Handsworth Grange
Community Sports College

CHEMISTRY KS4 CURRICULUM AND ASSESSMENT MILESTONES

AIM:

There are 10 topics (C1–C10) in the chemistry curriculum. The sequence of the lessons has been organised to guide pupils' learning over the 2 years. This process helps to ensure that foundational concepts are mastered before more complex topics are introduced. It also ensures that concepts are revisited and linked across different lessons.

YEAR 10 TOPICS (C1–C6)

Topic C1 **Atomic structure and the periodic table**	Prior KS3 Knowledge: atoms, elements, compounds, and the periodic table Students will learn about the structure of atoms, including subatomic particles, and how the periodic table is organized. They will explore the development of atomic models and how elements are arranged based on atomic numbers and properties. Students will understand different types of chemical bonding (ionic, covalent, and metallic) and how these influence the properties of substances. They will also study the structure of materials such as polymers and giant covalent structures. ***Triple Chemistry Content: Triple students will also study electronic structure in more detail and explore historical models of the atom including the alpha particle scattering experiment. Explore nanoparticles and their uses, as well as more detailed analysis of bonding and structure.***
C2 **Bonding, structure and properties of matter**	Prior KS3 Knowledge: particle model and chemical reactions Students will learn how to calculate relative formula masses, moles, and concentrations. They will apply the law of conservation of mass and use chemical equations to perform quantitative calculations. Students will investigate the reactivity of metals, reactions of acids with metals, bases, and carbonates, and the process of electrolysis. ***Triple Chemistry Content: Triple students will also calculate limiting reactants and use concentration calculations in greater depth. Study strong and weak acids in more detail and explore redox reactions more thoroughly.***
C3 **Quantitative chemistry**	Prior KS3 Knowledge: chemical reactions and conservation of mass Students will explore exothermic and endothermic reactions, including energy transfer in chemical reactions and how to calculate bond energies. Students will learn about factors that affect the rate of chemical reactions, reversible reactions, and dynamic equilibrium. ***Triple Chemistry Content: Triple students will also study cells and batteries, and fuel cells as energy sources. Explore Le Chatelier's Principle and its application in predicting changes to equilibrium.***
C4 **Chemical changes**	Prior KS3 Knowledge: acids, alkalis, and reactivity Students will study the composition and properties of hydrocarbons, including alkanes and alkenes, and how crude oil is separated by fractional distillation. ***Triple Chemistry Content: Triple students will also study alcohol, carboxylic acids, esters, and polymers in more detail.***
C5 **Energy changes**	Prior KS3 Knowledge: exothermic and endothermic reactions Students will learn how to identify pure substances, use chromatography to separate mixtures, and perform gas tests. Students will explore the evolution of the Earth's atmosphere, the greenhouse effect, and the impact of human activity on climate change. ***Triple Chemistry Content: Triple students will also study flame emission spectroscopy and more advanced chemical tests for ions.*** ***Study atmospheric pollutants and their effects in greater detail.***
C6 **Rate and extent of chemical change**	Prior KS3 Knowledge: rates of reaction Students will learn about sustainable development, finite and renewable resources, water treatment, and life cycle assessments. ***Triple Chemistry Content: Triple students will also study corrosion, alloys, ceramics, and the Haber process in more depth.***

YEAR 11 TOPICS (C7–C10)

C7 **Organic chemistry**	Prior KS3 Knowledge: hydrocarbons and combustion Pupils study hydrocarbons, focusing on alkanes as fuels and how crude oil is separated by fractional distillation. They also learn about cracking to produce smaller, more useful hydrocarbons. ***Triple Chemistry: In addition to the above, pupils explore alkenes, alcohols, carboxylic acids, and polymers. They learn about reactions of alkenes and alcohols, and the formation of synthetic and naturally occurring polymers***
C8 **Chemical analysis**	Prior KS3 Knowledge: separation techniques Pupils learn how to identify pure substances, understand formulations, and use chromatography to separate mixtures. They also perform tests for common gases. ***Triple Chemistry: Pupils go further by studying chemical tests for ions, including flame tests, precipitation reactions, and flame emission spectroscopy for identifying metal ions***
C9 **Chemistry of the atmosphere**	Prior KS3 Knowledge: climate and the carbon cycle Pupils explore the evolution of Earth's atmosphere, the role of greenhouse gases like CO_2 and CH_4, and the impact of climate change. ***Triple Chemistry: Additional content includes a deeper look at atmospheric pollutants, their sources, and effects on health and the environment***
C10 Using resources	Prior KS3 Knowledge: materials and sustainability Pupils study finite and renewable resources, potable water, wastewater treatment, and life cycle assessments. ***Triple Chemistry: Pupils also learn about corrosion and its prevention, alloys, ceramics, composites, and the Haber process for making ammonia. They also cover NPK fertilisers and their role in agriculture***

ASSESSMENT MILESTONES

Every chemistry lesson incorporates a retrieval grid that continuously links current topics to previous ones. It is compulsory that every chemistry lesson uses TLAC techniques to check understanding and misconceptions. It is also mandatory that every chemistry lesson has an exam question tailored to the ability of pupils. At the end of each topic students complete an end of topic assessment which begins with 1 knowledge recall question linked to a previous topic. Following the assessment, there is a pride lesson individualised to each pupil's ability.