



The Royal School

Wolverhampton

Curriculum 2025

SCIENCE

Curriculum Concepts

Science

Intent

At The Royal School, our curriculum is designed to foster a lifelong love of learning and to nurture pupils who are confident, knowledgeable, and empathetic. Grounded in our school values —**Respect, Trust, Community, Initiative and Risk** — our intent is to provide a high-quality education where every child knows more, remembers more, and applies their knowledge confidently. Our curriculum is carefully sequenced to ensure concepts are introduced logically, with foundational knowledge underpinning more complex ideas. We prioritise knowledge and memory building through planned opportunities for retrieval, consolidation and progression. Pupils revisit key concepts frequently, supporting long-term retention and understanding.

We are committed to ensuring that all children immerse themselves in their learning. Through diverse representation and a focus on cultural capital, we encourage empathy, inclusion, and global citizenship. Every child, regardless of background or ability, is supported to meet ambitious expectations through adaptive teaching and inclusive strategies that promote challenge and achievement for all. Our curriculum is purposefully designed to engage, inspire and challenge, cultivating learners who are resilient, reflective, and equipped to thrive in modern society.

Implementation

To support staff in developing long-term, medium-term, and short-term curriculum and lesson planning, we have identified key curriculum concepts that underpin effective teaching and learning. Below is a summary of these concepts with brief explanations:

Sequencing & Progression: Curriculum content is thoughtfully ordered across and within year groups. Long- and medium-term plans ensure coherence, while individual lessons and 'The Royal Way' framework scaffold learning effectively. Subject leaders oversee sequencing to ensure continuity and progression. Proper sequencing ensures that foundational concepts are mastered before introducing more complex ideas, thereby building upon prior knowledge. This structured approach supports cumulative learning and prevents cognitive overload.

Adaptive teaching & Assessment: Effective assessment strategies include both **formative assessments** (ongoing checks for understanding during instruction) and **summative assessments** (evaluations at the end of instructional units). Aligning assessments with learning objectives ensures that they accurately measure intended outcomes. Pupil progress is regularly reviewed, with targeted interventions delivered as needed. Adaptive teaching ensures that instruction is responsive to the varying needs, abilities, and learning styles of students. This approach involves ongoing assessment, flexible grouping, live feedback, questioning, informal checks, and formal reviews. These are used to identify gaps and adapt teaching responsively to support and challenge. Effective adaptive teaching fosters inclusivity, helping all students to progress at their own pace while achieving high expectations.

Retrieval Practice & Interleaving: We embed retrieval throughout lessons using 'Think Backs', 'Do Now' activities at the start of lessons, low-stakes quizzes and working walls. These strategies reinforce prior learning and strengthen memory pathways, promoting deep understanding and knowledge fluency. Interleaving is an instructional strategy that alternates between different topics or skills within a single learning session. Unlike traditional blocked practice, where one topic is practiced extensively before moving to the next, interleaving mixes multiple topics, enhancing discrimination between concepts and improving retention. This approach challenges learners to continually retrieve and apply different information, strengthening memory and understanding.

Engagement: Engagement encompasses the strategies employed to capture and maintain students' attention, interest, and active participation in the learning process. High levels of engagement are associated with improved comprehension and retention. Techniques to enhance engagement include interactive activities, real-world applications, collaborative learning, and incorporating student interests into lessons. We hook learners through exciting experience days, curriculum-linked enrichment, and content pitched to meet and build upon pupils' current understanding. Strong relationships and positive learning behaviours ensure high levels of participation and enthusiasm.

Challenge & Aspiration: Challenge involves designing tasks and questions that stretch students' thinking and push them beyond their comfort zones. It is important to balance support and challenge to ensure all students are appropriately stimulated and motivated to progress. Tasks are designed to stretch thinking through resilience, modelling, scaffolding, and high expectations. Learners are encouraged to persevere, question deeply, and embrace productive struggle. Aspiration in the curriculum encourages students to develop a growth mindset. It involves exposing students to ambitious goals, inspiring role models, and future pathways that foster motivation and ambition. A curriculum that promotes aspiration helps students understand the value of perseverance and lifelong learning.

Context: Contextual learning connects curriculum content to real-world applications, making learning more meaningful and relevant for students. Providing context helps learners see the purpose behind what they are studying, whether through cross-curricular links, historical or cultural perspectives, or practical, real-world scenarios. This approach enhances engagement and retention.

Personal Development: Personal development in the curriculum focuses on fostering students' social, emotional, and character growth alongside academic learning. It includes promoting resilience, self-awareness, emotional intelligence, and a sense of responsibility. A well-rounded curriculum should encourage students to develop key life skills, confidence, and independence, preparing them for future challenges in education, work, and personal life.

In Senior School our curriculum is structured in learning cycles. Each cycle lasts for 7 weeks and includes at least one assessment followed by a review where re-teaching or stretch and challenge opportunities, tailored to the needs of the pupils can take place. There are 5 learning cycles per year.

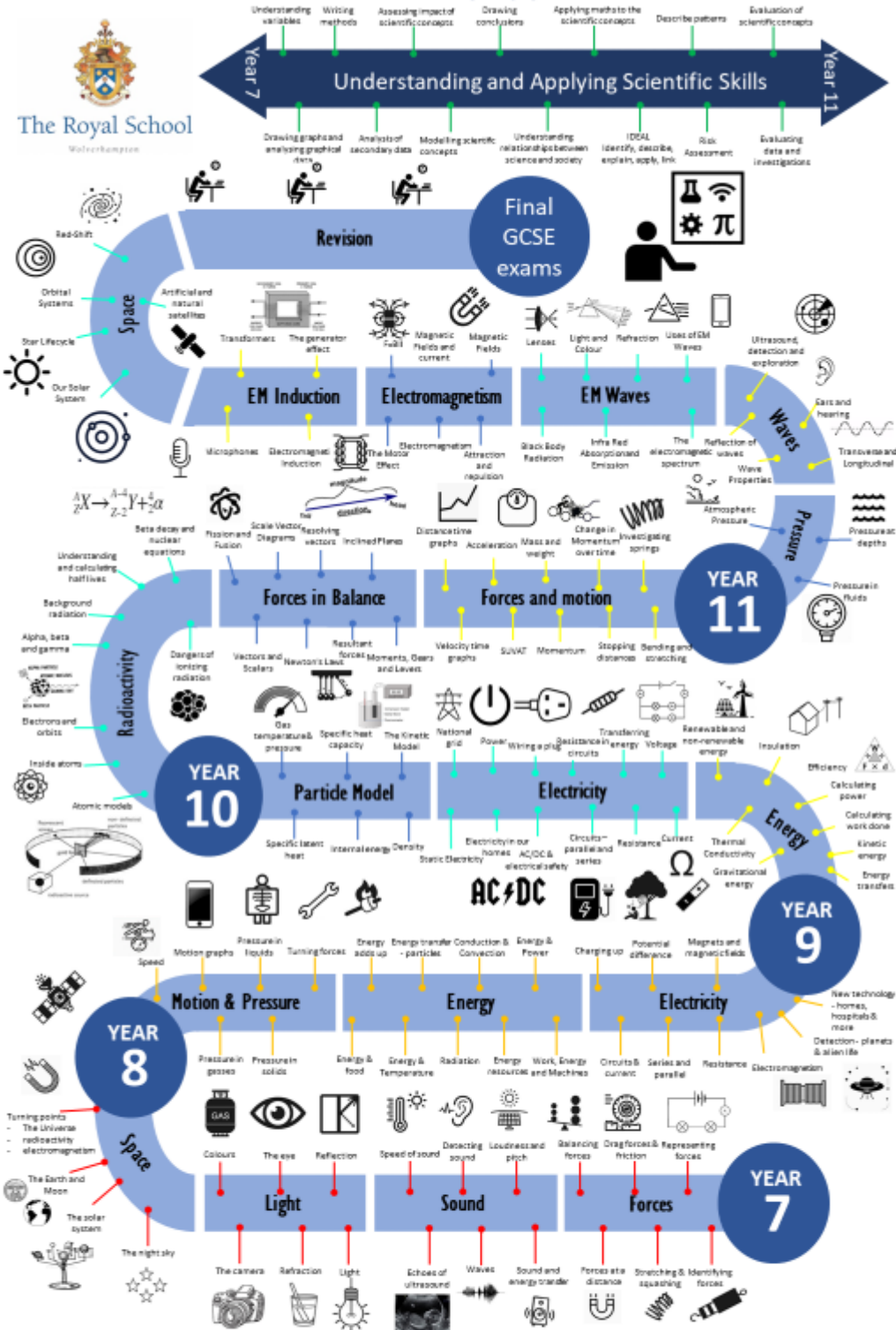
Impact

The impact of our curriculum is measured not only in outcomes but in how pupils grow as learners and individuals. Pupils develop secure knowledge, transferable skills, and the confidence to apply their learning. They are engaged, resilient, and motivated, with the capacity to meet challenges and adapt to new contexts.

Progress is tracked over time through assessment data, lesson drop-ins, pupil voice, and work scrutiny. By integrating these concepts into curriculum planning The Royal intend to create structured, dynamic, and effective learning experiences that cater to the varied needs of our pupils. A well-designed curriculum ensures progression, engagement, and long-term success in learning. Our ambition is that all children leave The Royal School with the knowledge, behaviours, and attitudes to succeed academically, socially, and emotionally — prepared for the next stage of their education and life beyond.

Physics Learning Journey

THE ROYAL SCHOOL PHYSICS LEARNING JOURNEY



CROSS-CURRICULAR LINKS

Isotopes	→	Chemistry	Energy	→	Chemistry
Electricity	→	Engineering	Calculations	→	Mathematics
Pressure	→	Chemistry	Radiation dangers	→	Biology
Atomic models	→	Chemistry	Detecting light & sound	→	Biology

Chemistry Learning Journey

THE ROYAL SCHOOL CHEMISTRY LEARNING JOURNEY

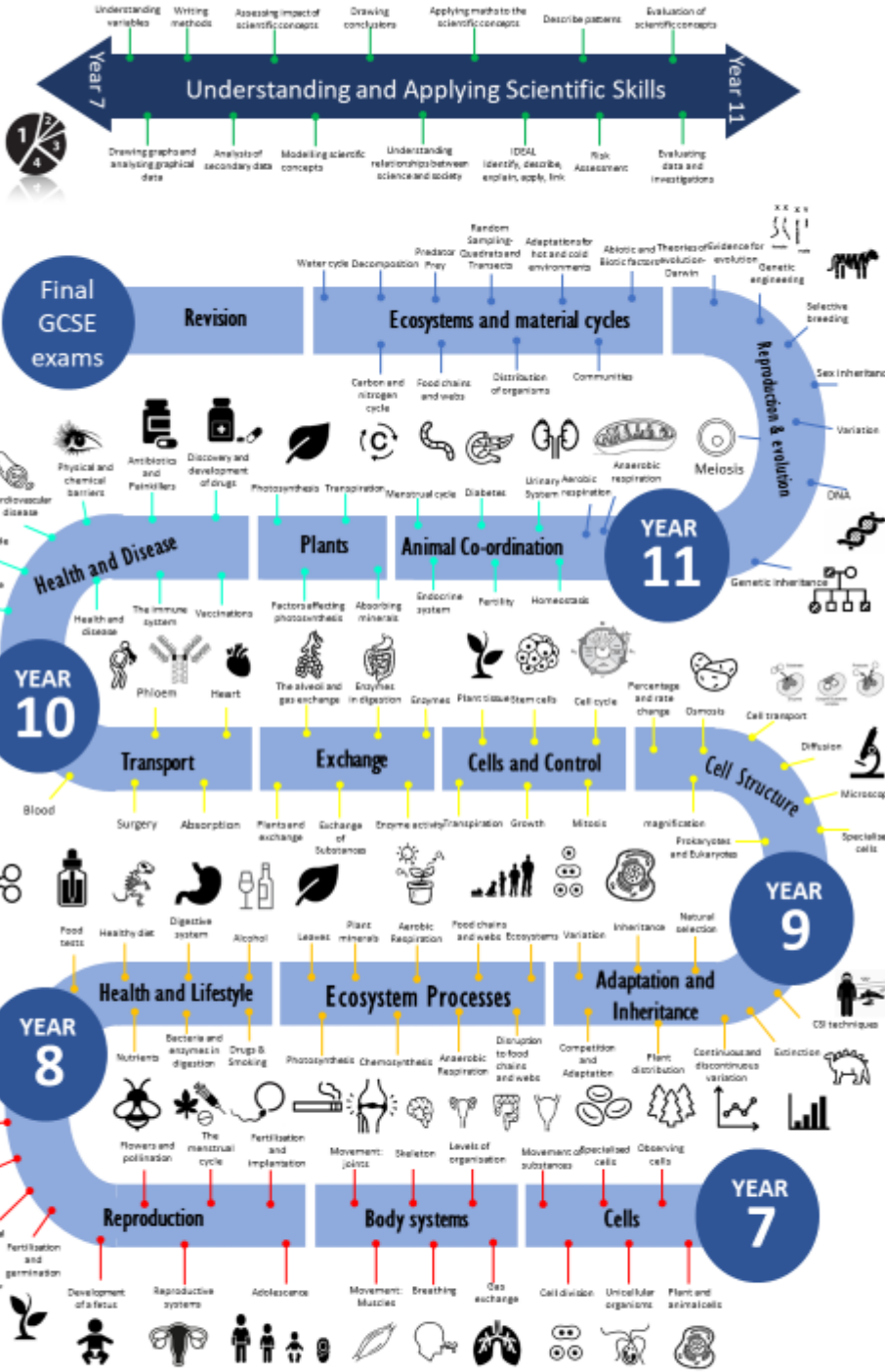


CROSS-CURRICULAR LINKS

Movement	→	Biology	→	Physics
Calculating mass	→	Mathematics	→	Biology
The Earth	→	Geography	→	Biology
Atomic models	→	Physics	→	Art & Design
		Isotopes	→	Physics
		Balancing equations	→	Biology
		Climate change	→	Biology
		Materials	→	Art & Design

Biology Learning Journey

THE ROYAL SCHOOL BIOLOGY LEARNING JOURNEY



CROSS-CURRICULAR LINKS

Body systems	→	PE	Health and disease	→	History
Reproduction	→	PSHE	Data analysis	→	Mathematics
Health & Lifestyle	→	PSHE	Photosynthesis	→	Chemistry
C, N and H ₂ O cycle	→	Geography	Diffusion & Osmosis	→	Chemistry

How Science enables all students to thrive and achieve

How inclusive lessons have been planned

Learning in science involves children and young people building their knowledge of important concepts and procedures. When learning new content, learners must connect this to what they already know. This means that it is important that learners develop secure understanding of previously taught concepts and procedures. When planning lessons, it is important to consider learners with SEND. Carefully consider the objective of each individual lesson; what specifically do you want pupils to learn? How can you present new information in a way that all learners can access? How can complex ideas be broken down into simpler parts for pupils to learn and practice? How can you focus learner's attention on the new content? For example, learners could observe and explore a stimulus to hook them into the new learning. This could be an object, a model, or an image. You should encourage learners to ask questions about their learning and build in opportunities for small group and whole-class discussions. Oracy-led sessions, with visuals to support the access of all learners, can enable you to build on and extend your learners' scientific thinking. If you have an additional adult in the lesson, plan their role and share their responsibilities with them in advance.

How an inclusive environment has been created

The classroom environment should be one where learners feel safe to make mistakes; more than most subjects, science lends itself to allowing learners opportunities to learn through guided scientific enquiry. Learners should be guided to develop scientific knowledge and conceptual understanding through working scientifically and the specific disciplines of biology, chemistry and physics. As scientific learning is a process, it is critical for teachers to ensure the set-up of the classroom enables all learners to engage in the lesson. All learners need to be able to see the teacher comfortably (e.g., consider the direction learners face and chair and table height) and have a clear space to complete individual work. In creating an inclusive environment, consider not only the physical space, but also the structure of your lessons. Greeting learners at the door of each lesson is the beginning of the development of your classroom environment. This is a key strategy for teachers to employ and is of particular benefit for learners who struggle with confidence in the subject. Providing structure enables all learners to engage effectively – tell learners what will happen in the lesson at the start – this can be as simple as talking through a slide identifying key parts of the lesson, and the approximate length of each. At the start of each lesson, a teacher should ensure key vocabulary is reviewed, bringing learners back to where the learning left off at the end of the previous lesson. Throughout each lesson, ensure that key information and resources learners need to apply and understand the matters, skills and processes are available and presented in an accessible manner

How the curriculum has been considered for pupils with additional needs

Key Stage 3 The principal focus is the understanding and application of new scientific content. By the end of Key Stage 3, learners are expected to know, apply, and understand the matters, skills and processes specified in the relevant programme of study. Working scientifically is of particular importance and should be incorporated throughout the course. Learners should ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge, and experience. Learners should have opportunities to select, plan and carry out the most appropriate types of scientific enquiries relating to the material they study, paying attention to objectivity and concern for accuracy, precision, repeatability and reproducibility.

Key Stage 4 The principal focus is to build upon and deepen scientific knowledge and the understanding of ideas developed previously in the subject disciplines of biology, chemistry and physics. The sciences should be taught in ways that ensure learners have the knowledge to enable them to develop curiosity about the natural world, insight into working scientifically, and appreciation of the relevance of science to their everyday lives. Learners should be taught essential aspects of the knowledge, methods, processes and uses of science with aspects of 'working scientifically' incorporated throughout and clearly related to substantive science content in the programme of study

Adaptive teaching strategies

How learners are supported with literacy
<ul style="list-style-type: none">• Model: 'think aloud' when demonstrating solve problems, e.g., balancing equations. Provide pre-teaching opportunities for mathematical processes.• Provide learners with worked examples in relevant lessons.• Numeracy learning mats: outline common calculations and processes for learners to use as a reference.• In Key Stage 4, learners could be provided with cue cards or a poster outlining the key physics equations, for reference and frequent practice at home so that they can be learned. Inclusion of visual cues to aid equation recall has shown to be very effective for some learners
How learners are supported to retain vocabulary
<ul style="list-style-type: none">• Model: 'think aloud' when demonstrating solve problems, e.g., balancing equations.• Provide pre-teaching opportunities for mathematical processes.• Provide learners with worked examples in relevant lessons.• Numeracy learning mats: outline common calculations and processes for learners to use as a reference.• In Key Stage 4, learners could be provided with cue cards or a poster outlining the key physics equations, for reference and frequent practice at home so that they can be learned. Inclusion of visual cues to aid equation recall has shown to be very effective for some learners
How learners are supported with numeracy
<ul style="list-style-type: none">• Model: 'think aloud' when demonstrating solve problems, e.g., balancing equations. Provide pre-teaching opportunities for mathematical processes.• Provide learners with worked examples in relevant lessons.• Numeracy learning mats: outline common calculations and processes for learners to use as a reference.• In Key Stage 4, learners could be provided with cue cards or a poster outlining the key physics equations, for reference and frequent practice at home so that they can be learned. Inclusion of visual cues to aid equation recall has shown to be very effective for some learners
How learners are supported to develop conceptual understanding
<ul style="list-style-type: none">• Model: 'think aloud' when demonstrating solve problems, e.g., balancing equations.• Provide pre-teaching opportunities for mathematical processes.• Provide learners with worked examples in relevant lessons.• Numeracy learning mats: outline common calculations and processes for learners to use as a reference.• In Key Stage 4, learners could be provided with cue cards or a poster outlining the key physics equations, for reference and frequent practice at home so that they can be learned. Inclusion of visual cues to aid equation recall has shown to be very effective for some learners
How teaching is adapted for learners who struggle with attention
<ul style="list-style-type: none">• Model: 'think aloud' when demonstrating solve problems, e.g., balancing equations.• Provide pre-teaching opportunities for mathematical processes.• Provide learners with worked examples in relevant lessons.• Numeracy learning mats: outline common calculations and processes for learners to use as a reference.• In Key Stage 4, learners could be provided with cue cards or a poster outlining the key physics equations, for reference and frequent practice at home so that they can be learned. Inclusion of visual cues to aid equation recall has shown to be very effective for some learners

How teaching is adapted for learners who struggle with change and transition

- Model: 'think aloud' when demonstrating solve problems, e.g., balancing equations.
- Provide pre-teaching opportunities for mathematical processes.
- Provide learners with worked examples in relevant lessons.
- Numeracy learning mats: outline common calculations and processes for learners to use as a reference.
- In Key Stage 4, learners could be provided with cue cards or a poster outlining the key physics equations, for reference and frequent practice at home so that they can be learned. Inclusion of visual cues to aid equation recall has shown to be very effective for some learners

KS3 Science – Curriculum Map 2025

	BIOLOGY	Approximate hours	CHEMISTRY	Approximate hours	PHYSICS	Approximate hours
YEAR 7	Cells	15	Introduction and safety	7	Forces	10
	Reproduction	15	Atoms and Particles	13	Waves	13
			Separation, Solutions & Change	10	Space	7
Year 7 overview	<p>In Year 7 Biology pupils will discover what plants and animals are made of. They will also meet study tiny organisms that can only be seen under a microscope. They will explore how movement is vital to cell functioning. Finally, they will discover how new plants and animals are created through the process of reproduction.</p>		<p>Pupils will consider 'What is stuff made of?' Everything is made up of chemicals – the food we eat, the plastic in our phone... and us! But what are these chemicals like inside, and why do they behave the way they do?</p> <p>In Year 7 Chemistry pupils will learn about the atoms that make up everything on Earth... and beyond. They will explore how chemical reactions make vital materials, and transfer energy for almost everything we do.</p>		<p>In Year 7 Physics pupils will learn about how we see, and how light and sound waves behave. They will learn about the place of the Earth in the Universe. They will also learn about the forces that keep us from falling through the floor and allow astronauts to stand on the Moon.</p>	
YEAR 8	Processes & Organisms	15	Acids & Alkalis	14	Energy & Speed	12
	Ecosystems	15	Reactivity	7	Electricity & Magnetism	12
			Fuels & Environment	10	Pressure & Moments	6
Year 8 overview	<p>In Year 8 pupils will compare the effect of healthy and unhealthy lifestyles on their body. They will look at why organisms need energy to function effectively. They will explore how different structures work together to keep an organism alive.</p>		<p>Pupils will ask the big question 'Where do we get the materials we need?' They will learn about the structure of the Earth, and the rocks of its crust. They will discover how we separate mixtures, and use chemical reactions, to obtain the materials</p>		<p>Pupils will recognise that it is hard to imagine a world without electricity. In Year 8 they will discover how circuits work and how the electricity in our houses is generated. They will learn why it is important to insulate a house and what they pay for when they</p>	

	Finally they will investigate the differences that exist between organisms, and why this is important for their survival.	we need from the Earth and its atmosphere. Pupils will also explore patterns in chemical reactions. They will identify patterns in the properties of elements and learn how to use the Periodic Table to predict properties.	pay their electricity bill. They will also learn how to use a graph to tell a story, and how forces explain gas and air pressure.
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Each topic has planned an opportunity for:

- A mid-topic assessment and review.
- An end-of-topic assessment and review.
- Multiple practical (AO3) investigative experiences.
- Numeracy and data-handling skills.
- Literacy and scientific language skills development.

	BIOLOGY	Learning cycle	CHEMISTRY	Learning cycle	PHYSICS	Learning cycle
YEAR 7	Cells	1, 2 & part 3	Introduction and safety	1	Forces	1 & 2
	Reproduction	Part 3, 4 & 5	Atoms and Particles	2 & 3	Waves	3 & 4
			Separation, Solutions & Change	4 & 5	Space	5
YEAR 8	Processes & Organisms	1, 2 & part 3	Acids & Alkalis	1 & 2	Energy & Speed	1 & 2
	Ecosystems	Part 3, 4 & 5	Reactivity	3	Electricity & Magnetism	3 & 4
			Fuels & Environment	4 & 5	Pressure & Moments	5

RSW All Through Science Curriculum map

Key Stage	Year	Biology Theme						
		Cells & Organisation	Disease & Bioenergetics	Biological responses	Genetics & Reproduction	Ecology	Maths skills	Practical & Investigative skills
EYFS	R			Surroundings and our senses		Weather and environment		Observing the environment
KS1	1	Identifying and classifying				Plants and animals in each season		Observing the environment
	2	Physics and Chemistry Focus						
KS2	3	Parts of a plant	Plant growth		Plant life cycle		Measurements using standard units	Investigating plant growth
	4					Classification Predator-prey Food chains Environmental change		Gather, record & classify data
	5	Physics and Chemistry Focus						
	6				The fossil record Living things and offspring Darwin & Natural Selection	Adaptations Classification	Data processing and graph skills	Scientific enquiry
KS3	7	Plant & Animal Cells Diffusion Microscopy	Cell Specialisms	Cell Specialisms	Gametes Reproduction		Graph skills Data capture & Processing	Microscopy
	8	Organ Systems (Plant & Animal)	Photosynthesis	Organ Systems		Ecological Processes		Dissections
KS4	9	Cell structure & transport Cell division Organisation and the digestive system Organising animals and plants	Cell specialism Non-communicable diseases Communicable diseases Preventing and treating disease	Cell specialism – nerves Cell specialism - eye	Mitosis Stem cells	Plant cells Plant transport systems	Microscopy Diffusion and osmosis Graph skills Digestion / heart rate / breathing rate calculations	Microscopy Required practicals Diffusion and osmosis Digestive system Dissections
	10	Cellular respiration and photosynthesis Leaf tissues	Photosynthesis Respiration Diffusion and osmosis	The human nervous system Hormonal control Homeostasis in action Cell specialism	Human reproduction and hormones Fertility and infertility	Adaptation, interdependence and competition	Graph skills Data manipulation Bioenergetics reaction rates Reaction times Quadrats required practical	Required practicals Photosynthesis limiting factors Respiration Reaction times
	11	Cell specialism Reproduction	Photosynthesis Decomposition and cycling of materials	Response to changing environment and adaptations	Reproduction Variation and evolution Genetics and evolution	Organising an ecosystem Biodiversity and ecosystems	Probability	Required practicals
KS5	12	Cells and microscopy Movement over membranes Circulation Gas exchange Digestion Biomolecules	Immunology	Heat loss and respiration rates	DNA and RNA Genetic diversity Genetic variation Protein synthesis	Classification Courtship	Specification maths requirements (section 6 of spec)	Required practicals
	13	Muscles Heart rate Breathing rate	Respiration & Photosynthesis	Stimuli Eye Heart rate	Patterns of inheritance Selection and speciation Gene technology	Nutrient cycles Energy flow Succession	Hardy-Weinberg Specification maths requirements (section 6 of	Required practicals

		Kidneys Neurones and receptors		Nervous system Muscle contractions Kidney Homeostasis		Population sizes	spec)	
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Key Stage	Year	Chemistry Theme						
		Atoms, structure, bonding	Chemical reactions and energy changes	Rate and extent of chemical change	Organic Chemistry	Analysis and the Earth's Resources, Environmental Chemistry	Stoichiometry (Mathematical Skills)	Practical and Investigative Skills
EYFS	R	Density State Changes				Materials Recycling Properties of Materials		Floating and Sinking Investigation
KS1	1				Use of Materials	Properties of Materials		Properties of Materials Investigation
	2		Physical Changes		Use of Materials	Uses of Materials Renewable and Non-Renewable Resources Recycling		Materials Chemist Research Task
KS2	3	Biology and Physics Focus						
	4	Biology and Physics Focus						
	5	Dissolving and Mixtures States of Matter Chemical and Physical Properties	Chemical Changes	Reversible and Irreversible Reactions		Separating Mixtures		Planning Scientific Enquiry Control of Variables
	6	Biology Focus						
KS3	7	States of Matter Elements, mixtures and compounds	Chemical & Physical Changes, Chemical Reactions	Jelly Investigation		Separation Techniques	Graph Drawing Concentration of solution Balancing Equations	Introduction and Safety Jelly Investigation Practical Lessons Element Presentations
	8		Acids and Bases Reactivity Series Endo and Exothermic Reactions	Denture Tablet Investigation	Fuels	Pollution, Climate Change, Use of resources	Reacting Masses Concentration of Acids and Bases	Denture Tablet Investigation Practical Lessons
KS4	9	Atomic Structure The Periodic Table Structure and Bonding	Chemical Reactions			Separation Techniques	Chemical Calculations Balancing Equations Graph Plotting	Required Practicals
	10		Acids, Bases and Salts Endo and Exothermic Reactions Electrolysis	Rates of Reaction Reversible Reactions Equilibrium	Crude Oil and Fuels	Polymers	Rates of Reaction	Required Practicals
	11				Organic Reactions	Chemical Analysis The Earth's Atmosphere The Earth's Resources Using Resources	Advanced Chemical Calculations	Required Practicals
KS5	12	Atomic Structure Structure and Bonding	Energetics Redox Groups 2 and 7	Kinetics Equilibrium	Organic Chemistry 1	Combustion of hydrocarbons Analytical Techniques Inorganic Analysis	Amounts of Substance	CPAC
	13	Lattice Enthalpy	Acids and Bases Transition Metals Electrochemistry Thermodynamics	Rate Equations Equilibrium Constants	Organic Chemistry 2 Organic Synthesis	NMR Organic Analysis	Redox Titrations	CPAC

Key Stage	Year	Physics Theme						
		Energy	Electricity, magnetism and electromagnetism	Particle model of matter	Atomic structure and radioactivity	Forces, motion and space	Waves	Practical and investigative skills
EYFS	R	Hot and cold observations		Melting		Floating and sinking		Floating and sinking investigation
KS1	1	Temperatures in different seasons		Properties of materials				Investigating properties of materials
	2			Properties of materials				Research into scientists' work
KS2	3		Magnets			Forces and motion		Practical enquiries, presenting data, conclusions. Units.
	4						Sound waves	Investigating sound
	5		Electrical conductors, magnetism	Properties of materials – solids, liquids, gases		Solar system – orbital motion	Light and shadows	Use of variables in investigations. Use of tables and graphs.
	6							Scientific evidence
KS3	7					Forces. Space.	Transverse and longitudinal waves. Sound and light.	Measuring forces. Investigating force v extension and light.
	8	Energy stores and transfers. Energy sources.	Electricity and magnetism, circuits, electromagnets			Speed.		Investigating energy in food, conduction, radiation, and speed.
KS4	9	Energy stores and changes in a system. Energy resources. Power.	Electric circuits. Domestic uses and safety. Static electricity.	Particle model of matter. Changes of state. Internal energy.		Pressure		Required practicals
	10	Work done and energy transfers, power			Atomic structure and radioactivity	Forces and their interactions, moments, levers and gears, pressure, motion and Newton's laws, momentum.		Required practicals
	11	Black body radiation, temperature	Magnetism, electromagnetism, transformers			Solar system, orbital motion and satellites, life cycle of a star, red-shift.	Waves in air, fluids and solids, electromagnetic waves, light, lenses, black body radiation	Required practicals
KS5	12	Work, energy and power, conservation of energy	Current electricity, resistivity, circuits, potential dividers, EMF and internal resistance.	Materials, properties of solids, stress, strain, the Young modulus.	Particles, their interactions and classification. Quantum phenomena.	Force and momentum. Circular and simple harmonic motion. Resonance.	Progressive and stationary waves, refraction, diffraction and interference	CPAC
	13	Energy stores and transfers in fields and capacitors. $E=mc^2$	Electric fields, capacitance, magnetic fields and electromagnetism	Thermal physics and gas laws.	Radioactivity, nuclear physics.	Fields – gravitational fields. Astrophysics.	Light, X-rays, gamma rays.	CPAC

Science Curriculum Maps 2025-26

BIOLOGY Curriculum Map – 2025 pathway for GCSE and A-level

	Year 9	Year 10	Year 11	Year 12	Year 13
Learning Cycle 1	B1 Cell structure.	B8 Photosynthesis.	B18 Biodiversity & Ecosystems (inc. Trophic Levels, Food Efficiency – Triple only)	Cell structure. Cells and replication Monomers & Polymers. Carbohydrates, lipids & proteins	Respiration & Photosynthesis. Stimuli and response. Nervous coordination.
Learning Cycle 2	B2 Cell division, stem cells & chromosomes. B3 Principles of organisation and the digestive system	B9 Respiration. YEAR 10 BIOLOGY PAPER 1 MOCK EXAMINATION PREPARATION	B13 Cell division and reproduction. (inc. sexual V asexual, DNA, cloning – triple only)	Transport across membranes. Cell recognition and the immune system. Enzymes. Nucleic acids. ATP, water & ions.	Energy & Ecosystems. Nutrient cycles. Skeletal muscles. Homeostasis. AQA PAPER 1 MOCK
Learning Cycle 3	B4 Animal tissues, organs and organ systems. B7 Non-communicable diseases.	YEAR 10 MOCK EXAMS Homeostasis. B10 The nervous system. (inc. brain, eye – triple only)	B14 Variation and evolution. (inc. cloning – triple only) B15 Genetics & Evolution (inc. Theories of Evolution – Triple only)	Surface area to volume ratio. Gas exchange. Digestion and absorption DNA, genes and chromosomes. Protein synthesis.	Inheritance. Populations. DNA, bases and protein changes. Gene expression.

<p>Learning Cycle 4</p>	<p>B4 Plant tissues, organs and organ systems.</p> <p>B5 Communicable diseases.</p> <p>(inc. culturing microorganisms – triple only)</p>	<p>Homeostasis.</p> <p>B11 Hormones.</p> <p>(inc. body temperature, water balance – triple only)</p> <p>Plant hormones. (Triple)</p> <p>B12 Homeostasis in Action</p> <p>The kidney (Triple)</p>	<p>Tidy up loose ends / recap.</p> <p>Revision</p> <p>AQA PAPER 2 FULL MOCK EXAM</p> <p>Further past paper work and practical review</p>	<p>Digestion and absorption.</p> <p>Mass transport in animals.</p> <p>Genetic diversity.</p> <p>Diversity and adaptation.</p>	<p>Evolution leading to speciation.</p> <p>Populations in ecosystems.</p> <p>Using genome projects.</p> <p>Gene technologies and gene function.</p> <p>MOCK PAPER 2</p>
<p>Learning Cycle 5</p>	<p>B5 Communicable diseases.</p> <p>Plant diseases. (Triple)</p> <p>B6 Preventing and Treating Disease</p> <p>Monoclonal antibodies. (Triple)</p>	<p>B16 Adaptations, Interdependence & Competition.</p> <p>B17 Organisation of an ecosystem.</p>	<p>Revision.</p> <p>Alternative Timetable lessons.</p> <p>Practical review.</p> <p>A-level bridging.</p>	<p>Mass transport in plants.</p> <p>Statistical analysis.</p> <p>Species & taxonomy.</p> <p>Biodiversity</p> <p>Year 12 review, end of year assessment and year 13 preparation.</p> <p>AQA AS MOCK PAPER 1 & PAPER 2</p>	<p>Exam revision and intervention.</p> <p>MOCK PAPER 2 (and also in Spring)</p> <p>MOCK PAPER 3</p>

Chemistry Curriculum Map 2025 Pathway for GCSE and A-level

	Year 9 T= Triple Science D = Double/Combined Science	Year 10	Year 11	Year 12 TEACHER 1 /TEACHER 2 Teacher with 3 lessons		Year 13 TEACHER /TEACHER 2 Teacher with 3 lessons	
Learning Cycle 1	<u>Atomic structure (T&D)</u>	<u>Chemical changes continued (T&D)</u> Req Prac 1 – Making Copper Sulfate Req Prac 2 - Titrations <u>Electrolysis (Triple)</u> Req Prac 3 - Electrolysis <u>Chemical calculations (Double award)</u>	<u>Polymers (Triple)</u> <u>Chemical analysis (D&T)</u> Triple award to cover Tests for Ions and Instrumental analysis Req Prac 6 - Chromatography Req Prac 7 – Identifying Ions – TRIPLE ONLY	<u>Amount of substance</u> RP 1 Make up a volumetric solution and carry out a simple acid–base titration	<u>Atomic structure</u>	<u>Acids, bases and buffers</u> RP 9 Investigate how pH changes when a weak acid reacts with a strong base and when a strong acid reacts with a weak base	<u>Nomenclature and isomerism</u> <u>Compounds containing the carbonyl group</u> RP 10a Preparation of a pure organic liquid

<p>Learning Cycle 2</p>	<p><u>The periodic table (T&D)</u></p> <p><u>Transition Metals (Triple)</u></p>	<p><u>Rates of reactions and equilibrium (T&D)</u></p> <p>Req Prac 5 – Rates Investigation</p>	<p><u>Our atmosphere (T&D)</u></p> <p>AQA PAPER 1 FULL MOCK EXAM</p>	<p><u>Bonding Periodicity</u></p>	<p><u>Group 2 and Group 7</u></p> <p><u>Oxidation, reduction and redox reactions</u></p> <p>RP 4 Carry out simple test-tube reactions to identify: • cations – Group 2, NH₄⁺ • anions – Group 7 (halide ions), OH⁻, CO₃²⁻, SO₄²⁻</p>	<p><u>Kinetics</u></p> <p>RP 7 Measuring the rate of reaction: • by an initial rate method • by a continuous monitoring method</p>	<p><u>Aromatic chemistry</u></p> <p>PAG 10b Preparation of a pure organic solid and test of its purity</p> <p><u>Amines</u></p> <p><u>Polymerisation</u></p> <p><u>Amino acids, proteins and DNA</u></p>
<p>Learning Cycle 3</p>	<p><u>Structure and bonding (T&D)</u></p> <p>ONLY States of Matter, Ions and Ionic Bonding for double award</p> <p><u>Bulk Properties (Triple)</u></p>	<p><u>Energy changes (T&D)</u></p> <p>Req Prac 4 – Temp Changes</p>	<p><u>The Earth's resources (T&D)</u></p> <p>Req Prac 8 – Water analysis – TRIPLE ONLY</p> <p><u>Using our resources (Triple)</u></p>	<p><u>Energetics</u></p> <p>PAG 2 Measurement of an enthalpy change</p>	<p><u>Introduction to organic chemistry Alkanes</u></p> <p><u>Halogenoalkanes</u></p> <p>PAG 5 Distillation of a product from a reaction</p>	<p><u>Thermodynamics</u></p>	<p><u>Organic synthesis and analysis</u></p> <p><u>Structure determination Chromatography</u></p> <p>PAG 12 Separation of species by thin-layer chromatograph</p>
						<p>AQA PAPER 1 and 2 MOCK</p>	

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Learning Cycle 4	<u>Structure and bonding Continued (Double)</u> Covalent Bonding, Metallic <u>Calculations (Triple)</u>	<u>Electrolysis (Double)</u> <u>Chemical Cells and Mid-point review (Triple)</u>	<u>Revision</u> AQA PAPER 2 FULL MOCK EXAM	<u>Kinetics</u> PAG 3 Investigation of how the rate of a reaction changes with temperature <u>Equilibria</u>	<u>Alkenes</u> <u>Alcohols</u> <u>Organic analysis</u> PAG 6 Tests for alcohol, aldehyde, alkene and carboxylic acid	<u>Electrode potential and electrochemical cells</u> PAG 8 Measuring the EMF of an electrochemical cell <u>Redox titrations</u>	<u>The transition elements</u> <u>Reactions of inorganic compounds in solutions</u> PAG 11 Carry out simple test-tube reactions to identify transition metal ions in aqueous solution
Learning Cycle 5	<u>Chemical changes (T&D)</u> Part 1 – Reactivity Series and Redox End of Year assessments	<u>Crude oil and fuels (D&T)</u> <u>Alkenes, Alcohols, Carboxylic Acids and Esters (Triple)</u> YEAR 10 AQA ASSESSMENT	<u>Revision and external examination</u>	Revision and Consolidation AQA AS MOCK PAPER 1 & PAPER 2 <u>Equilibrium constant Kp</u> <u>Period 3</u>	MOCK PAPER 1 <u>Revision and external examination</u> MOCK PAPER 2 MOCK PAPER 3		

SUBJECT Curriculum Map – Physics 2025 GCSE and A-level

	Year 9	Year 10	Year 11	Year 12 3 lessons (EHU)	Year 12 2 lessons (PM)	Year 13 3 lessons (EHU1)	Year 13 3 lessons (EHU2)
Learning Cycle 1	<p>Energy</p> <p>(Stores, Conservation, Work, Power & SHC)</p> <p>Required Prac: SHC</p>	<p>Atoms & Radiation</p> <p>Atomic Structure, Isotopes, Radioactivity, Half Life</p>	<p>Waves</p> <p>Transverse & Longi, properties, EM waves and uses</p> <p>Req Prac: Measuring Waves</p>	<p>Basics & Bridging</p> <p>Waves</p> <p>Req Prac: Stationary Waves</p>	<p>Basics & Bridging</p> <p>Mechanics</p>	<p>Circular Motion</p> <p>SHM</p> <p>Req Prac: Pendulums and mass spring</p>	<p>Thermal Physics</p> <p>Req Prac: Gas Laws</p>
Learning Cycle 2	<p>Energy</p> <p>Energy transfer through heating, insulation, Resources and demands.</p> <p>EOM LC1 Assessment</p>	<p>Atoms & Radiation</p> <p>Irradiation and Contamination</p> <p>Triple Only: Background Radiation, Fission and Fusion</p> <p>EOM LC2 Assessment</p>	<p>Waves</p> <p>Refraction</p> <p>Triple Only: Lenses, Light & Colour, Sound, waves for detection, reflection, Black body Radiation</p> <p>Req Prac: Infra-Red Radiation</p> <p>Req Prac (Triple only) Reflection</p> <p>EOM Assessment</p> <p>Christmas Mocks</p>	<p>Waves</p> <p>Req Prac: Interference</p> <p>Particles</p> <p>Christmas Mocks</p>	<p>Mechanics</p> <p>Req Prac: Freefall by g</p>	<p>Gravitational Fields</p>	<p>Nuclear</p> <p>Req Prac: Inverse Square Law</p>

Learning Cycle 3	<p>Electricity</p> <p>Circuits, symbols, components, IV curves, Ohms Law Series & Parallel.</p> <p>Req Prac: Resistance</p> <p>Req Prac: IV Curves</p>	<p>Forces</p> <p>Vectors & Scalars, weight, Vector diagrams and resolution, Newton's Laws</p> <p>Required Prac: $F=ma$</p>	<p>Electromagnetism</p> <p>Magnetic field, electromagnetism, motor effect, $F=BIl$</p> <p>Triple Only: Loudspeakers, Induction, Transformers</p> <p>Spring Mocks</p>	<p>Particles</p>	<p>Mechanics</p>	<p>Electric Fields</p> <p>Req Prac: Capacitance</p>	<p>Astrophysics (Option Module)</p>
Learning Cycle 4	<p>Electricity</p> <p>AC/DC, Domestic Electricity, Power, Electrical Distribution National Grid</p> <p>Triple Only: Static Electricity</p> <p>EOM LC2 Assessment</p>	<p>Motion</p> <p>Speed, distance and time. Velocity and Acceleration. Motion graphs.</p>	<p>Mop Up & Revision for <u>combined</u></p> <p>Triple: Electromagnetism</p> <p>Triple Only: <u>Space</u>: Solar System, Stars, Orbits</p>	<p>Electricity</p> <p>Required Prac: Resistivity, Internal Resistance</p>	<p>Materials</p> <p>Req Prac: Youngs Modulus</p>	<p>Magnetic Fields & Induction</p> <p>Req Prac: $F=BIl$</p> <p>Req Prac: Mag Flux Linkage</p>	<p>Practical Skills</p>
Learning Cycle 5	<p>Particle Model</p> <p>Kinetic Model, Density, Changing State, Internal Energy</p> <p>Specific Latent Heat, Gas Laws</p> <p>Triple Only: P vs V</p> <p>EOY Assessment & Review</p> <p>Req Prac: Density</p>	<p>Forces and Motion</p> <p>Weight and terminal velocity. Forces and Braking. Momentum. Forces and elasticity.</p> <p>Triple Only: Moments, Pressure in fluids</p> <p>Req Prac: Hookes Law</p>		<p>Practical Skills</p> <p>End of Year Assesment.</p> <p>Pre-year 13 Learning</p>	<p>Practical Skills</p> <p>End of Year Assesment.</p> <p>Pre-year 13 Learning</p>	<p>Revision for Final Exams</p>	<p>Revision for Final Exams</p>

Combined Science: Where a particular learning cycle contains a significant amount of triple only content (mostly paper 2) use some time to build deeper understanding of the content. Furthermore, the opportunity to advance to the next module should be taken to ensure revision time at the end of the course can be as comprehensive as possible.

Lesson orders and accompanying resources can be found on Teams within the Science POS/SOW folder.

SUBJECT Curriculum Map – BTEC Applied Science from 2020 onwards

	Year 12 Teacher A	Year 12 Teacher B	Year 12 Teacher C	Year 13 Teacher A	Year 13 Teacher B	Year 13 Teacher C
Learning Cycle 1	<p>Unit 1: Principles and applications of science 1</p> <p>Physics - Waves in communication</p> <p>Working with waves</p> <p>Wave features – periodic time, speed, wavelength, frequency, amplitude, oscillation Graphical representation of waves Transverse and longitudinal waves Displacement, coherence, path difference, phase difference, superposition Diffraction gratings – emission spectra, identifying gases Wave speed equations Stationary waves resonance, musical instruments</p> <p align="center">LC1 assessment</p>	<p>Unit 1: Principles and applications of science 1</p> <p>Biology - Structure and functions of cells and tissues</p> <p>Cell structure and function</p> <p>Cell theory, ultrastructure and function of organelles, electron micrographs and light microscopes, similarities and differences of plant and animal cells, bacterial cell walls and reactions with antibiotics, magnification</p> <p>Cell specialisation</p> <p>Palisade mesophyll cells, sperm and egg cells, root hair cells, white blood cells, red blood cells</p> <p align="center">LC1 assessment</p>	<p>Unit 1: Principles and applications of science 1</p> <p>Chemistry - Periodicity and properties of elements</p> <p>Structure and bonding in applications in science</p> <p>Electronic structure of atoms Ionic bonding Covalent bonding Metallic bonding Intermolecular forces Chemical reactions</p> <p align="center">LC1 assessment</p>	<p>Unit 3: Science Investigation Skills</p> <p>A Planning a scientific investigation</p> <p>Developing a hypothesis Selection of appropriate equipment, techniques and standard procedures Health and safety Variables Method for data collection and analysis</p> <p>B Data collection, processing and analysis / interpretation</p> <p>Collection of quantitative/qualitative data Processing data – standard deviation, formulae, units, standard form, percentage error, tables and graphs</p> <p align="center">LC1 assessment</p>	<p>Unit 3: Science Investigation Skills</p> <p>D Enzymes in action</p> <p>Protein structure – peptide linkage, active sites, denaturation</p> <p>Enzymes as biological catalysts in chemical reactions – collision theory, formation of enzyme-substrate complex, specificity of enzymes, lowering of activation energy, changing substrate concentration, importance of measuring initial rates of reaction</p> <p>Factors that can effect enzyme activity – temperature, pH, substrate and enzyme concentration</p> <p align="center">LC1 assessment</p>	<p>Unit 3: Science Investigation Skills</p> <p>E Diffusion of molecules</p> <p>Factors affecting the rate of diffusion – concentration gradient, shape and size of molecules, temperature, distance, surface area</p> <p>Arrangement and movement of molecules – random movement of molecules in liquids and gases, diffusion along a concentration gradient until dynamic equilibrium is reached</p> <p align="center">LC1 assessment</p>
Learning Cycle 2	<p>Waves in communication</p> <p>Principles of fibre optics – refractive index, total</p>	<p>Tissue structure and function</p> <p>Epithelial tissue,</p>	<p>Production and uses of substances in relation to</p>	<p>Drawing conclusions and evaluation</p> <p>Interpretation/analysis</p>	<p>F Plants and their environment</p> <p>Factors that can affect plant growth and/or</p>	<p>G Energy content of fuels</p> <p>Different types of fuels – petrol, paraffin, food,</p>

	<p>internal reflection, critical angles Applications of fibre optics in medicine Applications of fibre optics in communication – analogue and digital, broadband</p> <p>Properties of electromagnetic waves – speed, frequency Inverse square law – intensity of a wave Applications of electromagnetic waves – satellite communication, mobile phones, bluetooth, infrared, wi-fi</p> <p>LC2 assessment</p> <p>Unit 1 mock preparation and assessment</p>	<p>endothelial tissue, muscular tissue, nervous tissue</p> <p>LC2 assessment</p> <p>Unit 1 mock preparation and assessment</p>	<p>properties</p> <p>Periodic table – periods, groups, layout and electronic arrangement of elements using s, p, d notation</p> <p>Physical properties of elements – first ionisation energy, trends in groups and periods, electron affinity, ionic radius, electronegativity, melting and boiling points, electrical and thermal conductivity, thermal, malleability, ductility</p> <p>Chemical properties of elements – products and reactivity of elements, reactivity series, oxidation and reduction, displacement reactions, uses and applications of substances</p> <p>LC2 assessment</p> <p>Unit 1 mock preparation and assessment</p>	<p>of data – trends/patterns, primary and secondary data, making valid conclusions, interpretation of statistical tests</p> <p>Evaluation – improvements, anomalous data, sources of error, reliability, strengths and weaknesses</p> <p>H Electrical circuits</p> <p>Use of electrical symbols to design circuits – battery, ammeter, voltmeter, bulbs, resistors, diodes</p> <p>Electrical power and energy equations</p> <p>Energy usage – different domestic appliances, fuse sizes, power ratings</p> <p>LC2 assessment</p> <p>Unit 3 mock preparation and assessment</p>	<p>distribution – human effects, soil pH and aeration, light intensity, temperature, water, mineral ions</p> <p>Sampling techniques – random sampling, ecological sampling investigating abiotic factors e.g. transects, quadrats, point frames</p> <p>Sampling sizes – samples sizes selected with regards to practical constraints, need to collect sufficient data to make valid conclusions</p> <p>LC2 assessment</p> <p>Unit 3 mock preparation and assessment</p>	<p>cooking oil, methanol, ethanol, propan-1-ol, butan-1-ol, pentan-1-ol, wax temperature</p> <p>Hazards associated with fuels – flammability, toxicity, risk of explosion, harmful effects, pollution</p> <p>Units of energy – joules, calories Specific heat capacity Heat energy released from fuels in kJ/mol</p> <p>LC2 assessment</p> <p>Unit 3 mock preparation and assessment</p>
Learning Cycle 3	<p>Unit 1 external assessment preparation and external assessment</p> <p>Unit 2: Practical scientific procedures and techniques</p>	<p>Unit 1 external assessment preparation and external assessment</p> <p>Unit 2: Practical scientific procedures and techniques</p>	<p>Unit 1 external assessment preparation and external assessment</p> <p>Unit 2: Practical scientific procedures and techniques</p>	<p>Unit 3 external assessment preparation and external assessment</p> <p>Unit 8: Physiology of human body systems</p>	<p>Unit 3 external assessment preparation and external assessment</p> <p>Unit 8: Physiology of human body systems</p>	<p>Unit 3 external assessment preparation and external assessment</p> <p>Unit 8: Physiology of human body systems</p>

	<p>Undertake calorimetry to study cooling curves</p> <p>Obtain data using different equipment to construct cooling curves</p> <p>Determine the rate of cooling of substances using cooling curves</p> <p>Unit 2 Practical observations</p>	<p>Undertake chromatographic techniques to identify components in mixtures</p> <p>Use chromatographic techniques to produce chromatograms</p> <p>Explain the use of chromatographic techniques to separate mixtures</p> <p>Unit 2 Practical observations</p>	<p>Undertake titration and colorimetry to determine the concentration of solutions</p> <p>Prepare and standardise solutions</p> <p>Investigate the concentration of unknown solutions</p> <p>Unit 2 Practical observations</p>	<p>Understand the impact of disorders of the musculoskeletal system and their associated corrective treatments</p> <p>Structure of the musculoskeletal system</p> <p>Unit 8 Practical / presentation observation</p>	<p>Explore the physiology of the digestive system and the use of corrective treatments for dietary-related diseases</p> <p>Structure of the digestive system</p> <p>Unit 8 Practical / presentation observation</p>	<p>Understand the impact of disorders on the physiology of the lymphatic system and the associated corrective treatments</p> <p>Structure of the lymphatic system</p> <p>Unit 8 Practical / presentation observation</p>
Learning Cycle 4	<p>Undertake calorimetry to study cooling curves continued</p> <p>Analyse the rate of cooling of substances from your data using cooling curves to draw conclusions</p> <p>Evaluate the accuracy of practical work in calorimetry in relation to the analysis of the cooling curve</p> <p>Unit 2 practice assignment and feedback</p>	<p>Undertake chromatographic techniques to identify components in mixtures continued</p> <p>Analyse own chromatograms and relate the factors that affect the separation of mixtures to the quality of results obtained</p> <p>Evaluate the chromatographic techniques used in relation to outcomes</p>	<p>Undertake titration and colorimetry to determine the concentration of solutions continued</p> <p>Demonstrate skilful application of procedures and techniques in titration and colorimetry to accurately determine the concentration of solutions</p> <p>Evaluate the accuracy of procedures and</p>	<p>Understand the impact of disorders of the musculoskeletal system and their associated corrective treatments continued</p> <p>Function of the musculoskeletal system</p> <p>Health matters and treatments related to the musculoskeletal system</p>	<p>Explore the physiology of the digestive system and the use of corrective treatments for dietary-related diseases continued</p> <p>Function of the digestive system</p> <p>Health matters and treatments related to the digestive system</p> <p>Unit 8 practice</p>	<p>Understand the impact of disorders on the physiology of the lymphatic system and the associated corrective treatments continued</p> <p>Function of the lymphatic system</p> <p>Health matters and treatments related to the lymphatic system</p>

	Unit 2 assignment - internally assessed and verified	and suggest improvements Unit 2 practice assignment and feedback Unit 2 assignment - internally assessed and verified	techniques used in titration and colorimetry in relation to outcomes and suggest improvements Unit 2 practice assignment and feedback Unit 2 assignment - internally assessed and verified	Unit 8 practice assignment and feedback Unit 8 assignment - internally assessed and verified	assignment and feedback Unit 8 assignment - internally assessed and verified	Unit 8 practice assignment and feedback Unit 8 assignment - internally assessed and verified
Learning Cycle 5	Review personal development of scientific skills for laboratory work (shared across three teachers) Final Unit 2 assignment - internally assessed and verified Unit 1 external assessment attempt 2 preparation and external assessment 2 Year 13 learning introduction and preparation	Review personal development of scientific skills for laboratory work (shared across three teachers) Final Unit 2 assignment - internally assessed and verified Unit 1 external assessment attempt 2 preparation and external assessment 2 Year 13 learning introduction and preparation	Review personal development of scientific skills for laboratory work (shared across three teachers) Final Unit 2 assignment - internally assessed and verified Unit 1 external assessment attempt 2 preparation and external assessment 2 Year 13 learning introduction and preparation	Unit 3 external assessment attempt 2 preparation and external assessment 2	Unit 3 external assessment attempt 2 preparation and external assessment 2	Unit 3 external assessment attempt 2 preparation and external assessment 2

SUBJECT Assessment Calendar 2025-26

	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Learning Cycle 1	Science baseline Cells	Electricity Energy	Science baseline B1 Cell structure Atomic structure Energy (work, power, SHC)	B8 Photosynthesis Chemical changes Electrolysis (Triple) Chemical calculations Atoms and radiation (isotopes and half-life)	B18 Biodiversity & ecosystems Polymers and DNA (Triple) Chemical analysis Waves (Types and EM)	Initial review assessment Cells Monomer / polymer Atomic structure Amount of substance Waves Mechanics	Respiration & photosynthesis Nervous control Kinetics and Kp Period 3 Carbonyl Chemistry Circular motion SHM Thermal physics
Learning Cycle 2	Body systems Reproduction	Motion / pressure Health	B2 Cell division, stem cells and chromosomes B3 Organisation and the digestive system Periodic table. Transition metals (Triple) Energy (transfer, resources and demands)	B9 Respiration Rates of reaction Equilibrium Atoms and radiation (irradiation and contamination)	3-21 Nov Mock exams Full paper 1 mock exams B13 Cell division and reproduction Our Atmosphere Waves (refraction, light & sound)	5-9 Jan Mock exams Membranes / enzymes Bonding Groups 2 & 7 Redox Waves Mechanics Particles	5-9 Jan Mock exams Energy & ecosystems Muscles Homeostasis Acids/bases/buffers Aromatics and Bio-chemistry Gravitational fields Nuclear physics
Learning Cycle 3	Particles Elements, atoms Reactions	Ecosystems Adaptation	B4 Animal tissues, organs and systems B7 Non-communicable diseases Structure and bonding (triple) Structure and bonding Ions (double) Bulk properties (Triple) Electricity (circuits)	B10 Nervous system Energy changes Forces	23 Feb – 6 Mar Mock exams B14 Variation & evolution B15 Genetics & evolution Earth's resources Using our resources Electromagnetism	Mid-year assessment Immunology Energetics Particles Mechanics	Inheritance Gene expression Thermodynamics Organic synthesis and analysis Electric fields Astrophysics

Learning Cycle 4	Acids and alkalis Forces	Periodic table Separation tech.	B4 Plant tissues, organs and systems Structure and bonding covalent (double) Calculations 1 (Triple) Electricity (domestic & national grid)	13-24 April Mock exams B11 Hormones B12 Homeostasis in action Electrolysis Chemical cells Mid-point review Motion	Full paper 2 mock exams (internal) Review Review Review	Gas exchange / protein synthesis Kinetics Equilibria Electricity Materials	Full paper 2 & 3 mock exams Evolution Gene technology Transition elements Inorganic compounds Electrochemical cells Magnetic fields & induction Practical skills
Learning Cycle 5	Year 7 exams & Progress tests Sound & light Space	Year 8 exams & Progress tests Metals and acids The Earth	Year 9 exams & Progress tests B5 Communicable disease B6 Preventing and treating disease Chemical changes Particle model	B16 Adaptations and competition B17 Organisation of ecosystems Crude oil & fuels Alkenes, alcohols, acids & esters Forces & Motion	GCSE/BTEC exams	15-19 June mock exams Mass transport / ecology Organic chemistry Alkenes, alcohols, organic analysis Practical skills Pre-year 13 knowledge	A level/BTEC exams

NB. The assessments and mark scheme for each learning cycle will be placed in the science assessment folder in the science Teams.

Throughout each learning cycle, several units will be taught. Each of these units will conclude with a unit assessment. These unit assessments will follow the curriculum maps for biology, chemistry and physics, as set out in the pages above.

Biology – green

Chemistry – red

Physics – blue

KS3 Assessment Criteria

Pupils in years 7, 8 and 9 will be assessed on their knowledge, understanding and skills of the curriculum. GCSE grades will be used in years 10 and 11.

KS3	WB – Working below end of year expectations	WT – Working towards end of year expectations	WAT – Working at end of year expectations (SECURING)	WA – Working above end of year expectations (MASTERING)
General science skills	<p>I can use simple practical scientific techniques to investigate a prediction, produce results and can say whether the results support or refute the prediction.</p> <p>I have a basic understanding of the key ideas of science and can use this with some success to explain my observations. I can spot simple patterns in data and recognise obvious anomalies.</p> <p>I can recall important scientific facts such as key practical equipment, units for measurements, common chemical symbols or parts of cells.</p>	<p>I can use a range of scientific techniques with confidence and can select an appropriate technique to produce useful data. I am critical of the data I produce and can explain whether a set of data or an investigative strategy will produce reliable data. I can suggest improvements to produce better quality data.</p> <p>I can describe with confidence whether results support or refute a simple prediction and consider anomalous results.</p> <p>I can explain my observations using key scientific ideas and make a judgement about the extent to which data supports a conclusion.</p> <p>I can recall scientific ideas and apply these in new situations. I am</p>	<p>I can use a range of scientific techniques with confidence and make judgements about the best technique to produce the best quality data. I am critical of an investigative strategy and can recognise how to amend a strategy to produce reliable data. I can consider issues of accuracy and precision in my analysis of data.</p> <p>I can describe with confidence the extent to which results support a prediction.</p> <p>I can explain observations using more complex scientific ideas and incorporate ideas from more than one source into more complex models.</p> <p>I can predict outcomes in a variety of unfamiliar situations, using</p>	<p>I can use a range of scientific techniques with confidence and make judgements about the best technique to be used to produce the best quality data. I will be highly critical of the data that an investigative strategy is likely to produce and will amend my strategy accordingly to ultimately produce reliable data. I can consider issues of accuracy and precision in my choices of technique and my analysis of data.</p> <p>I can describe with confidence the extent to which results support a prediction and evaluate the success of an</p>

		beginning to be able to generalise and use simple models to explain ideas and observations.	models to justify my ideas.	<p>investigation.</p> <p>I can explain observations using more complex scientific ideas, analyse similarities and differences in data from different sources and use competing ideas to develop complex models.</p> <p>I can apply complex ideas in a variety of unfamiliar situations and suggest and justify outcomes.</p>
KS3	WB – Working below end of year	WT – Working towards end of	WAT – Working at end of year	WA – Working above end of

	expectations	year expectations	expectations (SECURING)	year expectations (MASTERING)
Scientific enquiry	<p>I can pose a question which can be investigated.</p> <p>I can follow instructions to reduce the risk from hazards in an investigation.</p> <p>I am aware of experimental error, know that variables need to be controlled and can suggest reasons for differences in repeat readings.</p> <p>I can analyse data to identify a simple pattern, identifying the variables involved, and can calculate a simple mean or estimate values of data between known values.</p> <p>I can draw simple conclusions from a data set.</p> <p>I am able to present data in a table and, with guidance, produce a chart or graph.</p> <p>I can communicate my key ideas in an understandable way using accurate scientific vocabulary.</p> <p>I can identify evidence which supports a claim</p>	<p>I can write an investigation question about how one variable can affect another.</p> <p>I can identify hazards in an investigation and take steps to reduce risk.</p> <p>I can recognise ways to reduce measurement errors and understand how the size of error in an investigation affects the strength of evidence.</p> <p>I can use a set of data to identify the relationship between two variables, can identify anomalous results and select appropriate data for calculating a mean.</p> <p>I can describe the pattern in a data set and explain it using scientific knowledge.</p> <p>I can present data in a table with correctly labelled headings with units. I can draw graphs with an accurate line of best fit.</p> <p>I can communicate my ideas coherently and</p>	<p>I can pose a question to investigate the correlation between one variable and another.</p> <p>I can identify strategies which enable a question to be safely investigated in a school laboratory.</p> <p>I can apply strategies to reduce experimental error and can explain how random and systematic errors affect data.</p> <p>I can confidently identify patterns in data and use these to describe the relationships between variables.</p> <p>I can consider anomalies in my analysis of the results and show some ability to be able to carry out more complex analysis such as calculating gradient of a sloping line.</p> <p>I can draw conclusions from primary and secondary data, justifying whether some data can be judged as anomalous, and describe the</p>	<p>I can explain whether a given question can be investigated scientifically and which type of enquiry to use.</p> <p>I can justify the decisions taken and strategies used to mitigate risks in an investigation.</p> <p>I can use strategies which avoid experimental error and can identify potential sources of random and systematic error.</p> <p>I am competent in undertaking a full analysis of data including more complex statistical analysis and taking full account of anomalies.</p> <p>I can use data from more than one source, fully justifying decisions about the significance of results in supporting a conclusion. I</p>

	<p>made.</p> <p>I can identify a fact, idea, data or conclusion which supports an opinion.</p> <p>I can identify a consequence of a scientific development.</p> <p>I can recognise that evidence can disagree with a theory.</p>	<p>using scientific vocabulary in a way that makes it clear the meaning is understood.</p> <p>I can comment on whether evidence is scientifically accurate and relevant to a claim made.</p> <p>I can identify the most important piece of evidence to support a claim as well as one or two supporting pieces of evidence.</p> <p>I can recognise consequences of scientific developments for economies, society and the environment.</p> <p>I can recognise that when evidence disagrees with a theory then the evidence needs to be tested, or the theory needs to be amended or abandoned.</p>	<p>extent to which a data set supports a conclusion.</p> <p>I can justify my chosen method of chart or graph for displaying results and recognise when to use zero or non-zero starting points for axes.</p> <p>I can communicate complex ideas coherently making full use of scientific vocabulary and taking account of audience.</p> <p>I can describe the reasoning which links the evidence to a claim made.</p> <p>I can give a justified opinion but acknowledge other opinions or interpretations of the evidence.</p> <p>I can evaluate the merits of scientific developments based on their economic, social and environmental impacts.</p> <p>I can recognise that evidence which disagrees with a theory needs to be evaluated to decide whether the evidence or the theory is refuted.</p>	<p>can identify further questions arising from the investigation.</p> <p>I can justify all aspects of the chart or graph used for displaying results and can explain my choice of a straight line or curved line of best fit.</p> <p>I am able to communicate complex ideas coherently and succinctly using scientific vocabulary appropriate to the audience for the report.</p> <p>I can comment on whether the reasoning for a claim made follows logically from the evidence.</p> <p>I can recognise, and take account of, contrasting interpretations of evidence. I can critique a claim made.</p> <p>I can justify an opinion about the merit of a scientific development and make choices which maximise benefit and</p>
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				minimise harm. I can explain how evidence challenges theories and refutes them or makes them more robust.
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To achieve grades 8 and 8-8 candidates will be able to:

- demonstrate relevant and comprehensive knowledge and understanding and apply these correctly to both familiar and unfamiliar contexts using accurate scientific terminology
- use a range of mathematical skills to perform complex scientific calculations
- critically analyse qualitative and quantitative data to draw logical, well-evidenced conclusions
- critically evaluate and refine methodologies, and judge the validity of scientific conclusions

To achieve grades 5 and 5-5 candidates will be able to:

- demonstrate mostly accurate and appropriate knowledge and understanding and apply these mostly correctly to familiar and unfamiliar contexts, using mostly accurate scientific terminology
- use appropriate mathematical skills to perform multi-step calculations
- analyse qualitative and quantitative data to draw plausible conclusions supported by some evidence
- evaluate methodologies to suggest improvements to experimental methods, and comment on scientific conclusions

To achieve grades 2 and 2-2 candidates will be able to:

- demonstrate some relevant scientific knowledge and understanding using limited scientific terminology
- perform basic calculations
- draw simple conclusions from qualitative or quantitative data
- make basic comments relating to experimental methods

Pupils recall some key words and their meanings. They can describe simple similarities and differences in the phenomena they observe. They can answer basic recall questions in familiar contexts. Pupils can recall some practical activities carried out and select some appropriate pieces of equipment for a task. They can identify a hypothesis and a conclusion. They can recall and use a small number of basic formulae. Pupils can identify simple patterns from a graph or data table.

Grade 2

Pupils apply skills (including suitable communication, mathematical and technological skills), knowledge and understanding in basic contexts. They show some understanding of the nature of science and its applications. They can explain straightforward models of phenomena, events and processes. They can use a select range of skills and techniques, answer scientific questions with a good range of vocabulary, and solve straightforward problems and tests. Pupils also begin to recognise simple interrelationships between science and society. Pupils can recall practical experiments they carried out and select appropriate equipment for a specific task. They have a basic understanding of hypotheses, evidence, theories and explanations. They can recall that models may be used in science but may not link this to specific examples. They can use basic skills to test hypotheses and answer scientific questions. They can recall and use some basic formulae. Pupils recognise and describe simple patterns and begin to link in scientific explanations for these.

Grade 3

Pupils can occasionally communicate scientific knowledge and understanding from the course of study. For example, facts, definitions, and explanations. They occasionally use scientific and technical knowledge, terminology, and conventions appropriately to show understanding of the nature of science and its applications. Pupils can occasionally apply appropriate communication, mathematical, and technical skills in a range of practical contexts. This includes making links between hypotheses, evidence, theories, and explanations. They understand models are used in science to explain phenomena. They can occasionally apply their understanding to connect theory with particular contexts. They can usually make sense of connections within data. They can recall and use the majority of simple formulae. Pupils can occasionally analyse information and ideas to interpret and evaluate. They can usually make judgements and draw conclusions from a range of quantitative and qualitative data and information. They can occasionally understand basic limitations of evidence and develop ideas to improve experimental procedures.

Grade 4

Pupils recall, select and communicate secure knowledge and understanding of a relatively wide range of concepts in science. Pupils demonstrate sound knowledge and understanding, which can

be applied to a range of scientific processes. They use scientific and technical knowledge, terminology and conventions appropriately most of the time, showing an understanding of scale in terms of time, size and space. They can apply appropriate skills, including communication, mathematical and technological skills. Pupils can apply knowledge and reasoning to carry out a range of practical tasks (PAGs). They recognise, understand and apply links between hypotheses, evidence, theories and explanations, in most cases. They use models to explain phenomena, events and processes in most cases. Using appropriate methods, sources of information and data, they apply their skills to answer scientific questions, solve problems and test hypotheses. Pupils can recall and apply the majority of scientific equations. They can use the majority of complex formulae, rearrange and use the majority of simple formulae. Pupils often analyse, interpret and evaluate a range of quantitative and qualitative data and information. They understand some of the limitations of evidence and develop arguments with some supporting explanations. They can draw the majority of the conclusions consistent with the available evidence.

Grade 5

Pupils recall, select and communicate secure knowledge and understanding of science. Pupils demonstrate extensive knowledge and understanding, which can be applied to various scientific processes. They use scientific and technical knowledge, terminology and conventions appropriately, showing understanding of scale in terms of time, size and space. They apply appropriate skills, including communication, mathematical and technological skills. Pupils can apply knowledge and reasoning to carry out a range of practical tasks, (PAGs). They recognise, understand and apply links between hypotheses, evidence, theories, and explanations. They use models to explain phenomena, events and processes. Using appropriate methods, sources of information and data, they apply their skills to answer scientific questions, solve problems and test hypotheses. Pupils can recall and apply the majority of scientific equations. They can use complex formulae and rearrange and use simple formulae. Pupils analyse, interpret and evaluate a range of quantitative and qualitative data and information. They understand some of the limitations of evidence and develop arguments with supporting explanations. They draw conclusions consistent with the available evidence.

Grade 6

Pupils recall, select and communicate accurate knowledge and detailed understanding of science. They demonstrate a broad understanding of the nature of science, its laws, its applications, and the influence of society on science and science on society. They understand how relationships between scientific advances and their ethical implications have benefits and risks associated with them. They use scientific and technical knowledge, terminology and conventions appropriately and consistently, showing a good understanding of scale in terms of time, size and space. They apply appropriate skills, including communication, mathematical and technological skills, knowledge and understanding effectively in a range of practical and other contexts. They are able to link the relationships between hypotheses, evidence, theories and explanations and make effective use of models to explain phenomena, events and processes. They use a range of appropriate methods, sources of information and data regularly, applying relevant skills to address scientific questions, solve problems and test hypotheses. Pupils can correctly recall and use the majority of formulae for calculations. They can rearrange the majority of these formulae when required. Pupils analyse, interpret and accurately evaluate a wide range of quantitative and qualitative data and information. They evaluate information to develop arguments and explanations taking account of the limitations of the available evidence. They make reasoned judgments and draw evidence-based conclusions. Pupils can apply higher level mathematical skills to analyse the majority of the evidence provided.

Grade 7

Pupils recall, select and communicate precise knowledge and a detailed understanding of science and its applications. Pupils can recall and explain the effects and risks of scientific developments and their applications on society, industry, the economy and the environment. They demonstrate a clear understanding of why and how scientific applications, technologies and techniques change over time, and the need for regulation and monitoring. They use terminology and conventions appropriately and consistently. They apply appropriate skills, including communication, mathematical and technological skills, knowledge and understanding effectively to a wide range of practical contexts, and to explain applications of science. They apply a comprehensive understanding of practical methods, processes and protocols to plan and justify a range of appropriate methods to solve practical problems. They apply appropriate skills, including mathematical, technical and observational skills, knowledge and understanding in a wide range of practical contexts. They follow procedures and protocols consistently, evaluating and managing risk and working accurately and safely. Pupils can correctly use the full range of complex formulae for calculations. They can recall all the formulae needed for calculations. Pupils analyse and interpret critically a broad range of quantitative and qualitative information. They reflect on the limitations of the methods, procedures and protocols they have used and the data they have collected, and can evaluate information systematically to develop reports and findings. They make reasoned judgments consistent with the evidence to develop substantiated conclusions. Pupils can apply higher level mathematical skills to analyse evidence provided.

Grade 8

Pupils are able to communicate precise knowledge and detailed understanding of the full range of concepts from biology, chemistry and physics. Pupils will be able to answer questions/tasks using their applied knowledge in written, numerical, theoretical, practical, ethical, social, economic and environmental scenarios. Pupils should be able to relate scientific advances to the ethical implications of the scientific advances, and be able to analyse and evaluate the associated risks and benefits. Pupils should select appropriate, scientific, technical knowledge, and associated terminology and conventions to demonstrate a consistently detailed understanding of scale, (size, time and space). Pupils are able to adapt, modify and enhance experimental procedures with justifications. They are also able to apply and demonstrate appropriate skills (communication/mathematical/ technological). Pupils should also be able to apply these skills to other scenarios. Pupils can recall and manipulate both simple and complex mathematical formulae. Pupils should be able to formulate and test hypotheses and link this to evidence, theories and explanations, alongside using models to explain phenomena, events and processes. Emphasis should be placed upon the pupil's ability to use and synthesise skills such as interpreting, evaluating, problem solving, judging, drawing conclusions and modifying/improving experimental procedures. Pupils are able to critically evaluate quantitative and qualitative data and develop arguments and explanations, taking into account limitations of the available evidence. Pupils can comprehensively apply higher level mathematical skills to analyse evidence provided.

Grade 9

Pupils apply principles and abstract concepts in familiar contexts and in contexts outside those experienced during lessons. They are able to link together appropriate facts, principles and concepts from all areas of the specification. They can devise and plan experimental and investigative activities, selecting appropriate techniques and demonstrating safe and skilful practical techniques. They make observations and measurements with precision and record these methodically. They can explain significant trends and patterns shown by complex data presented in tabular or graphical form. They are able to translate successfully data that is presented as prose, diagrams, tables or graphs from one form to another. Pupils can recall and manipulate both simple and complex mathematical formulae. They are able to interpret, explain and critically and systematically evaluate any statements and conclusions they make. They can also carry out all of the calculations and use complex mathematical techniques to analyse data and explain scientific phenomena. Pupils can comprehensively apply higher level mathematical skills to analyse evidence provided.



Year 11 Reproduction review

My score for this assessment: _____ My grade for this assessment: _____


My target for this assessment: _____

Assessing my performance – please tick the relevant boxes:

Question	Score	Strengths	Areas to improve
1. Genetics key words	/5		
2. Pedigree chart and inheritance	/4		
3. Division, chromosomes and gender	/7		
4. Data analysis and embryo screening	/8		
5. DNA and alleles	/6		

I am: Working below target / Working towards target / On target / Working beyond my target

Teacher Feedback:

 Progress! Well done guys – lots of really good scores, which shows a good understanding of this material. Lots of grade 5's. This is proving that many of you really do have the potential for higher tier work. Genetic crosses are going well and use of key words is strong.

T Please check reading of graphs and data analysis. Also, please review the cystic fibrosis (recessive needing two faulty alleles) and polydactyly (dominant, needing only 1 faulty allele) genetic diseases.



Make sure you can write pros and cons of genetic screening.

Pupil red pen response:

Questions I completed well – including why this was the case:

Questions I need to develop further – including how I will do this:

Questions to support your development – please complete in your book:

- What are the major differences between mitosis and meiosis?
- Can you draw a diagram to prove the inheritance of gender is 50:50?
- Why is polydactyly going to appear in the phenotype of a child if one parent is homozygous dominant?
- Looking ahead:
- **What was the work of Charles Darwin, what was his theory, and how does this explain evolution of different species of organism?**

Signed (Student): _____

Date: _____