

	Chapter	Content	Knowledge	Skills	Key Questions	Assessment	Literacy/numeracy	SMSC
Autumn 1	C3, C4 & C5	C3 - Structure and Bonding Covalent Bonding and Structures Fullerenes and Graphenes Metallic Bonding C4 - Chemical Calculations Relative and molecular mass Equation calculations C5 - Chemical Changes Content: Neutralisation and pH scale Strong and Weak Acids	How atoms can form ions How the different ionic, covalent and metallic bonds are formed How fullerenes and graphene originated Calculate the relative atomic mass and formula mass Calculating moles How to calculate the concentration of solutions Recall the different reactions of acids Why chemicals are either acids or alkali How to identify acids and alkalis How pH and acid concentration link	Appreciate the limitations of the particle theory and structure models Identification of different bonding in different elements Recognition of different compounds from diagrams. Using moles = mass x mr confidently Know what the balanced symbol equation tells about the chemical equation Deduce reactivity of metals from experimental data Predict reactions of unfamiliar metals when given information of their reactivity Identifying which chemicals have been oxidised or reduced in an ionic equation	How do atoms bond to each other? How can we use chemical equations to predict reacting quantities?	Diagnostics Test End of Chapter Test ReAct Task	Writing Ionic formulae Calculating charges on ions Rearranging and solving equations. Fractions in equations. solids, liquids, gases, particle theory, covalent, ionic, metallic, bonding, lattice, polymers, intermolecular, delocalised, fullerenes, alloys, relative atomic mass, relative formula mass, limiting reagent. Chemistry Keywords: ores, oxidised, ionic, neutralisation, alkalis, bases, neutral, pH scale, strong acids, weak acids	SMSC: Working together to collect data from the practical Sharing results from practicals to ensure reliability How could we sustainably produce chemicals to sell? Working together to complete the practical safely.
	B5	Communicable Diseases Health Pathogens Preventing Infections Bacteria, Viruses, Fungi and Protists in animals and plants Human and plant defence	Knowing how infections are spread from organism to organism. Describing how different pathogens infect organisms. Making lists of different diseases caused by certain pathogens. Knowing how plants and animals prevent and respond to infection.	Identifying different variables Confidence to carry out practicals Writing risk assessments. Recording data in a table.	How do Scientists carry out and document research? What are communicable diseases and how can we prevent them? How do pathogens infect organisms? Why was the periodic table such a significant science break through?	Diagnostics Test End of Chapter Test ReAct Task	Biology Key words: infection, pathogen, communicable disease, virus, bacteria, fungus, protist, aseptic technique, culture	Understanding how the spread of diseases can be minimised
	B6	Preventing and Treating Disease: Vaccination Antibiotics vs painkillers Discovering drugs Developing drugs	Knowing how vaccines work and the importance of herd immunity. Compare and contrast the use and effectiveness of antibiotics vs painkillers. Describe how drugs are discovered and the process involved in their development.	Analysing data	Who is Alexander Fleming? How do vaccines work? Why is herd immunity important in a population?	Diagnostics Test End of Chapter Test ReAct Task	Numeracy: calculating rate, interpreting data from graphs, percentage change Biology Key words: vaccinations, placebo, double blind trials	Understanding the role of vaccines and drug development in treating diseases
	B7	Non-communicable diseases: Health Non-communicable diseases Cancer and carcinogens Smoking and its risks Diet, exercise and its effects on preventing diseases Alcohol and its risks	Describe how the term 'health' encompasses both mental and physical wellbeing. Describe what cancer is and factors that may cause it. Explore the risks associated with smoking and alcohol and health. Explain how lifestyle choices such as diet and exercise play an important role in disease prevention.	Analysing data	How can your lifestyle affect your risk of developing many non-communicable diseases?	Diagnostics Test End of Chapter Test ReAct Task	Numeracy: calculating rate, interpreting data from graphs, percentage change Biology Key words: vaccine, health, limiting factors, carcinogen	Understanding the role of vaccines and drug development in treating diseases
Autumn 2	P4	Introduction to Circuits: Electrical Charges and Fields Current and Charge Potential Difference and Resistance Series and Parallel Circuits Electrical Component Characteristics	Investigating Resistance of a wire and resistors in series and parallel Investigating I-V characteristics of electrical components	To be able to use and read voltmeters and ammeters correctly To be able to construct electrical circuits correctly and safely. To be able to record scientific data accurately To be able to manipulate and use electrical equations correctly when appropriate	What is electricity? What is charge? What is resistance?	Diagnostics Test End of Chapter Test ReAct Task	Conversation between units. Recording data. Calculating current, voltage, power and resistance and order of magnitude. Physics Key words: Proton, Neutron, Ion, Electron, Current, Voltage, Charge, Potential Difference, Resistance	How does the world around us work?
	P5	Electricity in the home Alternating current Cables and Plugs Electrical power and potential difference Electrical current and energy transfer Appliances and energy efficiency		Learning how to wire a plug Calculating power, charge, energy transferred and efficiency	What type of current supplies our homes? How can we tell if our appliances are efficient? How can we calculate the power of an appliance? What is charge? Which fuse do we use for different appliances?	Diagnostics Test End of Chapter Test ReAct Task	Current, Voltage, Charge, Potential Difference, Resistance. Power, efficiency, direct and alternate current, fuse. Numeracy: Calculating specific latent heat and order of magnitude	
	P6	Molecules and Matter: Density States of Matter Internal Energy Specific Latent Heat Gas Pressure and Temperature		Calculating Densities of objects (solids and liquids)	What type of current supplies our homes? How can we tell if our appliances are efficient? How can we calculate the power of an appliance? What is charge? Which fuse do we use for different appliances?	Diagnostics Test End of Chapter Test ReAct Task	Density, Physical Changes, Changing State, Melting Point, Boiling Point, Freezing Point, Internal Energy, Specific Latent Heat of Fusion, Specific Latent Heat of Vaporisation	

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	P7	Radioactivity: Atoms and Radiation Discovery of the Nucleus Alpha, Beta and Gamma Radiation Activity and Half-life		To recall and identify correct scientific knowledge To be able to construct and complete radioactivity decay equations correctly	What were the key discoveries that led to the development of the model of the nuclear model of the atom?	Diagnostics Test End of Chapter Test ReAct Task	Key words: Alpha, Beta, Gamma Radiation, Atomic Number, Mass Number, Isotopes, Ionisation, Irradiation, Activity, Count Rate, Chain Reaction, Nuclear Fusion, Nuclear Fission Numeracy: Interpreting mass and atomic number notation in radioactive decay equations	
	B8	Bioenergetics: Photosynthesis Plant cells and chloroplast Rate of photosynthesis Glucose Optimising photosynthesis	Recognise the need for photosynthesis in plants and the role that plant cells and their chloroplasts play. Describe the process of photosynthesis identifying the reactants and products. Describe factors that affect the rate of photosynthesis. Describe how plants use the glucose produced in photosynthesis.	Writing word and chemical equation for photosynthesis Quantitatively test the rate of photosynthesis	How do plants use the glucose they make during photosynthesis?	Diagnostics Test End of Chapter Test ReAct Task	Biology Key words: metabolism, respiration, oxygen debt,	
Spring 1	C6	Electrolysis Content: What is electrolysis Extraction of aluminium Electrolysis of Solutions	Know how electrolysis works Understand why electrolysis only works with ionic compounds What happens to ions during electrolysis How does water affect the products of electrolysis How to extract aluminium Products from the electrolysis of brine	Required Practical Investigating the electrolysis of different solutions Representing the reactions occurring at each electrode as a half equation Predicting the products of the electrolysis of aqueous solutions Recording information from a practical Identifying the risks and hazards of a practical	How can we decompose ionic compounds to get useful products?	Diagnostics Test End of Chapter Test ReAct Task	Numeracy: Balancing Equations Recording data in a table. Keywords: electrolyte, anode, cathode, inert, brine	Is electrolysis the most environmentally friendly way to extract aluminium?
	C7	Energy Changes Content: Exo and Endothermic reactions Reaction Profiles Bond Energy Calculations Chemical Cells Fuel Cells	How to distinguish between exo and endothermic reactions Where exo and endothermic reactions are used in everyday life How to draw simple reaction profiles Calculating the over energy change of a reaction How to write half equations for fuel cells	Required Practical Investigating temperature changes of different reactions Plan an investigation on identifying temperature change for different solutions. Evaluate the uses and applications of exo and endothermic reactions when given appropriate information Identify reaction profiles for exo and endothermic reactions Calculate the overall energy change for a reaction Interpret data on chemical cells in terms of the relative reactivity of different materials Evaluate the use of chemical cells when given information Evaluate the use of hydrogen fuel cells	Why do chemical reactions always involve energy transfers?	Diagnostics Test End of Chapter Test ReAct Task	Numeracy: Recording data Calculating energy changes Keywords: exothermic, endothermic, activation energy, bond energy, electrical cells, fuel cell	Working together to plan an investigation Could fuel cells help to reduce our dependence on fossil fuels?
	B9	Bioenergetics: Respiration Aerobic vs. Anaerobic respiration Exercise and the body Oxygen debt Fermentation	Explain the difference between aerobic and anaerobic respiration. Explain what is meant by an oxygen debt. Know that anaerobic respiration takes place in different organisms and how it differs in each.	Qualitatively test exercise affects pulse	How does exercise affect breathing and heart rate?	Diagnostics Test End of Chapter Test ReAct Task	Key words: metabolism, respiration, oxygen debt,	
	B10	Biological Responses: The Human Nervous System Homeostasis Central Nervous System Reflexes	Identify why it is important for the body to maintain an internal balance. Describe how the body maintains homeostasis. Recall parts of the central nervous system. Explain how a reflex occurs and the role of synapses. Required Practical: Measuring reaction times	Qualitatively test exercise affects pulse Qualitatively test reaction times Interpret data from tables and graph	How does exercise affect breathing and heart rate? How does the nervous system help with survival? What factors affect reaction times? What is homeostasis and why is it so important?	Diagnostics Test End of Chapter Test ReAct Task	Key words: metabolism, respiration, oxygen debt, homeostasis, reflex, synapse, cerebellum, cerebral cortex, hypothalamus, medulla, pituitary gland Numeracy: Interpreting data and graphs, calculating mean	

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Spring 2	C8	Rates and Equilibrium Content: Rates of Reactions Collision Theory Factors affecting collision theory Reversible Reactions Dynamic Equilibrium	Different ways of measuring rates of reactions Know the factors that affect the rate of reaction Explain how different factors affecting collision theory affect the rate of reaction Know what a reversible reaction is and how to represent them What happens in the energy transfers in reversible reactions How a reversible reaction in a closed system can be at equilibrium	Calculating the mean rate Calculating the rate at a specific time. Planning a practical Interpreting graphs Linking the changes in condition with the composition of a reaction Evaluating the uses of catalysts	How are reaction rates affected by changing conditions?	Diagnostics Test End of Chapter Test ReAct Task	Numeracy: Calculating Tangents Recording Data in a table Plotting graphs Measuring the mass of chemicals Rearranging equations Keywords: Rate, collision theory, activation energy, gradient, tangent, catalysts, reversible reactions, hydrated, anhydrous, equilibrium	- Working together to carry out a practical. - Evaluating the uses of catalysts in industry
	C9	Crude Oil and Fuels Content: Hydrocarbons Fractional Distillation Burning fuels Cracking	Know the composition of crude oil Naming and representing alkanes Process of fractional distillation Identify the different types of combustion Know why we need to crack long chain hydrocarbons	Drawing and representing chemicals Writing balanced equations for complete and incomplete combustion Identifying different functional groups Writing balanced equations for cracking	How is a range of useful products obtained from crude oil? How do functional groups affect the reactions of organic compounds?	Diagnostics Test End of Chapter Test ReAct Task	Numeracy: Calculating the formulae of common functional groups Balancing equations Keywords: mixture, hydrocarbons, fractions, distillation, alkanes, saturated, general formulae, flammable, fractional distillation, oxidise, cracking, thermal decomposition, unsaturated, functional group	Is crude oil good for our environment or should we use alternative sources?
	B11	Hormonal Communication Mammals. Hormonal control Controlling blood glucose levels Diabetes and its treatment Negative feedback Human reproduction The menstrual cycle Artificial control of fertility Infertility treatments	Recognise how hormones are involved with maintaining homeostasis in mammals. Explain how blood glucose levels are controlled. Describe the different types of diabetes and how they are treated. Explain what is meant by negative feedback and its role in the body. Identify hormones involved in human reproduction, their roles and where they are produced. Outline the menstrual cycle and explain how it is controlled by hormones. List different methods of contraception and compare their effectiveness.	Interpret data from tables and graph. Evaluate different types of contraceptions and the risks of each	How do hormones control the release of a mature egg in the human menstrual cycle?	Diagnostics Test End of Chapter Test ReAct Task	Key words: hormone, pupil, lens, menstrual cycle, oestrogen, FSH, LH, contraception, infertility, IVF Numeracy: Interpreting data and graphs	Evaluate different solutions and treatments for infertility.
Summer 1	P8	Forces in Balance: Vectors and Scalars Resultant Forces Centre of Mass Resolution of Forces		To recall and identify correct scientific knowledge	How can moments help to lift heavy objects?	Diagnostics Test End of Chapter Test ReAct Task	Key words: Displacement, Vector, Scalar, Magnitude, Newton's 1st and 3rd Law, Friction, Resultant Force, Moment	
	P9	Motion: Speed and Distance-Time Graphs Velocity and acceleration Analysing Motion Graphs		To be able to draw and analyse graphs correctly	How can you work out the acceleration of an object from a speed-time graph?	Diagnostics Test End of Chapter Test ReAct Task		
	P10	Force and Motion: Force and acceleration Weight and terminal velocity Forces and breaking Momentum and conservation of momentum		Required Practicals: Investigating the relationship between force and acceleration Investigating the relationship between force and the extension of a spring To recall and identify correct scientific knowledge To be able to use and manipulate $f = ma$ equation To be able to use stop watch accurately To be able to use a ruler effectively to measure length		Diagnostics Test End of Chapter Test ReAct Task	Numeracy: Calculating resultant force and moments and order of magnitude	

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Summer 2	C10	Chemical Analysis Content: Pure Substances and Mixtures Chromatography Gas Tests Testing for Ions Instrumental Analysis	How chromatography can identify between pure and impure substances How chromatography works Tests for common gases	Identifying pure and impure substances by chromatography Distinguishing pure substances from impure by melting point Identifying formations Interpreting Chromatograms	How can we use chemical tests to identify unknown substances?	Diagnostics Test End of Chapter Test ReAct Task	Numeracy: Measuring the height of a chromatogram Calculating the Rf Value of a chromatogram Reading pie charts Analysing graphs Keywords: Formulations, mixtures, chromatogram, retention factor	Working together to investigate chromatography
	P11	Wave Properties: Properties of waves Reflection and refraction Sound Waves Uses of ultrasound Seismic waves		To recall and identify correct scientific knowledge To be able to use a ripple tank correctly To be able to use a stop watch and meter ruler appropriately	How can energy be passed from one place to another without moving matter between the two places? How are earthquakes formed?	Diagnostics Test End of Chapter Test ReAct Task	Key words: Mechanical Waves, electromagnetic waves, Amplitude, Wavelength, Frequency, Refraction, Transmission, Ultrasound Numeracy: Calculating speed of waves and distance travelled and order of magnitude	
Enrichment opportunities and futures			Visiting the Science Museum Watching the Royal institution on Youtube Visiting the Summer Fayre at the Royal Society of Chemistry Researching the uses of Crude Oil Visiting the Science Museum in Central London Investigate how radiation is used in hospitals (ie. CT scanners, PET scanners etc) Visiting Body World's exhibition in Leicester square- Get up close to real bodies and examine their organs and systems Visit Watson and Crick's original DNA model at the Science Museum in South Kensington- See their model up close Francis Crick Institute at King's Cross- Look into some current research taking place at the Francis Crick Institute in London https://www.cri.ac.uk/ Visit Alexander Fleming's Laboratory at St Mary's Hospital London- see where Fleming discovered penicillin Visiting local power stations and asking about how transformers work					