THE BROMFORDS SCHOOL

ACHIEVE ENRICH PREPARE

The Bromfords School

Science Faculty.

Intent of Chemistry Curriculum

	The Bromfords School	Science Department - Chemistry

The intent of Chemistry in Science at Bromfords is the systematic study of the physical and natural world through observations and experimentation. Our intent is to make students scientifically literate in order to make sense of information and to communicate their ideas to contribute to a better and more advanced world.

Achieve:
Students are supported and challenged to think scientifically. To be inquisitive and pose genuine investigative questions. Through problem solving approaches they will use experimental observations to deepen their understanding.

Enrich:
To offer a blend of independent investigation and team working skills to explore and suggest solutions to real world problems. To help students be better members of society through a deeper understanding of how science works, and consequently help students make better life decisions. Enable students to acquire accurate information about the natural world and about society and culture.

Prepare:
To re-visit key skills in real world contexts. Allow students to reflect on the purpose of the topic in the bigger picture of how the world works and future career opportunities. Students are aware of implications of actions through application of real science.

Department: Chemistry	Curriculum Map What does Chemistry within the Science Faculty at Bromfords look like?					
Entry KS2	**Year 7**	**Year 8**	**Year 9**	**Year 10**	**Year 11**	**Post-16**
Knowledge: States of Matter Water Cycles Properties and testing materials Dissolving & separating materials Reversible and irreversible reactions Basic particle theory Skills: - Set up simple practical enquiries, which are fair tests. - Report on findings from enquiries including oral and written explanations, based on graphical data. - Plan different types of scientific enquiries to answer questions	Knowledge: - Introduction to practicals - Particles and their behaviour - Elements atoms and compounds - Reactions - Acids and alkalis Skills: - Observing change - Using the periodic table - Practical skills - Understand scientific keywords. - Following teacher guidance to draw graphs and practical diagrams - Understand that models are used to help explain scientific ideas. - Working as part of a team to investigate the impact of different variables on experiments	Knowledge: - Periodic table - Separation techniques - Metals and acids Skills: - Using chemical symbols and equations - Using specialised equipment - Use scientific keywords in their writing. - Independently solve scientific calculations. - Independently draw graphs and circuit diagrams - Understand that models are used to help explain scientific ideas. - Interpret distance time graphs - Working as part of a team to identify and investigate the impact of different variables on experiments	Knowledge: - Materials - Environmental chemistry - Chemical reactions - Atomic structure and the periodic table Skills: - Planning investigations - Predict chemical behaviours from trends - Use more ambitious scientific keywords in their writing. - Following teacher guidance solve multi-step calculations. - Describe trends shown in graphs - Refer to models in explanations. - Enhance mathematical skills in preparation for Year 10 and beyond. - Working as part of a team to identify, investigate and predict the impact	Knowledge: - Bonding, structure and the properties of matter - Chemical calculations - Chemical changes - Energy change - The rate and extent of chemical change Skills: - Drawing bonding diagrams - Interpreting energy level diagrams - Use of tangents to calculate rate of change on a graph - Describe scientific keywords in extended writing. - Independently solve multi-step calculations. - Create circuit diagrams to investigate resistance - Use science to explain trends shown in graphs. - Refer to models in explanations and how models change over time.	Knowledge: - Organic Chemistry - Chemical analysis - Chemistry of the atmosphere - Using resources Skills: - Linking scientific keywords and concepts together in extended writing. - Recall, rearrange and solve calculations independently. - Use science and data to explain trends shown in graphs. - Evaluate scientific models - Interpret graphs and diagram to explain the effect of forces on objects. - Analyse data from graphs and tables - Understand and express opinions based on scientific reasoning. - Working independently to	Knowledge: - Physical Chemistry - Inorganic Chemistry - Organic Chemistry Skills: - Practical Chemistry - Follow written procedures - Apply investigative approaches and methods when using instruments and equipment - Safely use a range of practical equipment and materials - Make and record observations - Research reference and report.

			of different variables on experiments	- Analyse data from graphs and tables - Understand and express opinions based on scientific reasoning. - Working independently to identify, investigate and predict the impact of different variables on experiments	identify, investigate and predict the impact of different variables on experiments.	
Enrichment, Careers, Real world Experience.	Opportunities to link knowledge to careers through lessons Exploration of properties and uses including why we use helium in balloons for example. Science clubs and trips are run periodically on the availability of local and national competitions e.g., National Rocket Launch Competition	Opportunities to link knowledge to careers through lessons Students solve very practical problems like separating mixtures and using ink separation to solve an actual crime. Science clubs and trips are run periodically on the availability of local and national competitions e.g., National Rocket Launch Competition	Opportunities to link knowledge to careers through lessons Students plan their own rocket combustion launch experiment and launch a bottle in competition to see who can design the best rocket. Science clubs and trips are run periodically on the availability of local and national competitions e.g., National Rocket Launch Competition	Opportunities to link knowledge to careers through lessons. Students continue to expand their skills in using advanced practical equipment in science lab settings. STEM activities and sessions enthuse students to consider a career in the STEM field. Science clubs and trips are run periodically on the availability of local and national competitions e.g. National Rocket Launch Competition	Opportunities to link knowledge to careers through lessons. Students continue to expand their skills in using advanced practical equipment in science lab settings. STEM activities and sessions enthuse students to consider a career in the STEM field. Science clubs and trips are run periodically on the availability of local and national competitions e.g. National Rocket Launch Competition	Students continue to expand their skills in using advanced practical equipment in science lab settings. Opportunities to link knowledge to careers through lessons. Several excursions to University providers to enlighten students to the variety of FE options available including vocational and apprenticeships. Assessed practical work supports knowledge and skill delivery.
	Careers & Real-World: Chemical Researcher, Biochemist, Teacher/Lecturer, Forensic Scientist, Chemical Engineer, Pharmacologist, and Cosmetic Scientist, to name a few!					

Year 7 – Intent: Engage and enthuse students in the application of Science (including literacy and numeracy skills). To gain understanding of it in a physical and natural world.

Term 1 a		Term 1	Term 2	Term 3
Scheme of Work: Year 7 Transition to Science (Revised July 2022) Learning Intent: To capture prior knowledge of students and explore the purpose of Science through the development of practical skills.		Scheme of Work: C1 & C2 Particles Elements, atoms, compounds Learning Intent: Be able to explain materials and their properties by applying particle theory	Scheme of Work: C3 Reactions Learning Intent: Understand how chemical reactions take place and use particle theory to explain practical science.	Scheme of Work: C4 Acids and Alkalis Learning Intent: To use investigation skills to understand the reactions between acid and alkalis
Measuring Impact through:	*Baseline assessment*	*Measuring Impact through:*	*AFL and internal assessment practices. These include detailed and levelled end of topic tests and short individual topic-based assessments where appropriate*	

Year 8 – Intent: Engage and enthuse students in the application of Science (including literacy and numeracy skills). To gain understanding of it in a physical and natural world. Students have the opportunities to develop practical skills and to apply to real world problems.

Term 1	Term 2	Term 3
Scheme of Work: C1 Periodic Table Learning Intent: To be able to carry out chemical reactions safely and predict the outcomes of reactions.	Scheme of Work: C2 Separation techniques Learning Intent: To be able to apply scientific techniques to the problem of separating mixtures.	Scheme of Work: C3 Metals and Acids Learning Intent: To apply knowledge of the periodic table to predict outcomes and understand the chemical properties of materials around them.
Measuring Impact through:	AFL and internal assessment practices. These include detailed and levelled end of topic tests and short individual topic-based assessments where appropriate	

Year 9 – Intent: Expose students to the developing nature of learning resources, including the implications of use. Building on prior knowledge to tackle more complex problems. Continue to use analytical skill and interpret data in readiness for Key Stage 4 Curriculum, which commences in Term 3.

Term 1	Term 2	Term 3
Scheme of Work: 9ca – Environmental chemistry Learning Intent: Evaluating evidence to support scientific theories and predicting future impact using models around the question 'Have humans changed the atmosphere?'	Scheme of Work: 9cb - Materials Learning Intent: Matching property to purpose and using data analysis to evaluate performance of materials for different circumstances whilst answering the question 'Why do we build houses from bricks?'	Scheme of Work: 9cc – Chemical Reactions Learning Intent: Give students the opportunity to further develop safe use of a range of practical techniques whilst exploring the question 'How does Chemistry influence our lives?'
Measuring Impact through:	*AFL and internal assessment practices. These include detailed and levelled end of topic tests and short individual topic-based assessments where appropriate*	

Year 10– Intent: To further enhance and develop mathematical skills learnt at KS3. Working scientifically and using apparatus and techniques, students will build on their basic concepts and principles, in areas such as atomic structure, bonding and structure and quantitative chemistry.

Term 1/2		Term 2/3		Term 3
Scheme of Work: C1 Atoms, elements, compounds and mixtures and The Periodic Table Learning Intent: Trends in behaviours of naturally occurring substances, and the use of the Periodic Table to predict outcomes of chemical reactions	Scheme of Work: C2 Bonding and Structure and Types of matter Learning Intent: How combining elements can give rise to a range of materials with varying properties and how these link to structure in order to understand their uses in modern technological applications.	Scheme of Work: C3 Amounts of substance. Concentrations. Atom economy and Yield. Learning Intent: Developing fluency in using formulae and equations to communicate chemical reactions. Assess purity and yield for industrial processes.	Scheme of Work: C4 Chemical Changes Learning Intent: Explore the way that chemicals react with each other in order to develop materials and processes to extract further resources and understand reactions that take place in living organisms.	Scheme of Work: C5 Energy changes Learning Intent: Recognise the transfer of energy due to the breaking and formation of bonds can lead to a heating or cooling effect and how it is used in everyday applications and the generation of electricity.
Measuring Impact through: Individual end of unit internal tests (50 Marks) and in Paper 1 of external exam in Year 11. In class AFL activities				

Year 11– Intent: To further enhance and develop knowledge and skills learnt at KS3 and year 10. Working scientifically and using apparatus and techniques, students will build on their basic concepts and principles, in areas such as atomic structure, bonding and structure and quantitative chemistry.

Term 1		Term 2			
Scheme of Work: C6 Rates of Reaction and Reversible reactions Learning Intent: Understand how changing conditions of chemical reactions to maximise yield and give better industrial output. To explore the human impact of this.	Scheme of Work: C7 Hydrocarbons, Crude Oil and Organic Compounds Learning Intent: To learn that the main sources of organic compounds are living, or were once living materials from plants and animals. Apply knowledge to describe how chemists can make organic molecules to make everyday products.	Scheme of Work: C8 Chemical Analysis Learning Intent: In the world of work, this unit allows links to be made to roles like forensic and drug control scientists. Students learn how a range of qualitative tests detects specific chemicals based on reactions that produce gas, with distinctive properties, in addition to instrumental methods.	Scheme of Work: C9 Chemistry of the Atmosphere Learning Intent: To understand causes of ever changing environment cycles. Learn that scientists use a range of equipment to help predict and solve these issues to reduce impact of human activity.	Scheme of Work: C10 Using resources Learning Intent: Learn how chemists aim to develop ways of disposing of products at the end of their useful lives. Apply knowledge to discuss how environmental chemists study how human activity effects Earth's natural cycles and how damaging impacts are minimised.	
Measuring Impact through: Individual end of unit internal tests (50 Marks) and in Paper 2 of external exam in Year 11. In class AFL activities					

Year 12– Intent: To develop an appreciation of the scope of chemistry to influence our lives. Students will further their understanding and knowledge of physical, inorganic and organic chemistry. They will use practical sessions to deepen their grasp of chemical fundamentals and the scientific method. Students will learn to handle chemicals safely and understand the process of risk assessment. During the course students will be made aware of the large number of STEM careers that rely on an advanced qualification in chemistry.

Term 1		Term 2/3		Throughout Year 12
Scheme of Work: Physical chemistry Learning Intent: Students will learn about the structure of the atom, why atoms bond and the usefulness of the periodic table. They will calculate chemical amounts in a variety of contexts. Energetics will be studied which will lead on to an appreciation of why chemical reactions proceed at different rates. Students will study why reactions reach an equilibrium and how redox explains how electrical energy can be obtained from chemical reactions		Scheme of Work: Inorganic Chemistry Learning Intent: Students will study the true nature of trends in the periodic table and relate these to their work in Physical Chemistry. Using a practical approach students will study the chemistry of group 2 and 7 elements and be able to write both symbolic and ionic equations.	Scheme of Work: Organic Chemistry Learning Intent: Students will further develop their understanding of carbon compounds, including the alkanes, alkenes, halogenoalkanes and alcohols. They will learn elementary reaction mechanisms and be able to predict the behaviour of unknown molecules. Students will learn the rudiments of chemical and spectroscopic analysis.	Scheme of Work: Practical Chemistry Learning Intent: Students will be taught how to handle chemicals and the importance of risk assessment. They will carry out at least 6 practical assessments as well as performing illustrative practicals to aid their understanding of theoretical chemistry.
Measuring Impact though:	Internal tests involving all types of question. Homework concentrating on opportunities to show flair and depth of understanding	Internal tests involving all types of question. Homework concentrating on opportunities to show flair and depth of understanding	Internal tests involving all types of question. Homework concentrating on opportunities to show flair and depth of understanding	Use of CPAC criteria, effect on test scores and understanding. Assessment of enjoyment of the subject

Year 13– Intent: To develop an appreciation of the scope of chemistry to influence our lives. Students will further their understanding and knowledge of physical, inorganic and organic chemistry. They will use practical sessions to deepen their grasp of chemical fundamentals and the scientific method. Students will learn to handle chemicals safely and understand the process of risk assessment. During the course students will be made aware of the large number of STEM careers that rely on an advanced qualification in chemistry.

Term 1	Term 2/3		Throughout Year 13
Scheme of Work: Physical Chemistry Learning Intent: Students will deepen their knowledge of various types of equilibria (acid / Base, redox, and gas systems). They will continue to deepen their use of mathematics to solve problems and predict the outcome of chemical reactions.	Scheme of Work: Inorganic Chemistry Learning Intent: Students will study the chemistry of the transition metals and be able to describe chemical reactions using complex notation. They will use practical work to illustrate the usefulness of transition metal chemistry in our everyday lives. Also students will study the chemistry of aqueous ions and relate this to the properties of transition metals. The periodic properties of period 3 elements will be studied and linked to the study of atomic structure and the properties of matter.	Scheme of Work: Organic Chemistry Learning Intent: Students will study the behaviour of more complex homologous series, the carbonyls, amines, alcohols, arenes, polymers and amino acids. They will learn how to construct and interrogate reaction sequences and how NMR can be used to ascertain the structure of Organic molecules.	Scheme of Work: Practical Chemistry Learning Intent: Students carryout a further 6 practical assessments. They deepen their ability to use mathematical methods to assess precision, accuracy and error.
Measuring Impact through: Internal assessments and Final Exam performance on Paper2. CPAC skills will be assessed as an ongoing exercise		*Measuring Impact through: Internal assessments and Final Exam performance on Paper3. CPAC skills will be assessed as an ongoing exercise*	