products formed at electrodes, and analyse experimental evidence from electrolysis investigations.
Reversible reactions	3	Using scientific terminology and communication - Use key terminology accurately. - Write balanced equations using the symbol for reversible reactions. - Explain equilibrium shifts using scientific reasoning linked to conditions.	Explain reversible reactions and dynamic equilibrium, predict how changes in conditions affect equilibrium position, and apply this understanding to industrial processes such as the Haber process.