

Term	Topic	Disciplinary Knowledge	Vocabulary	Assessment	Cross-Curricular Links	Golden Threads	Personal Development	Rationale
1	Biology – Organs, Cells and Microscopes Chemistry – States of Matter Physics - Forces	Observe cells with microscopes, record findings, assess risks, identify variables, read scales accurately, select suitable apparatus, and write methods for investigations, including force experiments using rulers and Newton meters.	Organism Multicellular Unicellular Particle Element Compound Force Balanced Unbalanced Magnitude	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Interpret tables and charts, plot graphs, apply scientific equations for magnification and moments, calculate forces, draw diagrams, solve inequalities, and link maths progression to scientific contexts for accurate data analysis and problem-solving.	Life processes Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> • Biomedical Scientist • Materials Engineer • Structural Engineer 	Build on KS2 learning by introducing cells, particle model, and forces. Reinforce life processes, states of matter, and quantitative measurements while developing scientific skills in data handling, accuracy, and disciplinary methods.
2	Biology – Nutrition and Diet Chemistry – The Periodic Table Physics – Energy Stores and Transfers	Identify variables, predict outcomes, evaluate reliability, and suggest improvements. Assess risks, record temperatures accurately, select equipment, investigate food energy and conductivity, and classify materials using the periodic table.	Nutrient Deficient Digest Conductivity Property Atom Energy Store Transfer	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Record and interpret data in tables and graphs, calculate temperature changes, measure volumes accurately, apply conservation principles for energy, and integrate maths and food technology knowledge into scientific investigations for reliability and precision.	Life processes Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> • Dietician • Chemical Plant Process Operator • Heat Pump Engineer 	Extend KS2 learning by reinforcing living organisms, nutrition, and energy. Develop enquiry through variables, predictions, and data handling. Explore periodic table, chemical reactions, energy conservation, thermal transfer, and improve methods through data evaluation.
3	Biology – Gas Exchange Chemistry – Chemical Reactions Physics – Gravity	Observe leaf structures with microscopes, follow methods, record observations, identify risks, use apparatus for reactions and force investigations, distinguish mass and weight, and repeat experiments to improve accuracy.	Diffusion Stomata Reactants Products Mass Contact Non-contact	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Make observations with microscopes, link to photosynthesis equations, apply KS3 maths for means, unit conversions, ratios, and use weight formula to compute planetary weights using gravitational data	Life processes Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> • Nurse • Pharmacy Assistant • Seismologist 	Link biology and chemistry through diffusion, respiration, and photosynthesis. Reinforce data collection and reliability, explore oxidation and combustion with word equations, and revisit gravity as a non-contact force, calculating weight using mass and gravitational strength.

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4	Biology – Skeletal-Muscular System Chemistry – Acids and Alkalis Physics – Earth’s Magnetic Field and Seasons	Identify risks, test acidity with litmus, record observations, select apparatus, investigate magnetism and Earth’s field, draw magnetic lines, and repeat experiments to improve accuracy and ensure safe, systematic practices.	Contract Muscles Tissue Acid Alkali Neutral Attraction Repulsion Pole	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Measure volumes accurately with pipettes, apply safe techniques, use inequalities to compare data, analyse planetary tables and bar charts, and link maths skills like ratios and inequalities to scientific investigations.	Life processes Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> Physiotherapist and Sports Therapist Consumer Scientist Meteorologist 	Revisit MRS GREN and organ hierarchy, deepen chemistry through acid reactions and word equations, develop safe practical skills, and introduce magnetism as a non-contact force linked to Earth’s properties, seasons, and gravity.
5	Biology – Plant Reproduction Chemistry – The Rock Cycle	Use correct tools for flower dissection and slide preparation, conduct and time seed helicopter experiments, follow clear methods, and repeat investigations to improve accuracy and reliability of results.	Pollen Gamete Fertilisation Dispersal Metamorphic Sedimentary Igneous	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Interpret and present data using tables, line graphs, and bar charts; identify patterns and anomalies; calculate means and percentages; and link to Geography through the Rock Cycle and key vocabulary.	Life processes Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> Dietician Agricultural Engineer Quarry Engineer 	Reinforce KS2 learning on plant reproduction and structure, develop data analysis through seed dispersal, revisit rock types and chemical changes, link to geography, and strengthen disciplinary skills in interpretation and scientific reasoning.
6	Biology - Transport Systems Chemistry – Chemical Reactions 2 Physics – Sound and the Ear	Safely use scientific equipment, analyse data by identifying variables and conclusions, and understand reproducibility and reliability to strengthen scientific practice.	Circulate Xylem Phloem Displace Conserve Longitudinal Wave Frequency	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Interpret and present data using graphs and tables, apply mathematical principles like conservation of mass and speed-time calculations, and strengthen scientific reasoning through blood flow analysis and secondary data calculations.	Life processes Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> Hospital Doctor Chemical Engineer Audiologist 	Deepen knowledge of plants, animals, and chemistry, develop data analysis and reasoning, and explore sound, energy, reproducibility, and safe equipment use.

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1	Biology – Animal Reproduction Chemistry – Properties of Elements Physics – Light Waves and the Eye	Write conclusions from secondary data, check reproducibility, compare wave types, identify hazards, and measure reflection angles accurately using a protractor.	Fertile Gamete Periods Groups Inert Transverse Oscillate	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Plot and interpret graphs, calculate means and percentage change, use standard form, identify trends, and predict outcomes from scientific data.	Life processes Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> Vet Materials Engineer Optometrist 	Students build on plant reproduction by studying animal systems, fertilisation, and menstrual cycle, revisiting life processes, chemistry concepts, and physics topics like light and waves, while developing graphing, calculation, reproducibility, and safe practical skills.
2	Biology – Respiration Chemistry – Chemical and Physical Properties Physics – Forces and their Effects	Identify variables, write methods and conclusions, assess reliability and reproducibility, suggest improvements, and use equipment safely while managing experimental risks.	Mitochondria Aerobic Anaerobic Exothermic Endothermic Magnitude Stationary Gradient	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Organise data in tables, calculate means, plot graphs, apply maths for speed and temperature, convert units, and interpret gradients accurately.	Life processes Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> Performance Sports Scientist Chemical Engineer Automotive Engineer 	Introduce respiration as an energy-releasing reaction, compare to combustion, revisit cells, explore exercise effects, temperature changes, catalysts, and forces, while developing skills in variables, calculations, graphing, risk assessment, and reliable conclusions.
3	Biology – Photosynthesis Chemistry – Separating Mixtures Physics – Physical and Chemical Changes	Understand peer review and publishing, perform separation techniques safely, record mass, manage Bunsen burner risks, and improve methods for accuracy and reliability.	Photosynthesis Biomass Pure Impure Soluble Insoluble Atoms Density	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Interpret data and patterns, analyse ratios, apply maths concepts, assess purity with chromatograms, and calculate using conservation of mass.	Life processes Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> Tree Surgeon Forensic Scientist Materials Engineer 	Explore photosynthesis and its link to respiration, revisit plant processes, develop skills in data interpretation and chromatography, reinforce energy concepts, and ensure safe practical work using Bunsen burners, filter paper, and mass balances.

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4	Biology – Skeletal-Muscular System Chemistry – Acids and Alkalis Physics – Earth’s Magnetic Field and Seasons	Draw evidence-based conclusions from secondary data, explain patterns using scientific knowledge, and interpret results clearly with strong analytical communication.	Enzyme Monomer Polymer Climate Composition Energy Renewable Non-renewable	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Analyse data using percentages, interpret graphs and tables, apply KS3 maths skills, and use standard form for scientific estimations.	Life processes Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> Biochemist Climate Scientist Renewable Energy Engineer 	Study enzymes in digestion and photosynthesis, interpret data, revisit key reactions, and explore carbon cycle, energy, and practical techniques.
5	Biology – Plant Reproduction Chemistry – The Rock Cycle	Explain evolving scientific ideas, evaluate material properties, ensure safe practical work, and improve reliability through accurate measurements and conclusions.	Producer Consumer Trophic Reactivity Recycle	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Calculate toxins in food chains, interpret data using graphs and tables, apply KS3 maths concepts like ratios and inequalities effectively.	Life processes Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> Zoologist Materials Engineer 	Explore ecosystem interdependence, food webs, and energy transfer; calculate toxins, interpret data, and study reactivity, recycling, and material properties, reinforcing links between scientific concepts, maths skills, technology, and environmental impact.
6	Biology - Transport Systems Chemistry – Chemical Reactions 2 Physics – Sound and the Ear	Emphasize peer review, deepen atomic structure knowledge, develop practical skills for circuits, and ensure accurate, reliable data analysis with safety.	Gene Chromosome Allele Proton Neutron Electron Current Potential difference	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Select appropriate graphs, calculate averages, apply ratios and fractions, perform circuit calculations, and analyse trends using accurate data representation.	Life processes Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> Microbiologist Nano-technologist Electrician 	Students revisit reproduction and DNA, explore variation, peer review, and graphing, then study atomic structure and electricity, applying analytical skills to collect, calculate, and interpret data trends for scientific understanding.

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1	B1 – Cell Level Systems	Enzyme action follows lock-and-key; investigations use variables, controls, and equipment to test photosynthesis and exercise effects scientifically.	ATP Complementary DNA Photosynthesis Respiration	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Know key formulas and photosynthesis equation; interpret graphs; apply inverse square law to light intensity changes with distance.	Life processes	Careers: • Microbiologist	Students build on prior learning of enzymes, photosynthesis, and respiration, enhancing skills in risk assessment, equipment selection, method writing, and accurate observation to understand factors influencing biological processes.
2	C1 – Particles and P1 - Matter	Measure dimensions, volumes, and mass; select suitable equipment; visualize particles; ensure reliability; identify errors and explain heating/cooling trends.	Proton Neutron Electron Ion Isotope Specific heat capacity Density	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Calculate neutrons, apply significant figures, compute density, rearrange equations, plot graphs, and determine liquid pressure accurately from data.	Chemical reactions Energy and forces	Careers: • Pharmacologist • Laboratory technician	Students start GCSE C1, learning atomic structure, particles, ions, and isotopes; develop skills in density, energy calculations, gas pressure, and visualizing atomic models while understanding scientific collaboration and peer review.
3	P1 – Matter and B2 – Scaling Up	Measure dimensions and volumes, select suitable tools, identify variables, correct errors, and conclude investigations using observed data.	State Pressure Fluid Undifferentiated Mitosis	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Calculate volumes, convert units, apply significant figures, compute density, plot graphs, and analyse trends in blood flow and transpiration.	Life processes Energy and forces	Careers: • Design engineer] • Naval architect • Quality control officer	Students revisit density and states of matter, calculate energy changes, explore gas pressure, and apply surface area-to-volume ratios to understand efficient exchange in multicellular organisms, reinforcing scientific reasoning and data analysis.

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4	B2 – Scaling Up	Identify variables, select accurate tools, and write evidence-based conclusions linking data trends to hypotheses and scientific principles.	Diffusion Active transport Transpiration Translocation Potometer	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Calculate areas and volumes, measure solids and liquids, interpret blood flow graphs, and compute transpiration rates with precision and correct units.	Life processes	Careers: <ul style="list-style-type: none"> • Cardiologist • Phlebotomist 	Students revisit cell structures, photosynthesis, and respiration; explore efficient exchange in large organisms; calculate surface area-to-volume ratios; and apply data analysis to density, states of matter, energy changes, and gas pressure relationships.
5	C2 – Elements, Compounds and Mixtures	Perform filtration, crystallisation, distillation, and chromatography; select equipment, identify risks, and evaluate methods to develop practical accuracy and design skills.	RFM Chromatography Distillation Filtration Crystallisation Empirical Formulation	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Use decimals, fractions, and percentages; calculate RFM and empirical formula; apply significant figures and standard form for precision.	Chemical reactions	Careers: <ul style="list-style-type: none"> • Analytical Chemist • Chemical plant process operator 	Students build on KS3 knowledge of particles and atomic structure, exploring bonding and forces; apply separation techniques, predict bonding, and evaluate methods, developing logical decision-making for advanced chemical reasoning.
6	C2 – Elements, Compounds and Mixtures and P2 – Forces	Perform filtration, crystallisation, distillation, chromatography, and motion/force investigations; select equipment, identify variables, assess errors, and ensure repeatability and reproducibility.	Bonding Metallic Covalent Ionic Scalar Vector Force	MOR – substantive knowledge recall Assessment – substantive, disciplinary and application	Use decimals, fractions, and percentages; calculate RFM and empirical formula; rearrange equations, compute statistics, interpret graphs, and ensure precision.	Life processes Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> • Motorsport Engineer • Civil engineer • Scaffolders 	Students extend KS3 knowledge by exploring bonding, forces, and atomic structure; apply separation techniques; and study Newton's laws, motion graphs, and force arrows to understand contact and non-contact forces in physics.

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1	B3 – Organism Level Systems	Reflex research tests stimulus type and reaction time; stronger stimuli predict faster reflexes; improve accuracy using sensors and repeated trials.	CNS Hormone Impulse Contraception Diabetes IVF	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Reflex investigations require spotting anomalies, calculating averages, using significant figures, interpreting graphs, and presenting data clearly with units.	Life processes	Careers: <ul style="list-style-type: none"> Performance Sports Scientist 	The nervous system coordinates body responses and homeostasis. Students study hormones, reproduction, and reaction times, applying variables, predictions, methods, improvements, and maths skills like means, graphs, rounding, and anomaly detection.
2	C3 – Chemical Reactions	Electrolysis uses electrodes in electrolyte to form gases; salt production reacts acid and base, evaporates solution, controls risks.	Electrolysis Endothermic Exothermic Conservation Redox	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Conservation of mass uses balanced equations; apply mole and energy formulas, rearrange bond equations, calculate pH, and ensure precision.	Chemical reactions	Careers: <ul style="list-style-type: none"> Chemical engineer Quarry worker 	This unit builds on KS3 and prior chemistry knowledge, exploring atomic-level reactions, predicting outcomes, improving methods, and applying quantitative skills like mole and enthalpy calculations to strengthen practical competence and analytical reasoning.
3	P3 – Electricity	Circuit tests need digital meters, tight connections, and temperature control; reproducibility and accuracy improve with consistent apparatus and trials.	Static Current Potential difference Electromagnet Series Parallel	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Plot graphs with clear axes and units; apply Ohm's law, power, energy, resistance formulas; use prefixes and significant figures.	Energy and forces	Careers: <ul style="list-style-type: none"> Electrical Engineer Electrician Recycling operative 	Students progress from KS3 to advanced electricity and magnetism, exploring electrostatic and electric fields, constructing circuits, analysing current, voltage, resistance, and linking charge flow to magnetic fields for deeper conceptual understanding.

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4	B4 – Community Level Systems and C4 – Predicting and Identifying Reactions and Products	Observe root nodules' size, number, and colour; record details; conclude health and nitrogen-fixing role supporting soil fertility hypothesis.	Ecosystem Community Habitat Population Competition Halogen Noble gas Reactivity Trend Density	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Skills include ratios, percentages, inequalities, scaling axes, plotting graphs, adding best-fit lines, interpreting charts, predicting trends, and spotting anomalies.	Life processes Chemical reactions	Careers: • Ecologist • Pharmacist • Ceramics designer	Students study ecosystems, food webs, and nutrient cycling, linking energy transfer to photosynthesis. Chemistry extends KS3 knowledge with atomic structure, reactivity, and practical skills like predicting reactions, analysing data, and presenting accurate graphs and charts.
5	P4 – Waves and Radioactivity	Ripple tank practical observes wave behaviour; measure wavelength and frequency accurately using ruler and stopwatch; calculate frequency from timed wave cycles.	Wavelength Amplitude Transverse Decay	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Students develop skills calculating wave speed and half-life, converting units, using standard form, interpreting data, and supporting hypotheses.	Energy and forces	Careers: • Nuclear Engineer • Radiographer • Seismologist • Sound engineer	Students explore energy transfer through waves, study electromagnetic spectrum, and link concepts to radiation and atomic emissions, reinforcing atomic structure knowledge while investigating wave behaviour, applications, and potential hazards in scientific contexts.
6	B5 – Genes, Inheritance and Selection	Explain why ideas change with new technology.	Gene Chromosome Homozygous Heterozygous	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Students build data skills by creating frequency tables, histograms, and bar charts, calculating averages, probabilities, and interpreting scientific data accurately.	Life processes	Careers: • Animal breeding technician	Students build on KS3 reproduction knowledge to study DNA inheritance, variation, and natural selection, analysing evolution evidence and applying mathematical skills through interpreting frequency tables, bar charts, and histograms for scientific conclusions.

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1	C5 – Monitoring and Controlling Chemical Reactions and P5 – Energy	Students measure reaction rates, calculate heat capacity, predict outcomes, identify variables, and improve accuracy.	Catalyst Kinetic energy Activation energy Store Transfer Radiation	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Students develop graphing, data interpretation, and calculation skills, applying scientific methods to analyse trends accurately.	Chemical reactions Energy and forces	Careers: <ul style="list-style-type: none"> Research Scientist Quality control officer Gas plumber Thermal insulation engineer 	Students deepen understanding of reactions, catalysts, and equilibrium, revisiting energy transfer and efficiency. They apply concepts to real-world contexts like insulation, evaluating methods to minimise energy loss and improve sustainability.
2	B6 – Global Challenges	Students learn sampling, aseptic techniques, identify errors, improve reliability, and explore evolving scientific ideas.	Sampling Quadrat Transect Phagocyte Lymphocyte	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Students strengthen maths skills by calculating averages, ratios, areas, and interpreting data for reliable conclusions.	Life processes	Careers: <ul style="list-style-type: none"> Environmental consultant Biomedical Scientist 	Students apply biological knowledge to global challenges, investigating ecosystems, disease spread, and sustainability. Practical work includes sampling and aseptic techniques, supported by mathematical skills like area calculation to enhance scientific reasoning and accuracy.
3	C6 – Global Challenges	Students measure electrolysis, predict outcomes, identify errors, improve reliability, and develop safe, critical laboratory skills.	Fractional distillation Hydrocarbon Cracking Atmosphere Potable water	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Students develop data-handling skills, interpret graphs, identify trends, and convert values for accurate scientific analysis.	Chemical reactions	Careers: <ul style="list-style-type: none"> Environmental consultant Recycling operative 	Students apply chemical knowledge to global challenges, revisiting carbon cycle, reactivity, and electrolysis. Practical work includes copper purification, data analysis, and predictions, strengthening problem-solving and understanding chemistry's role in sustainability and improving lives.
4	P6 – Global Challenges	Students design reaction time tests, record observations, analyse reliability, and develop accuracy and evaluation skills.	Transformer Stopping distance National grid	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Students estimate calculations, compute motion variables, and interpret data using charts, graphs, and frequency tables.	Energy and forces	Careers: <ul style="list-style-type: none"> Forensic collision Investigator Wind turbine technician 	Students integrate physics concepts to address global challenges, exploring forces, motion, and electricity. They evaluate energy resources, efficiency, and safety, applying knowledge to sustainability and real-world contexts through a synoptic approach.

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1	B1 – Cell Structures	Comparison of transcription and translation and how mutations affect phenotypes.	Transcription Translation	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Carry out rate calculations for chemical reactions and understand and use simple compound measures such as the rate of reaction.	Life processes	Careers: • Microbiologist	Life processes depend on biological molecules whose structure is related to their function. Inside every cell is genetic material and this is used as a code to make proteins. Enzymes are important proteins in biology.
1+2	B3 – Organism Level Systems	Demonstrate cooling effect of skin and effect of water potential on cells. Problems associated with eye defects and brain research.	Auxin Nephron Impulse Negative feedback	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Reflex investigations require spotting anomalies, calculating averages, using significant figures, interpreting graphs, and presenting data clearly with units and standard form.	Life processes	Careers: • Performance Sports Scientist	The nervous system coordinates body responses and homeostasis. Students study hormones, reproduction, and reaction times, applying variables, predictions, methods, improvements, and maths skills like means, graphs, rounding, and anomaly detection.
4	B4 - Ecosystems	Learners should understand food webs, variation for survival, and how organisms both influence and respond to environmental changes within ecosystems.	Ecosystem Community Habitat Population Competition	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Calculate rates, percentages, fractions, plot and draw appropriate graphs, extract information from charts and graphs.	Life processes	Careers: • Ecologist	Microorganisms recycle chemicals in ecosystems where biotic and abiotic factors interact. Organisms form populations, communities, and ecosystems, showing interdependence, adaptations, and feeding relationships that maintain stability and biomass flow.

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1	B5 – Genes, Inheritance and Selection	Learners should understand heredity as genetic information transfer via chromosomes, genes, and DNA, and appreciate how environmental changes can cause extinction through competition and reproduction failure.	Transcription Translation Auxin Nephron Impulse Negative feedback	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Apply ratios and direct proportion in genetic crosses, use probability to predict outcomes, and accurately interpret data from charts, graphs, and tables for analysis.	Life processes	Careers: • Animal breeding technician	Students build on KS3 reproduction knowledge to study DNA inheritance, variation, and natural selection, analysing evolution evidence and applying mathematical skills through interpreting frequency tables, bar charts, and histograms for scientific conclusions.
2, 3 + 4	B6 – Global Challenges	Learners should understand ecosystems, biotic and abiotic influences, heredity, DNA organisation, photosynthesis, species interactions, variability, and health impacts of diet, exercise, drugs, and environmental changes.	Sampling Quadrat Transect Phagocyte Lymphocyte	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Students strengthen maths skills by calculating averages, ratios, areas, and interpreting data for reliable conclusions.	Life processes	Careers: • Environmental consultant • Biomedical Scientist	Students apply biological knowledge to global challenges, investigating ecosystems, disease spread, and sustainability. Practical work includes sampling and aseptic techniques, supported by mathematical skills like area calculation to enhance scientific reasoning and accuracy.

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1 + 2	C3 – Chemical Reactions	Electrolysis uses electrodes in electrolyte to form gases; salt production reacts acid and base, evaporates solution, controls risks.	Electrolysis Endothermic Exothermic Conservation Redox	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Conservation of mass uses balanced equations; apply mole and energy formulas, rearrange bond equations, calculate pH, and ensure precision.	Chemical reactions	Careers <ul style="list-style-type: none"> Chemical engineer Quarry worker 	This unit builds on KS3 and prior chemistry knowledge, exploring atomic-level reactions, predicting outcomes, improving methods, and applying quantitative skills like mole and enthalpy calculations to strengthen practical competence and analytical reasoning.
4 +5	C4 – Predicting and Identifying Reactions and Products	Learners study Periodic Table principles to predict element properties and reaction patterns, comparing metals, non-metals, and their oxide behaviours.	Halogen Noble gas Reactivity Trend Density	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Arithmetic computation and ratio when determining empirical formulae, balancing equations.	Chemical reactions	Careers <ul style="list-style-type: none"> Pharmacist Ceramics designer – maker 	Models and the Periodic Table reveal reaction patterns, trends, and properties by linking observable behaviour to atomic structure and electron arrangement.

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1	C5 – Monitoring and Controlling Chemical Reactions	Models and the Periodic Table reveal reaction trends by linking element properties to atomic structure and electron arrangement, enabling prediction of chemical behaviour.	Catalyst Kinetic energy Activation energy	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Graphing skills include scaling axes, plotting accurately, analysing trends, calculating gradients and rates, identifying anomalies, extrapolating, supporting hypotheses, and converting units.	Chemical reactions	Careers: <ul style="list-style-type: none"> Research Scientist Quality control officer 	Students learn how conditions affect reaction rate and yield, apply particle models, and explain reversible reactions and equilibrium changes using prior knowledge.
2, 3 + 4	C6 – Global Challenges	Students measure electrolysis, predict outcomes, identify errors, improve reliability, and develop safe, critical laboratory skills.	Fractional distillation Hydrocarbon Cracking Atmosphere Potable water	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Students develop data-handling skills, interpret graphs, identify trends, and convert values for accurate scientific analysis.	Chemical reactions	Careers: <ul style="list-style-type: none"> Environmental consultant Recycling operative 	Students apply chemical knowledge to global challenges, revisiting carbon cycle, reactivity, and electrolysis. Practical work includes copper purification, data analysis, and predictions, strengthening problem-solving and understanding chemistry's role in sustainability and improving lives.

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2 + 3	P2 – Forces	Learners should understand speed–distance–time relationships, interpret graphs, apply Newton’s laws, balanced and unbalanced forces, Hooke’s Law, gravity variations, and energy transfer when forces deform objects or restrict motion.	Scalar Vector Force Solve Motion	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Recall and apply equations.	Energy and forces	Careers: <ul style="list-style-type: none"> • Motorsport engineer • Civil engineer • Scaffolder 	Students extend KS3 knowledge by exploring forces; and study Newton’s laws, motion graphs, and force arrows to understand contact and non-contact forces in physics.
4 + 6	P4 – Magnetism and Magnetic Fields	Learners extend prior knowledge of charge and fields to explore the link between moving charge and magnetism, investigating magnetic fields around magnets and current-carrying wires.	Electromagnet Magnetic field Permanent Induced Solenoid	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Recall and apply equations.	Energy and forces	Careers: <ul style="list-style-type: none"> • Non-destructive testing technician • Recycling operative 	Having an understanding of how charge can be generated and its effects, we can now consider the link between movement of charge and magnetism. To begin, learners will investigate magnets and magnetic fields around magnets and current-carrying wires.

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1	P5 – Waves in Matter	Learners should have prior knowledge of transverse and longitudinal waves through sound and light. Learners should be aware of how waves behave and how the speed of a wave may change as it passes through different media. They may already have knowledge of how sound is heard and the hearing ranges of different species.	Wave Frequency Vibration Velocity Transverse Longitudinal	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Recall and apply equations.	Energy and forces	Careers: • Seismologist • Sound engineer	Waves are means of transferring energy and the two main types of wave are introduced in this section: mechanical and electromagnetic. This section considers both what these types of waves are and how they are used. The main terms used to describe waves are defined and exemplified in this topic.
1 + 2	P6 – Radioactivity	Students learn about isotopes, radioactive emissions, hazards, applications, and how fission and fusion release energy by combining particle and wave ideas.	Net decline Half life Irradiation Contamination Decay	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Calculate net decline, express ratios, using significant figures and reading graphs	Energy and forces	Careers: • Nuclear engineer • Radiographer	This section links wave and particle ideas, introducing isotopes and emissions while building on KS3 atomic-model knowledge in radioactivity.

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2 + 3	P7 - Energy	Students consolidate energy concepts by exploring storage, transfer, conservation, dissipation, and efficiency, learning how to reduce unwanted energy transfers in systems.	Store Transfer Radiation Dissipate Conduction Convection Radiation	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Recall and apply equations.	Energy and forces	Careers: <ul style="list-style-type: none"> Gas plumber Thermal insulator engineer 	Students develop knowledge on how energy is stored and transferred from KS3, reduce wasted energy, and evaluate efficiency and insulation using real-world systems and applications.
4 + 5	P8 – Global Challenges	Learners should understand forces and motion, momentum, vehicle safety, renewable and non-renewable energy, power station basics, electricity costs, and household electrical safety features.	Fossil fuels Resources Star Planets Sona	Topic assessment – substantive, disciplinary and application Mock exams – substantive, disciplinary and application	Recall and apply equations.	Energy and forces	Careers: <ul style="list-style-type: none"> Forensic collision investigator Wind turbine technician Astronomer 	Students integrate physics concepts to address global challenges, exploring forces, motion, and electricity. They evaluate energy resources, efficiency, and safety, applying knowledge to sustainability and real-world contexts through a synoptic approach.