Year 9: Chemistry

Curriculum Intent: Year 9 Chemistry looks to build on the foundations from years 7&8 and work towards developing knowledge of the same 4 areas: Particles, Periodic Table, Chemical Reactions and Earth and Environmental Science, with the addition of more complex ideas in Monitoring Reactions. The subject and procedural knowledge demands increase in this year, and students will be exposed to more complex ideas, models and explanations. Practical Activities (PAG) will be coupled with mathematical skills to build more procedural knowledge; focusing on areas such as data analysis and interpretation of graphs. The Chemical knowledge developed through this year will proved the basis for further study in these areas as students enter year 10, with the whole of the combined science content being taught before the year 10 PPE.

	Topic 1 Particles and PT	**Topic 2** Chemical reactions	**Topic 3** Monitoring reactions	**Topic 4** Earth and environmental science
Key ideas	• Revision/retrieval • Changes of state • Ion/isotopes/groups/ periods • Ionic dot and cross • Covalent dot and cross • Structure of metals • Giant covalent • Rf calculations • Fractional distillation (separation technique)	• Revision/retrieval • RFM • Balancing equations • Energy profile diagrams • Redox • Electrolysis theory • Electrolysis practical • Acids and bases - reactions	• Revision/retrieval • Group 1 – trend and equations • Group 7 – trend and equations • Group 0 and transition metals • Rates and temperature • Rates and concentration • Rates and surface area • Rates and catalysts • Reversible reactions	• Revision/retrieval • Alkanes • Fractional distillation • Cracking alkanes • Research project on uses and disadvantages of using crude oil
Sequence of Learning - Key Questions	1. Everything from topic 1 and 2 from year 7+8 2. How do materials change state? 3. Describe the melting and boiling in covalent, ionic and metals. 4. What are groups and periods? 5. What is an ion?	1. Everything from topic 3 in year 7 and topic 3 NOT relating to rates of reactions 2. How do you calculate the RFM of a molecule? 3. How do you balance a symbol equation? 4. Can you draw a reaction profile for an endothermic	1. All questions from topic 3 in year 8 relating to rates of reaction 2. What is the reactivity trend down group 1? 3. Can you write word equations for alkali metals reacting with water? 4. What is the reactivity trend down group 7?	1. All questions from topic 4 in years 7&8 2. What are alkanes? 3. Where do alkanes come from? 4. Name and draw the first six alkanes. 5. What is the general formula for alkanes? 6. How is crude oil separated?

	6. What is an isotope? 7. How do you find PEN of ions and isotopes? 8. How do you draw ionic compounds? 9. How do you draw covalent compounds? 10. How do you draw a metal? 11. What are the differences between diamond and graphite? 12. How do you calculate the Rf value? 13. How do you use the Rf value to identify compounds? 14. How is fractional distillation different from simple distillation?	and an exothermic reaction? 5. What is the difference between endo and exo reaction profiles? 6. What is the definition of oxidation? 7. What is the definition of reduction? 8. What is an electrolysis reaction? 9. What is an anode and a cathode? 10. What happens during an electrolysis reaction? 11. What are the products of an acid and alkali reaction? 12. How do you name salts? 13. Can you write and balance acid and alkali word and symbol equations given the symbols of compounds?	5. Can you predict and write equations for group 7 displacement reactions? 6. Describe the properties of group 0 elements 7. Describe the properties of transition metals 8. How and why does increasing the temperature affect the rate of reaction? 9. How and why does increasing the concentration affect the rate of reaction? 10. How and why does increasing the surface area affect the rate of reaction? 11. How and why does adding a catalyst affect the rate of reaction? 12. What is a reversible reaction?	7. How are long chain alkanes made into shorter ones? 8. Why is cracking used?
Vocabulary	Solid Liquid Gas Melting Point Boiling Point Ion Isotope Group Period Ionic compound Covalent compound Dot and cross diagram Metals	Relative formula mass Symbol equation Endothermic Exothermic Reduction Oxidation Redox Electrolysis Anode Cathode Electrolyte Salt Acid	Reactivity Inert Catalyst Properties Collision Kinetic energy Activation energy Concentration Surface area Frequent Successful	Alkanes Hydrocarbon Crude oil Saturated Methane Ethane Propane Butane Pentane Hexane Fractions Fractional Distillation Catalytic cracking

	Lattice Giant covalent Rf value Fractional Distillation	Alkali Neutralisation		
Practical Skills	Measuring melting point of a substance Calculating Rf value from chromatography Simple distillation of ink/water mixture	Electrolysis of of $CuCl_2$ Acid and alkali neutralisation - NaOH + HCl, H_2SO_4, HNO_3 Measuring the temperature change of endo and exothermic reactions	Group 7 displacement reactions Group 1 demo Measuring the rate of reaction with gas syringes and inverted cylinders - Change temperature - Change concentration - Change surface area - Use different catalysts Heating hydrated copper sulfate and reverse with adding water	Cracking alkanes practical Spirit burners for combustion
Assessment (Related to mastery grids)	Chemistry 5A badger task (in KS4) Exam practice – assessed hwk task	Balancing equations and rfm calculations quiz Exam practice – assessed hwk task	Planning and completing a rate of reaction experiment Exam practice – assessed hwk task	Research project on crude oil Exam practice – assessed hwk task