Chemistry	Working towards expected outcomes Your child is not yet making the expected progress within this course.	Working at expected outcomes Your child is achieving the expected progress for this point within the course.	Working beyond expected outcomes Your child is working beyond the expected progress for this point within the course.
Year 9 Autumn Term 1 Atomic Structure and Separation Techniques	Students working **towards** expected outcomes in Year 9 can: • Identify some symbols, names of elements (first 20) and their groups. • Give basic examples of elements and compounds. • Attempt simple word equations • Recognise that mixtures are made of substances not chemically joined. • Name or identify basic separation methods like filtration. • Recognise that atomic models have changed over time and be able to name these models • Know atoms contain protons, neutrons, and electrons. • Understand that atoms can have different masses (isotopes). • Attempt to write electronic structures	Students working **at** expected in Year 9 can: • Use correct symbols and names for key elements (first 20, Groups 1 & 7). • Name compounds, write correct word and symbol equations. • Describe and explain how mixtures are separated using physical methods. • Explain how evidence led to changes in atomic models and be able to compare atomic models. • State and explain charges of subatomic particles using this to explain why atoms are neutral. • Describe atomic size and mass using correct units. • Describe isotopes and calculate relative atomic mass. • Represent electronic structures (1–20) in diagrams or numbers.	Students working **beyond** expected in Year 9 can: • Write and balance complex symbol equations accurately. • Explain how compounds form and describe energy changes. • Explain atomic model development using experimental evidence. • Explain how ions form using subatomic particle knowledge. • Compare atomic and nuclear sizes using standard form and real-world examples. • Interpret isotope data and explain atomic mass. • Predict properties and reactivity using electronic structure.

Year 9 Autumn Term 2 & Spring Term 1 Periodic Table	• Recognise that elements are arranged by atomic number in the periodic table. • Identify that similar elements are placed in the same group. • Match metals and non-metals to their position on the periodic table. • Identify Group 0, Group 1, and Group 7 on the periodic table. • Recall that Group 0 elements are unreactive and have full outer shells. • State that Group 1 metals react with water, oxygen, and chlorine. • Recall that Group 7 elements get less reactive down the group. • Know that early periodic tables were arranged by atomic weight.	• Explain how an element's position in the Periodic Table relates to its atomic number and electron arrangement. • Predict the reactivity of elements using their position in the periodic table. • Describe how Mendeleev developed the periodic table and left gaps for undiscovered elements. • Compare typical physical and chemical properties of metals and non-metals. • Explain how atomic structure links to whether an element is a metal or non-metal. • Explain the reactivity trends in Group 1 (increasing down the group) and Group 7 (decreasing down the group). • Describe the properties of noble gases and predict trends such as boiling point. • Describe the reactions of Group 1 elements with oxygen, water, and chlorine. • Describe how Group 7 elements form compounds and can displace less reactive halogens. • Compare transition metals to Group 1 metals in terms of melting point, hardness, reactivity, and ion formation	• Predict properties and reactivity of unfamiliar elements using trends across groups and periods. • Evaluate Mendeleev's approach to leaving gaps and rearranging elements in light of modern understanding. • Link group number to outer electrons and explain reactivity trends using energy and shielding. • Justify physical and chemical differences between metals and non-metals using electron structure. • Describe key transition metal properties, such as variable ion charges, coloured compounds, and catalytic activity. • Apply understanding of trends to explain displacement reactions and predict outcomes.

Year 9 Spring Term 2 & Summer 1 Structure and Bonding	• Recognise ionic, covalent, and metallic bonds in simple examples. • State that metals lose electrons and non-metals gain electrons in ionic bonding. • Name some simple covalent and ionic compounds. • Recognise that metals have delocalised electrons. • Identify solids, liquids, and gases using particle diagrams. • Match physical states to state symbols (s), (l), (g), (aq). • Describe metals as good conductors and name a use for graphite or diamond. • Recognise polymers, fullerenes, and nanoparticles from diagrams.	• Explain ionic, covalent, and metallic bonding in terms of electron transfer or sharing. • Draw dot-and-cross diagrams for common ionic and covalent compounds. • Deduce charges on ions from Group 1, 2, 6, and 7 elements. • Describe limitations of different bonding models • Compare properties of substances based on structure and bonding • Explain why ionic compounds conduct electricity when molten or dissolved. • Describe how weak intermolecular forces affect boiling points in small molecules. • Recognise structures of polymers, diamond, graphite, and silicon dioxide. • Explain how alloys are harder than pure metals. • Identify and explain trends in properties using particle theory. • Include correct state symbols in chemical equations. • Compare nanoparticles to larger particles using size and surface area to volume ratio. • Describe advantages and risks of using nanoparticles in products.	• Justify bonding types using structure, properties, and electron behaviour. • Evaluate different models for representing bonding in complex substances. • Link energy transfer and particle arrangement to changes of state. • Discuss limitations of the particle model in describing real substances. • Critically evaluate the use of nanoparticles, weighing risks and benefits.

Year 9 Summer 2 Organic Chemistry – Crude Oil	• Know that crude oil is a fossil fuel and a finite resource. • Recognise that hydrocarbons are made of hydrogen and carbon atoms. • Identify alkanes from their formulae (e.g. methane, ethane, propane, butane). • Describe crude oil as a mixture of hydrocarbons. • Match the names and formulas of the first four alkanes. • Describe combustion as a reaction that produces heat, carbon dioxide, and water. • Recall that smaller hydrocarbons burn more easily. • Recognise that cracking produces smaller hydrocarbons.	• Explain how crude oil was formed. • Describe alkanes as a homologous series with the formula $C_nH_{2n+2.}$ • Explain how fractional distillation separates hydrocarbons by boiling points. • Link molecular size to hydrocarbon properties like flammability and viscosity. • Write word and balanced symbol equations for complete combustion of hydrocarbons. • Describe the conditions needed for catalytic and steam cracking. • Recognise that cracking makes useful fuels and produces alkenes. • Balance symbol equations for cracking reactions when given the formulas. • Give examples of fuels and materials made from crude oil.	• Explain trends in boiling point, viscosity, and flammability using molecular size and intermolecular forces. • Evaluate why cracking is essential for fuel demand and chemical production. • Compare the reactivity of alkanes and alkenes and link this to their bonding. • Discuss how the structure of carbon atoms allows for a vast range of organic compounds. • Evaluate the benefits and limitations of fossil fuel use in terms of sustainability and resource availability.