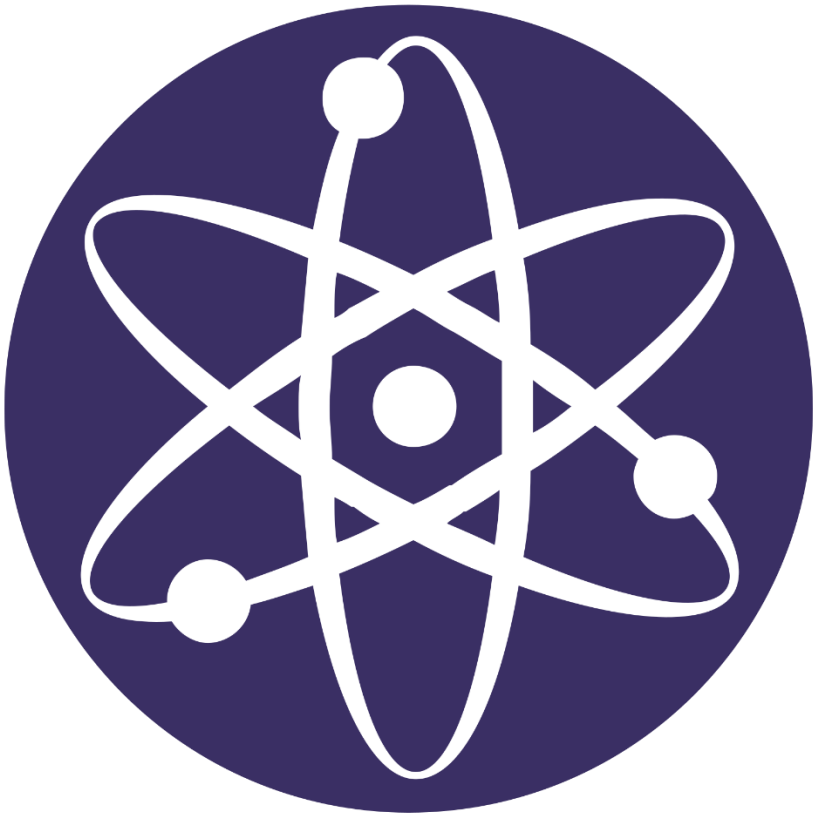
PARKSIDE COMMUNITY SCHOOL

EMBARK FEDERATION



Science

Learning Journey

Intent · Implementation · Impact

Curriculum Intent

At Parkside, we believe that science is not only a body of knowledge but a way of thinking, a lens through which pupils can explore, question, and understand the world. Our science curriculum is designed to ignite curiosity, foster creativity, and empower every pupil to become a confident, critical thinker and problem-solver.

1. Equity and Excellence for All

- Ensure that every pupil, regardless of background, gender, ability, or need, has access to a broad, balanced, and ambitious science curriculum.
- Promote high expectations and inclusive practices that enable all learners to thrive and feel valued as scientists.

2. Knowledge-Rich and Conceptually Coherent

- Deliver a sequenced and cumulative curriculum that builds deep understanding of key scientific concepts across biology, chemistry, and physics.
- Embed interdisciplinary links and real-world contexts to help pupils see the relevance and interconnectedness of science.

3. Scientific Literacy

- Prioritise the development of scientific vocabulary, reading, and communication skills to ensure pupils can articulate ideas clearly and confidently.
- Use explicit instruction, modelling, and retrieval practice to secure long-term retention and application of scientific language.

4. Practical Science and Inquiry Skills

- Provide regular opportunities for pupils to engage in hands-on investigations, develop experimental techniques, and apply the scientific method.
- Cultivate pupils' ability to hypothesise, predict, observe, analyse, interpret, and evaluate with increasing independence and sophistication.

5. Character, Values, and Careers

- Embed the school's core values: resilience, respect, responsibility, and community—into every aspect of science learning:
    - Encourage pupils to show resilience when tackling challenging concepts or experiments.
    - Promote respect for diverse perspectives, ethical scientific practice, and the natural world.
    - Foster responsibility in the safe and accurate use of scientific equipment and data.
    - Build a sense of community through collaborative learning, peer support, and shared scientific inquiry.
- Inspire pupils to pursue further study and careers in science by showcasing diverse role models, emerging technologies, and STEM pathways that reflect their potential and place in the wider world.

6. Responsive and Reflective Teaching

- Use formative assessment and adaptive teaching to meet the needs of all learners and close gaps in understanding.
- Foster a safe, supportive, and intellectually stimulating environment where pupils are encouraged to ask questions, take risks, and learn from mistakes.

We are committed to nurturing a generation of scientifically literate citizens who are equipped to make informed decisions, tackle global challenges, and contribute meaningfully to society. At Parkside, every pupil is a scientist and every lesson is a step toward discovery, guided by our shared values.

Curriculum Implementation

Year 7 through Year 11, we build knowledge in small, carefully sequenced steps; constantly revisit and retrieve prior learning; model expert thinking; and gradually release responsibility so that every pupil achieves mastery and develops a genuine passion for science.

1 Curriculum Sequencing & Coherence

Thematic Parallel Units (Years 7–9): Each week pupils have one lesson of physics, one of chemistry and one of biology, each driven by its own theme. Studying three discipline-specific themes in parallel builds interlinked schema, deepens understanding and manages cognitive load.

Small-Step Progression: New material is introduced in bite-sized chunks. Each lesson begins with a ‘Memory Platform’. These ensure pupils secure and reinforce foundation knowledge before encountering new concepts or tackling more complex ideas

Key Stage 4 Pathways: Our KS3 themes feed directly into AQA Trilogy or Separate Sciences. Concepts are rehearsed in progressively complex scenarios, ensuring high success rates.

2 Explicit Teaching & Modelling

We begin each lesson by stating clear learning objectives and activating prior knowledge. Teachers then unpack new content with direct, step-by-step instruction: using metacognitive talk, annotated worked examples, and multiple representations (diagrams, simulations, physical models), to make the underlying logic of scientific reasoning transparent. By breaking complex ideas into bite-sized chunks and demonstrating each stage of a procedure, we reduce cognitive load and provide the scaffolding pupils need before they practise independently.

3 Guided Practice & Metacognition

We structure practice in graduated steps, from scaffolded worked examples through collaborative problem-solving to independent application, while integrating explicit metacognitive routines. In every lesson, pupils pause to articulate their plan (“What am I trying to achieve?”), monitor their strategy (“Is this approach helping?”) and evaluate their outcome (“What could I do differently next time?”). Through guided tasks and peer dialogue, they internalise the plan, monitor, evaluate cycle as a personal toolkit, taking ownership of their progress and building lasting self-regulation.

4 Purposeful Practical Work

We weave practical investigations into every thematic unit so that hands-on experiments drive deeper understanding and genuine scientific skill. Each practical begins with a focused introduction that makes its precise learning goal clear and links back to prior knowledge. During the investigation, teachers model key techniques and guide pupils as they manipulate variables, collect data and troubleshoot in real time. Finally, a structured debrief helps pupils connect their observations to underlying theory, critique their methods, and reflect on what they’ve learned. By sequencing every practical with framing, guided inquiry and reflective follow-up, we ensure each activity is a purposeful step toward independent scientific thinking.

5 Disciplinary Literacy & Vocabulary

We prioritise mastery of domain-specific (Tier 3) vocabulary, deliberately selecting the terms that underpin each unit and unpacking their morphemes to reveal links across contexts. Lessons feature quick retrieval drills for these words and model their use in explanations and diagrams. Pupils engage with authentic scientific texts, identifying and defining Tier 3 terms, analysing text structure, and summarising key ideas, to deepen comprehension. Writing activities use scaffolded frames and sentence stems to guide pupils in embedding precise terminology into concise, evidence-based explanations. This dual focus on reading and writing builds the fluency and precision they need to think and communicate like scientists.

6 Formative and Summative Assessment

We use sharp, diagnostic questioning and rapid formative checks to uncover and challenge misconceptions in real time, then close every gap before moving on. Each lesson includes hinge-point questions or diagnostic multiple-choice questions that force pupils to confront alternative ideas. Pupils record their answers, via whiteboards, A, B, C, D cards or digital quizzes, then work immediately to revise any errors, explaining both the misconception and the correct reasoning.

Pupils routinely use clear success criteria and exemplar responses to evaluate their own and each other’s work. This builds their evaluative muscles and deepens metacognitive awareness

Pupils complete a low-stakes quizzes as part of our Memory Platform, challenging them to recall key ideas from both current and earlier themes. Teachers review the results to spot common misconceptions and individual gaps, then use adaptive teaching and targeted homework to secure foundational knowledge before new content is introduced.

Pupils sit mid-topic checkpoint assessments and full end of topic assessments. After each assessment, we analyse performance at the question level to pinpoint both cohort-wide misconceptions and individual gaps. These insights then drive dedicated feedback lessons, during which pupils: Review exemplar answers and common errors; Reflect on their own responses, explain the correct reasoning, and identify personal misconceptions; Complete targeted practice tasks to apply the right concepts.

7 Homework & Independent Study

Purposeful & Time-Bound: Pupils receive a biweekly 20-minute homework task that directly extends the lesson's learning objective, whether that's low-stakes retrieval, skill practice or application of new concepts.

Targeted Retrieval Practice: Homework regularly revisits core ideas from recent and earlier units through quizzes, short-answer questions or concept maps, strengthening long-term retention.

Gap-Focused Activities: Question-level insights from our assessments inform bespoke tasks designed to challenge each pupil's specific misconceptions and knowledge gaps.

Classroom Review: Homework outcomes are discussed in a dedicated segment of the following lesson. Pupils self-assess against exemplar responses, explain any errors and consolidate understanding before moving on.

Curriculum Impact

At Parkside, our science curriculum delivers measurable impact by equipping every pupil with the knowledge, skills, and mindset to succeed academically and thrive as scientifically literate citizens. Through a carefully sequenced, inclusive, and values-driven approach, we ensure that all pupils, develop a deep understanding of scientific concepts, confidence in practical inquiry, and a lifelong curiosity about the world around them.

How We Measure Impact

We use a robust combination of assessment data, pupil voice, and classroom evidence to evaluate the effectiveness of our curriculum:

1 Academic Achievement:

Pupils achieve strong outcomes in internal assessments and external GCSEs (AQA Trilogy and Separate Sciences), with progress tracked through low-stakes quizzes, mid-topic checkpoints, and end of topic assessments. Question-level analysis identifies misconceptions and informs responsive teaching.

2 Knowledge Retention & Conceptual Mastery:

Regular retrieval practice through “Memory Platforms” and cumulative assessments demonstrates pupils’ ability to recall and apply key concepts over time. Pupils confidently use scientific vocabulary and make interdisciplinary links across biology, chemistry, and physics.

3 Scientific Thinking & Practical Competence:

Pupils develop increasing independence in planning, conducting, and evaluating investigations. Practical work is purposeful and embedded, with pupils demonstrating accurate data handling, critical analysis, and reflective thinking.

4 Pupil Engagement & Aspirations:

Pupil voice surveys and lesson observations show high levels of engagement, enjoyment, and a sense of identity as scientists. Exposure to diverse STEM role models and career pathways inspires pupils to consider further study and careers in science.

5 Character Development & Values:

Pupils consistently demonstrate resilience, respect, and responsibility in their scientific learning. They engage thoughtfully with ethical issues and environmental challenges, showing an appreciation for science’s role in shaping a better future.

Our Impact in Summary

By the end of Key Stage 4, Parkside pupils are:

- Confident and articulate in their scientific thinking
- Skilled in practical inquiry and problem-solving
- Equipped with the literacy and reasoning to evaluate evidence and make informed decisions
- Inspired to pursue further study and careers in STEM
- Grounded in the values of resilience, respect, and responsibility

At Parkside, every pupil is a scientist and every science lesson is a step toward discovery, empowerment, and meaningful contribution to society.

Mr C Banyard

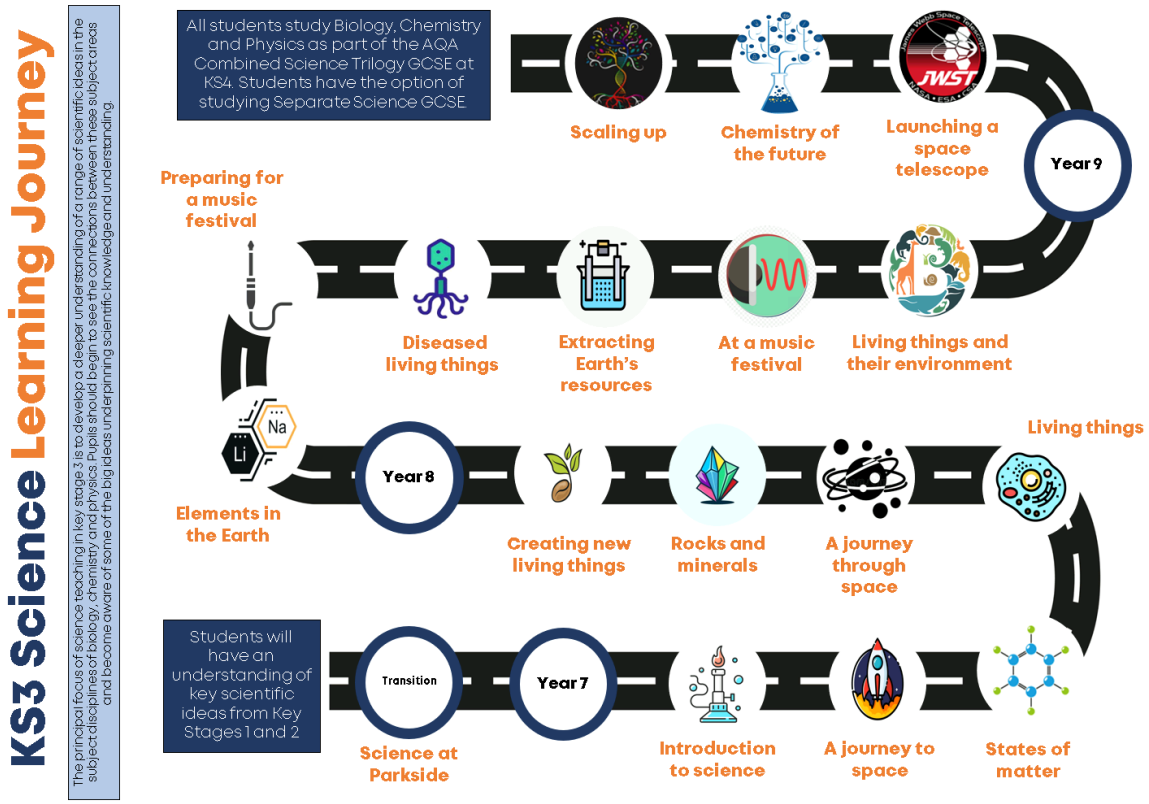
Head of Science

Key Stage 3 Curriculum Overview

At Key Stage 3, students follow a broad and ambitious science curriculum that builds on their experiences at primary school and lays the foundation for success at GCSE. Students receive three science lessons per week: one each in biology, chemistry, and physics, taught by subject specialists to ensure depth, consistency, and progression.

To support a smooth transition from Key Stage 2, the Year 7 curriculum begins with an introductory theme that revisits and strengthens core scientific skills, including working safely in a laboratory, using scientific equipment, and developing enquiry-based thinking. This ensures all students, regardless of their starting point, are equipped with the confidence and competence to access the secondary science curriculum.

Knowledge is carefully sequenced across Key Stage 3 to build on the substantive content taught at primary level: such as basic forces, materials, and life processes and to prepare students for the more rigorous and specialised content of AQA GCSE Science. Each year develops increasingly sophisticated understanding of key concepts, such as energy, particles, cells, and ecosystems, while also embedding disciplinary knowledge through practical work, data analysis, and scientific reasoning. By the end of Key Stage 3, students have developed a secure understanding of the fundamental principles of biology, chemistry, and physics, and are well-prepared to progress into either AQA Combined Science: Trilogy or AQA Separate Sciences at Key Stage 4.



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Term 1 (01/09/2025)

Year	Subject	08/09/2025	15/09/2025	22/09/2025	29/09/2025	06/10/2025	13/10/2025	20/10/2025
Year 7	Physics	Introduction to Science at Parkside				A Journey to Space		
Year 7	Chemistry					States of Matter		
Year 7	Biology					Living Things		
Year 8	Physics	Preparing for a Music Festival						
Year 8	Chemistry	Elements in the Earth						
Year 8	Biology	Diseased Living Things						
Year 9	Physics	Launching a Space Telescope						
Year 9	Chemistry	Chemsitry of the furture						
Year 9	Biology	Scaling Up						

27/10/2025

Term 2

Year	Subject	03/11/2025	10/11/2025	17/11/2025	24/11/2025	01/12/2025	08/12/2025	15/12/2025
Year 7	Physics	A Journey to Space					Y7 Summative Assessment	
Year 7	Chemistry	States of Matter						
Year 7	Biology	Living Things						
Year 8	Physics	Preparing for a Music Festival				Y8 Summative Assessment	Preparing for a Music Festival	
Year 8	Chemistry	Elements in the Earth					Elements in the Earth	
Year 8	Biology	Diseased Living Things					Diseased Living Things	
Year 9	Physics	Launching a Space Telescope						Y9 Summative Assessment
Year 9	Chemistry	Chemistry of the future						
Year 9	Biology	Scaling Up						

22/12/2025 — 29/12/2025

Term 3

Year	Subject	05/01/2026	12/01/2026	19/01/2026	26/01/2026	02/02/2026	09/02/2026
Year 7	Physics	A Journey to Space					MTT
Year 7	Chemistry	States of Matter					MTT
Year 7	Biology	Living Things					
Year 8	Physics	Preparing for a Music Festival					MTT
Year 8	Chemistry	Elements in the Earth					MTT
Year 8	Biology	Diseased Living Things		MTT	Living Things and Their Environment		
Year 9	Physics	Conservation and Dissipation of Energy					
Year 9	Chemistry	Atomic Strucure					
Year 9	Biology	Cell Structure and Transport					

16/02/2026

Term 4

Year	Subject	23/02/2026	02/03/2026	09/03/2026	16/03/2026	23/03/2026
Year 7	Physics	A Journey Through Space				
Year 7	Chemistry	Rocks and Minerals				
Year 7	Biology		MTT	Creating New Life		
Year 8	Physics	At A Music Festival				
Year 8	Chemistry	Extracting Earths Resources				
Year 8	Biology	Living Things and Their Environment				
Year 9	Physics	Conservation and Dissipation of Energy				
Year 9	Chemistry	Atomic Strucure				
Year 9	Biology	Cell Structure and Transport				

30/03/2026 — 06/04/2026

Term 5

Year	Subject	13/04/2026	20/04/2026	27/04/2026	04/05/2026	11/05/2026	18/05/2026
Year 7	Physics	A Journey Through Space					
Year 7	Chemistry	Rocks and Minerals					
Year 7	Biology	Creating New Life					
Year 8	Physics	At A Music Festival					Y8 Summative Assessments
Year 8	Chemistry	Extracting Earths Resources					
Year 8	Biology	Living Things and Their Environment					
Year 9	Physics	Energy Resources				Y9 Summative Assessments	
Year 9	Chemistry	The Periodic Table					
Year 9	Biology	Cell Division					

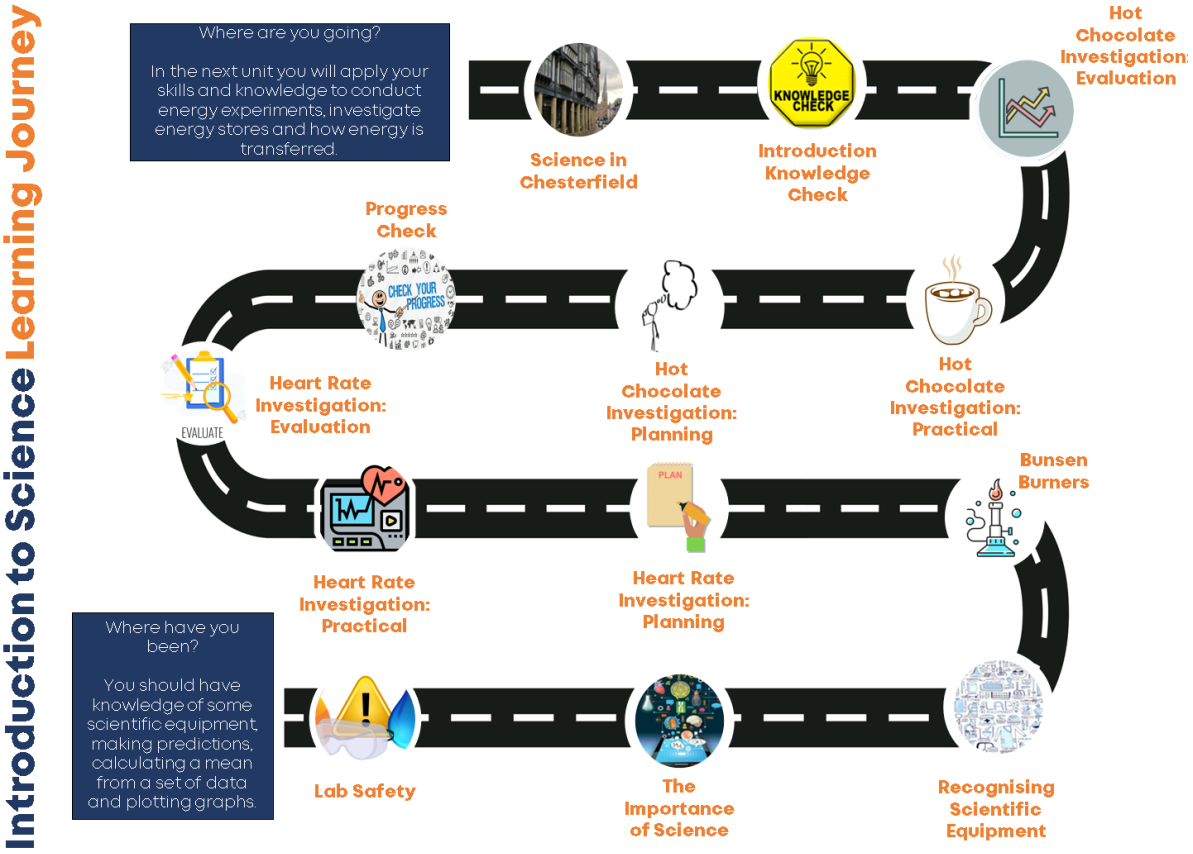
25/05/2026

Term 6

Year	Subject	01/06/2026	08/06/2026	15/06/2026	22/06/2026	29/06/2026	06/07/2026	13/07/2026	20/07/2026
Year 7	Physics	Y7 Summative Assessments	A Journey Through Space					EOTT	Science Culture Day Activities
Year 7	Chemistry		Rocks and Minerals						
Year 7	Biology		Creating New Life						
Year 8	Physics	At A Music Festival						EOTT	
Year 8	Chemistry	Extracting Earths Resources							
Year 8	Biology	Living Things and Their Environment							
Year 9	Physics	Molecules and Matter							
Year 9	Chemistry	Strucutre and Bonding							
Year 9	Biology	Organisation and The Digestive System							

27/07/2026

Introduction to Science at Parkside



At the start of Year 7, pupils begin their scientific journey with the theme *Introduction to Science at Parkside*. This unit is designed to welcome pupils into the world of secondary science by building confidence, curiosity, and a strong foundation in scientific thinking and practical work.

The theme begins with a focus on laboratory safety and routines, ensuring pupils understand how to work responsibly and confidently in a science lab. They learn to identify hazards, use equipment correctly, and follow safety procedures, skills that underpin all future practical work. From there, pupils explore the importance of science in everyday life and the wider world, considering how scientific understanding shapes technology, medicine, the environment, and their own communities.

Pupils are introduced to the scientific method through engaging, hands-on investigations. They explore how exercise affects heart rate and how the number of marshmallows in hot chocolate influences its temperature over time. These practicals allow pupils to develop key skills such as making predictions, taking accurate measurements, recording data, and drawing conclusions. They begin to understand how evidence is used to support ideas and how variables are controlled to ensure fair testing.

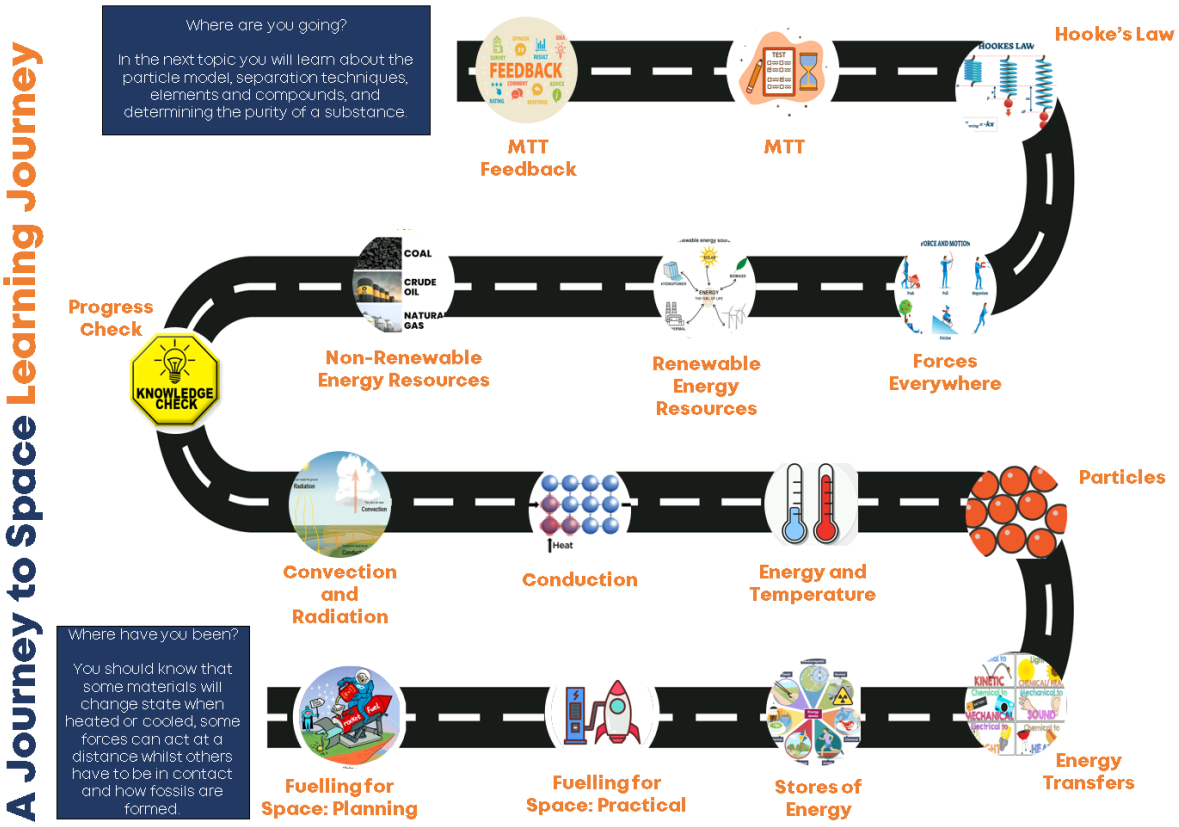
The theme concludes with *Science in Chesterfield*, where pupils explore how science connects to their local area, whether through local industry, environmental issues, or historical scientific contributions. This helps pupils see science as something relevant and meaningful, not just in textbooks but in the world around them.

By the end of this unit, pupils have developed the essential habits of a scientist: curiosity, precision, and a willingness to ask questions. They are equipped with the practical skills, safety awareness, and investigative mindset needed to thrive in the rest of the Key Stage 3 science curriculum and beyond.

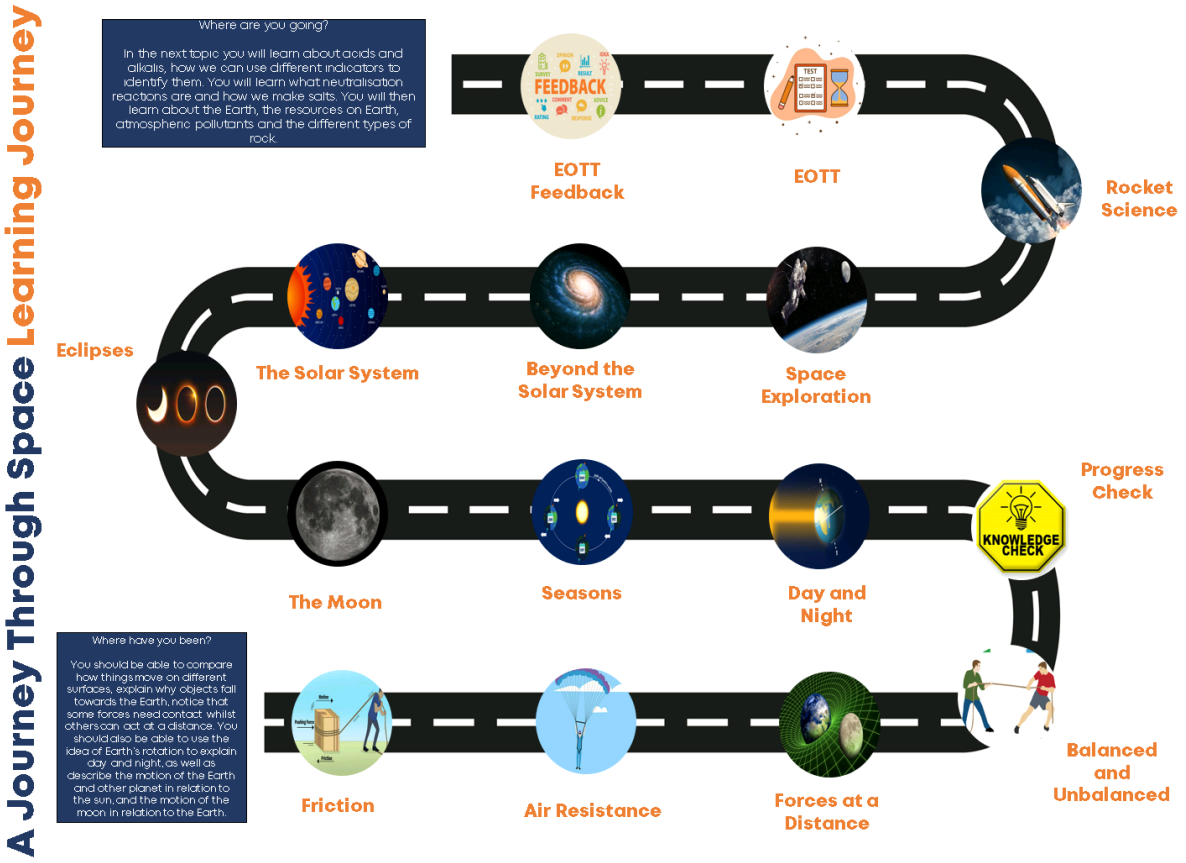
Year 7 Physics

In Year 7 Physics, pupils embark on an inspiring thematic journey through two interlinked units: *A Journey to Space* and *A Journey Through Space*. These themes are designed to spark curiosity, build foundational scientific knowledge, and develop key skills that prepare pupils for success at Key Stage 4.

In *A Journey to Space*, pupils explore the science behind launching into space and sustaining life beyond Earth, with a strong focus on energy. They learn about different energy resources, both renewable and non-renewable, and consider their uses and environmental impacts in the context of space missions. Through practical investigations and real-world applications, pupils develop an understanding of how energy is transferred by conduction, convection, and radiation, and how thermal insulation is used to protect astronauts and spacecraft. They also explore how chemical energy stored in fuels is converted into kinetic and gravitational potential energy during rocket launches, laying the groundwork for understanding energy stores and transfers that are central to GCSE Physics.



In *A Journey Through Space*, pupils shift their focus to the wider universe, investigating the structure and scale of the solar system, the Earth's motion, and the causes of day, night, seasons, and eclipses. This unit introduces the concept of balanced and unbalanced forces, with a particular emphasis on gravity and its role in orbital motion. Pupils also explore the life cycle of stars and the vast distances in space, measured in light-years, fostering a sense of awe and wonder while developing their understanding of key astronomical concepts.



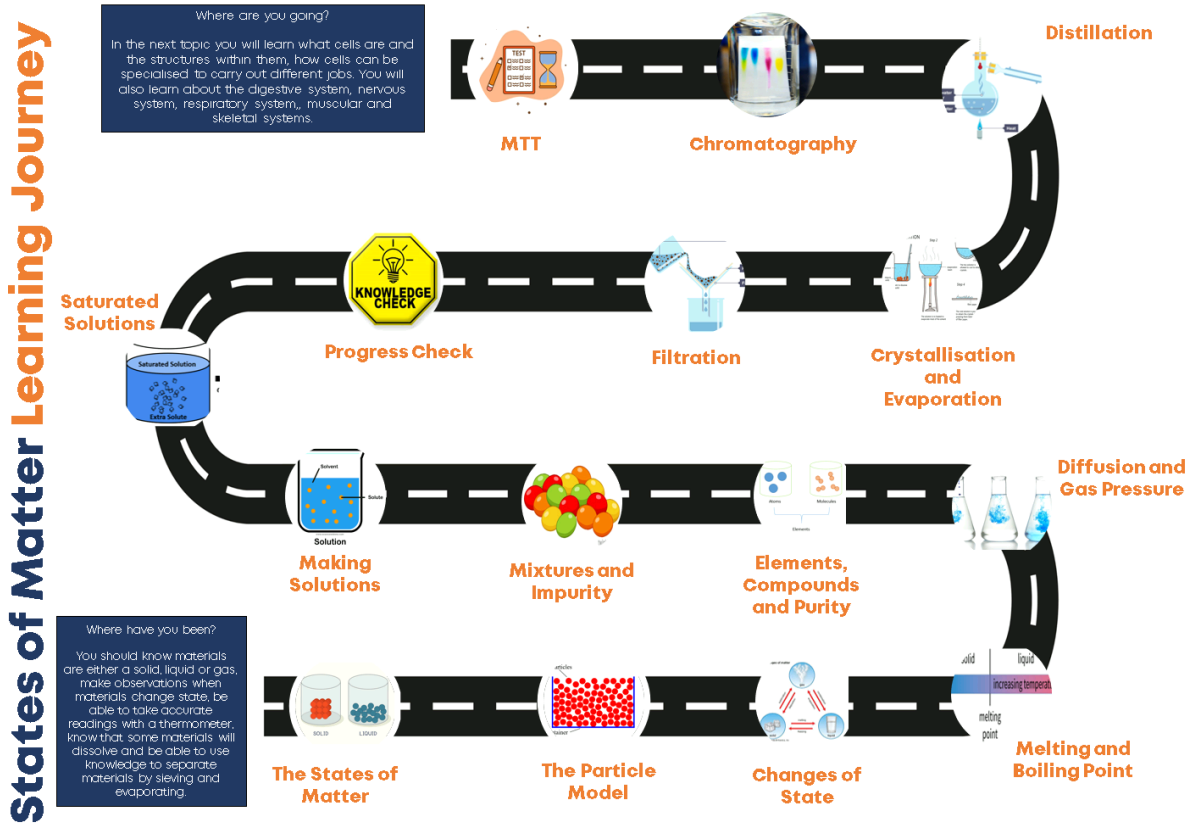
The curriculum is carefully sequenced to move from the familiar, energy in everyday and engineered systems, to the abstract, such as forces acting across the cosmos. This progression supports conceptual development and ensures that pupils build secure foundations for future learning. Throughout both themes, pupils develop essential scientific skills including modelling, evaluating evidence, and drawing conclusions. These are embedded in engaging contexts that support long-term retention and prepare pupils for the more complex demands of Key Stage 4.

By the end of Year 7, pupils have not only explored the physics behind space travel and the universe but have also built a solid foundation in energy and forces, ready to launch into deeper learning at GCSE and beyond.

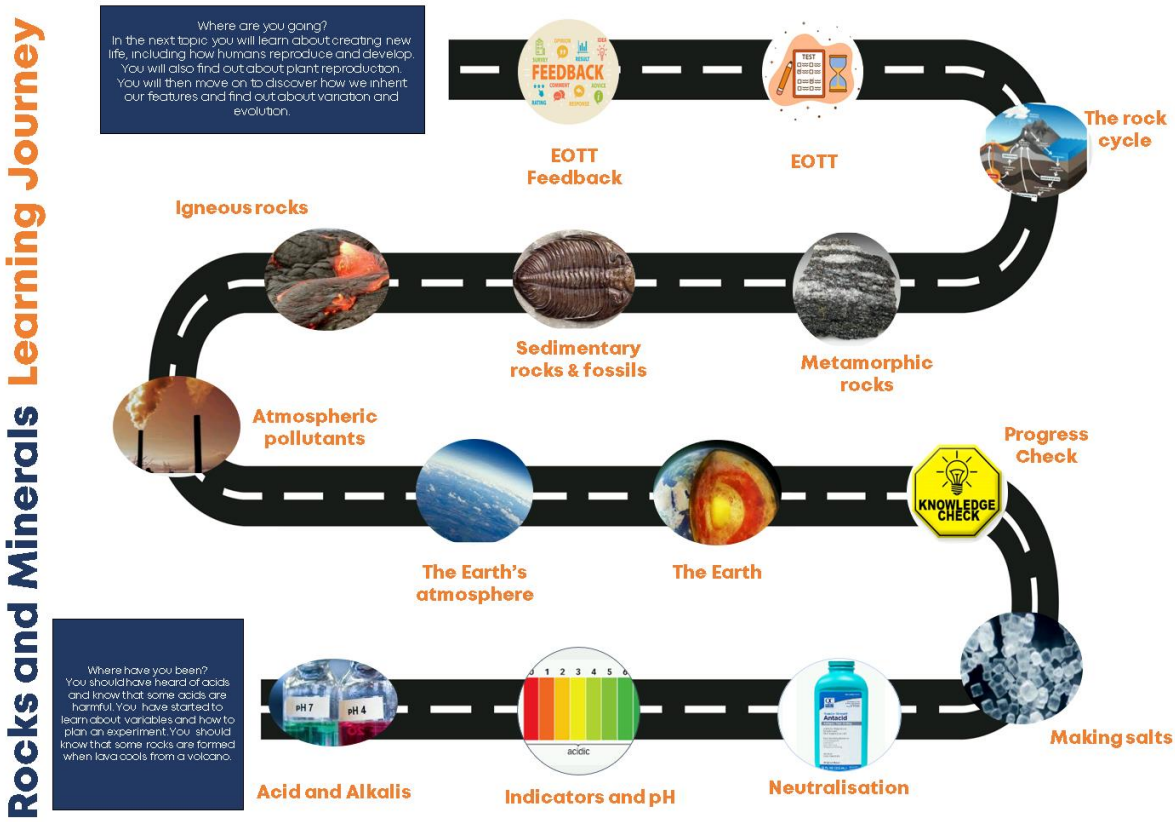
Year 7 Chemistry

In Year 7 Chemistry, pupils begin to explore the building blocks of the material world through two interconnected themes: *States of Matter* and *Rocks and Minerals*. These units are designed to develop pupils' understanding of the properties, behaviour, and composition of substances, while laying the conceptual foundations for more advanced chemistry at Key Stage 4.

In *States of Matter*, pupils are introduced to the particle model as a way of explaining the properties and behaviour of solids, liquids, and gases. They learn how particles are arranged and move in different states, and how changes in temperature and energy can lead to changes of state such as melting, boiling, condensation, and freezing. Through practical investigations and modelling, pupils begin to understand key ideas about energy transfer, diffusion, and the conservation of mass. This unit also introduces the concept of physical versus chemical changes, an essential distinction that underpins later topics in chemistry.



The second theme, *Rocks and Minerals*, takes pupils beneath the Earth's surface to explore the rock cycle and the formation of different types of rocks. They investigate how igneous, sedimentary, and metamorphic rocks are formed, and how processes such as weathering, erosion, and heat and pressure contribute to the continual recycling of Earth's materials. Pupils also examine the composition and uses of minerals and consider the environmental impact of extracting natural resources. This theme encourages pupils to think about chemistry in a broader Earth science context, linking the microscopic structure of materials to large-scale geological processes.



The curriculum is carefully sequenced to move from abstract particle-level understanding to more tangible, real-world applications. By first establishing how matter behaves at the microscopic level, pupils are better equipped to understand the physical and chemical changes that occur in natural systems like the rock cycle. This progression supports deeper conceptual understanding and prepares pupils for the more quantitative and theoretical demands of GCSE Chemistry.

Throughout both themes, pupils develop essential scientific skills such as observation, data collection, and evaluation. They learn to use models to explain phenomena, to draw conclusions from evidence, and to communicate their ideas clearly. These skills are embedded in engaging, hands-on contexts that make chemistry relevant and accessible.

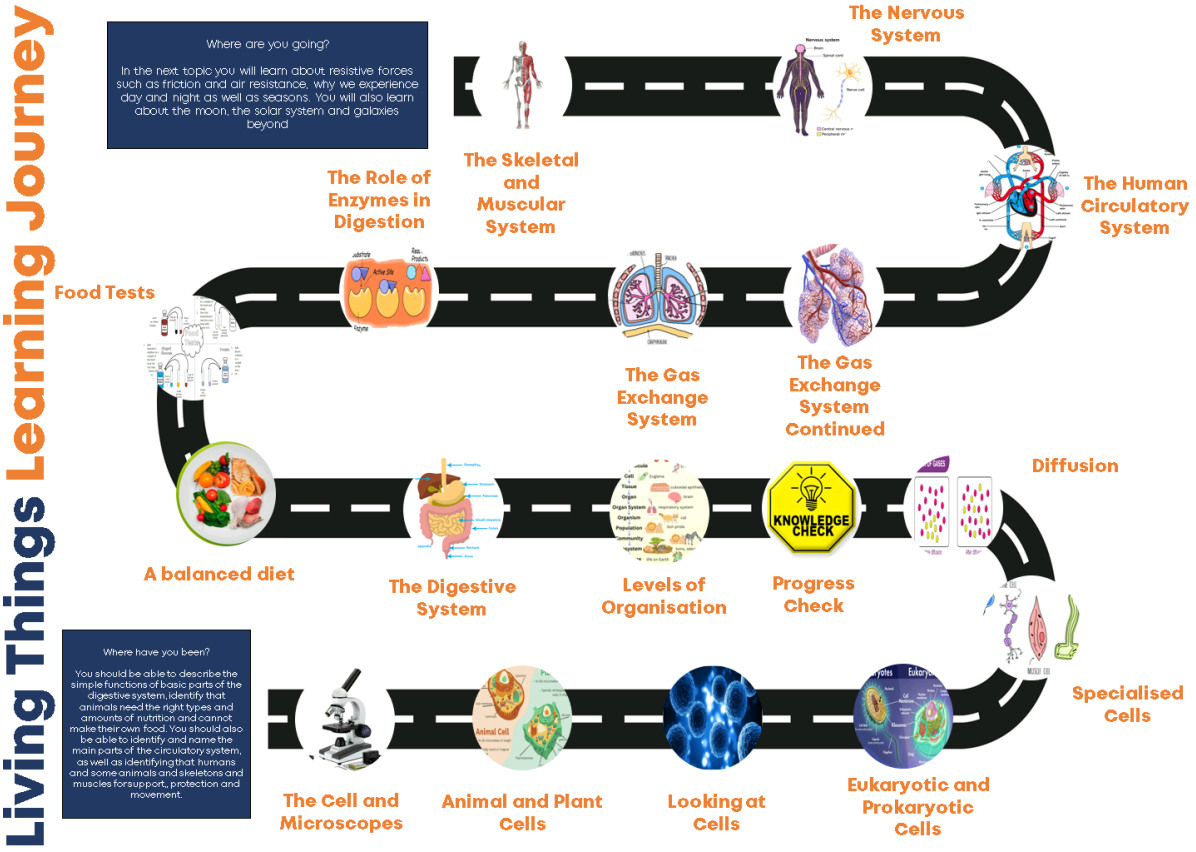
By the end of Year 7, pupils have built a strong foundation in the nature of matter and Earth materials. They are equipped with the curiosity, confidence, and core knowledge needed to explore more complex chemical concepts at Key Stage 4 and beyond.

Year 7 Biology

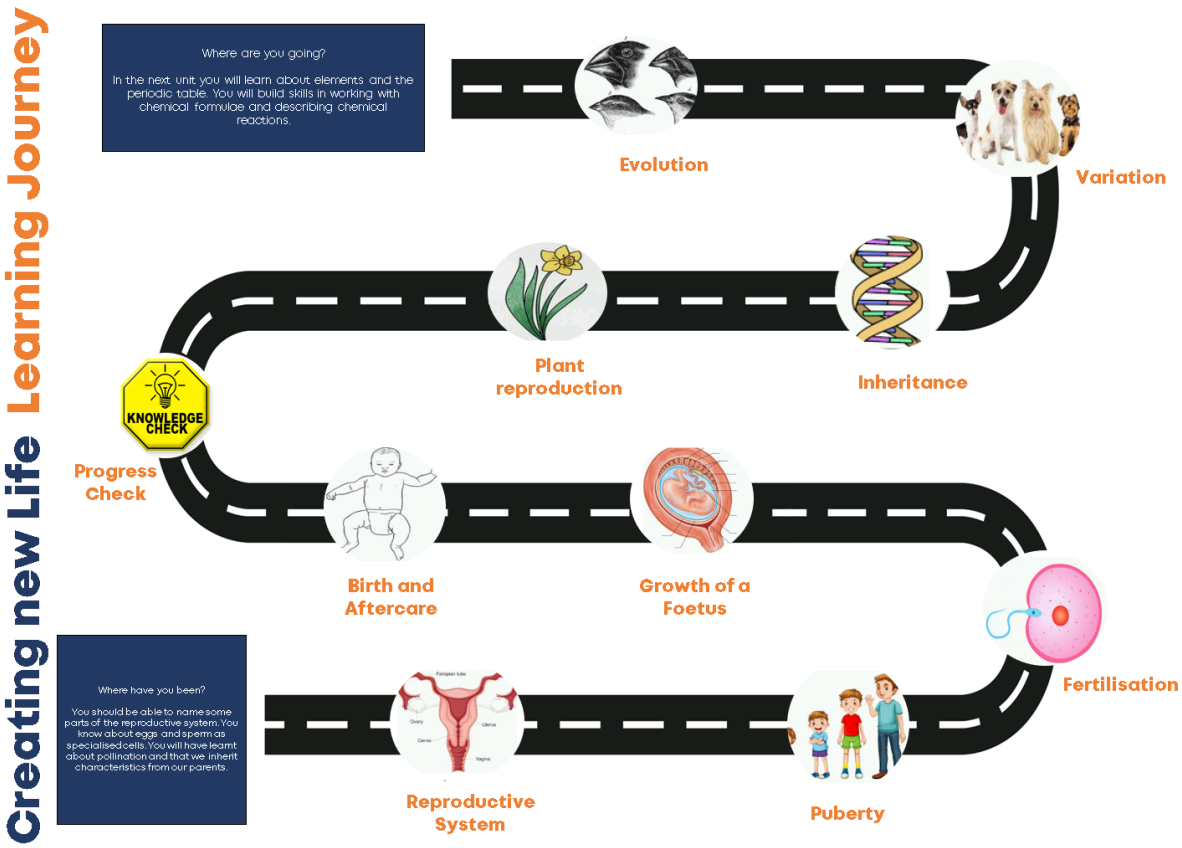
In Year 7 Biology, pupils begin their exploration of the living world through the theme *Living Things*, a rich and varied journey that introduces them to the structures, systems, and processes that underpin life. This theme is designed to build curiosity, develop scientific thinking, and lay the conceptual foundations for the biological topics they will encounter at Key Stage 4.

The theme begins at the microscopic level, where pupils learn about cells, the fundamental units of life. They compare the structure and function of prokaryotic and eukaryotic cells and begin to understand how specialised cells work together to form tissues, organs, and systems. This leads naturally into a study of major human organ systems, including the digestive, circulatory, nervous, muscular, and skeletal systems. Pupils explore how these systems interact to keep the body functioning, and how lifestyle choices can affect health.

As part of their study of the digestive system, pupils are introduced to enzymes and their role in breaking down food. They carry out food tests to identify key nutrients, developing practical skills and learning how to interpret experimental results. These investigations help pupils understand the importance of nutrition and the biochemical processes that sustain life.



The second half of the theme, *Creating New Life*, focuses on reproduction and inheritance. Pupils explore the human reproductive system, the changes that occur during puberty, and the process of fertilisation. They also study reproduction in plants, drawing comparisons between sexual and asexual reproduction. This leads into an introduction to genetics, where pupils learn about inherited characteristics, variation, and the principles of natural selection and evolution. These topics encourage pupils to think critically about the diversity of life and the mechanisms that drive change over time.



The curriculum is carefully sequenced to move from the smallest units of life, cells, to the complexity of organ systems, and finally to the continuity of life through reproduction and inheritance. This progression supports a deepening understanding of biological structures and processes and prepares pupils for the more detailed and quantitative study of biology at GCSE.

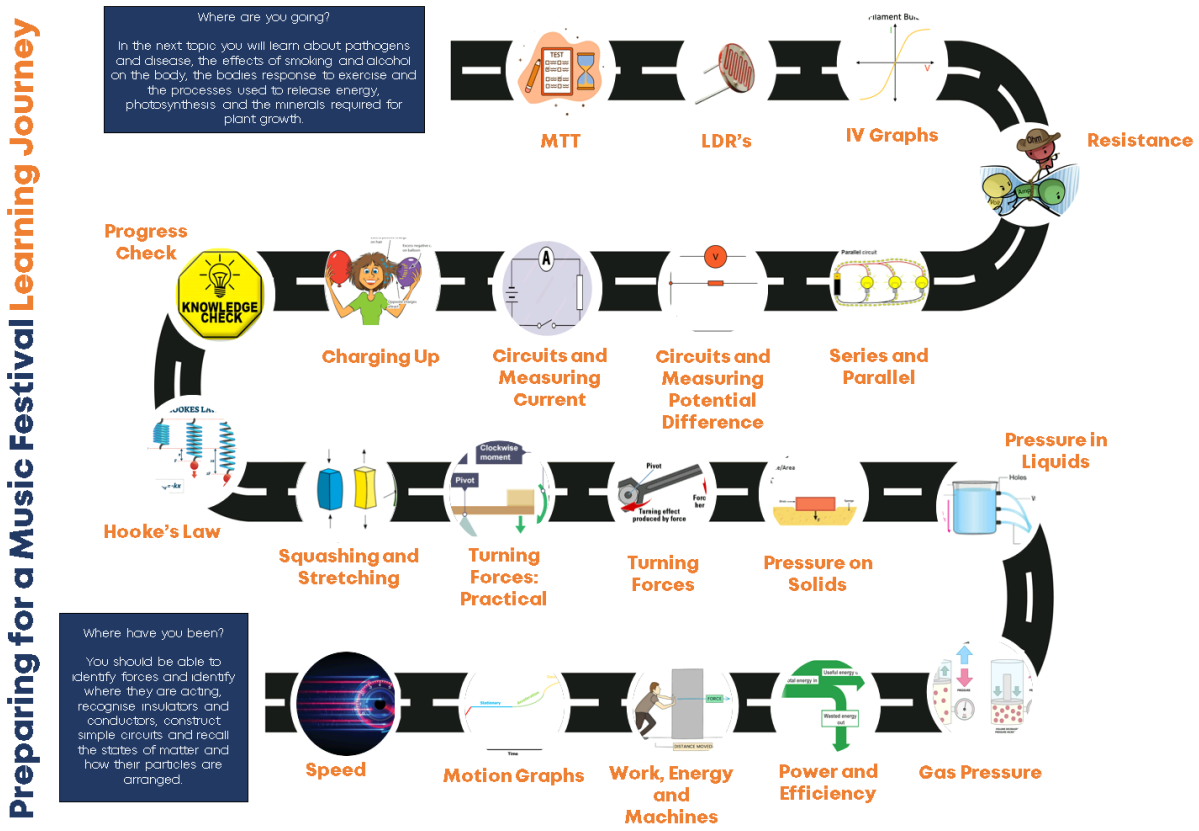
Throughout the theme, pupils develop key scientific skills such as using microscopes, conducting experiments, analysing data, and drawing evidence-based conclusions. These skills are embedded in engaging, real-world contexts that help pupils see the relevance of biology to their own lives and the world around them.

By the end of Year 7, pupils have developed a strong foundation in biological science. They understand how living things function, grow, and reproduce, and are well-prepared to explore more complex biological concepts at Key Stage 4 and beyond.

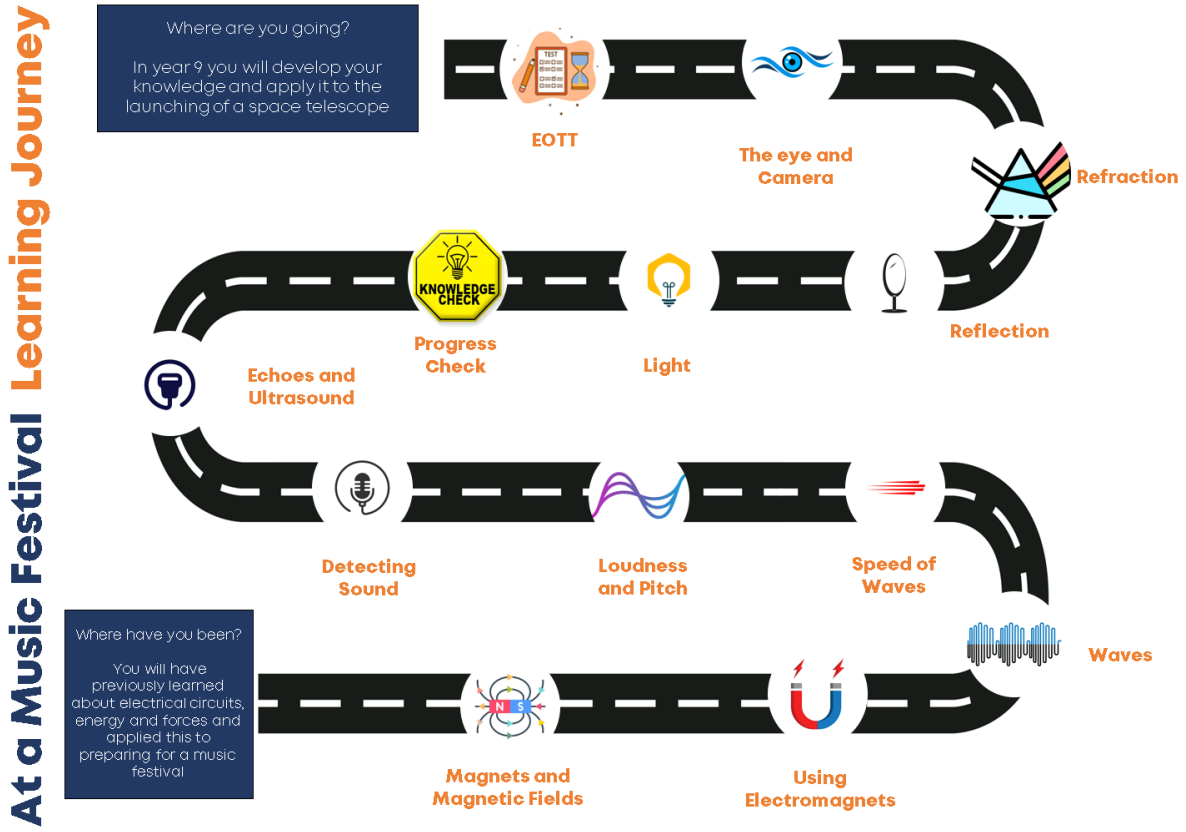
Year 8 Physics

In Year 8 Physics, pupils explore the physical principles that underpin sound, light, motion, and electricity through two vibrant and interconnected themes: *Preparing for a Music Festival* and *At a Music Festival*. These themes are designed to bring physics to life by placing abstract concepts into real-world contexts that are relevant, engaging, and memorable. The curriculum builds on prior knowledge from Year 7 and lays the groundwork for the more quantitative and analytical demands of Key Stage 4.

In *Preparing for a Music Festival*, pupils investigate the physics behind setting up a festival site. They begin by exploring motion, learning how to calculate speed and interpret motion graphs. This leads into the study of work, energy, and machines, where pupils examine how forces do work, how energy is transferred, and how machines can make tasks easier. Concepts such as power and efficiency are introduced, helping pupils understand how energy is used and conserved in practical systems. The theme also covers pressure in gases, liquids, and solids, including applications such as hydraulics and atmospheric pressure. Pupils explore turning forces and moments and investigate Hooke's Law through practical experiments with springs. The unit concludes with an introduction to electricity, where pupils build and analyse series and parallel circuits, investigate resistance, and explore the relationships between current, potential difference, and resistance using IV graphs and components like LDRs.



The second theme, *At a Music Festival*, focuses on the physics of sound, light, and magnetism, key elements of the festival experience. Pupils explore magnets and magnetic fields and learn how electromagnets are used in devices such as speakers. They then investigate waves, with a focus on sound waves: how they travel, how their speed is measured, and how pitch and loudness are affected by frequency and amplitude. Pupils study how sound is detected by the ear and microphones and explore applications such as echoes and ultrasound. The theme concludes with the physics of light, including reflection, refraction, and how we see. Pupils compare the human eye to a camera, deepening their understanding of how light behaves and how it is used in technology.



The curriculum is carefully sequenced to move from mechanical and electrical systems to wave phenomena and optics. This progression allows pupils to build a coherent understanding of energy, forces, and wave behaviour, while reinforcing key ideas such as energy transfer, system interactions, and practical applications of physics.

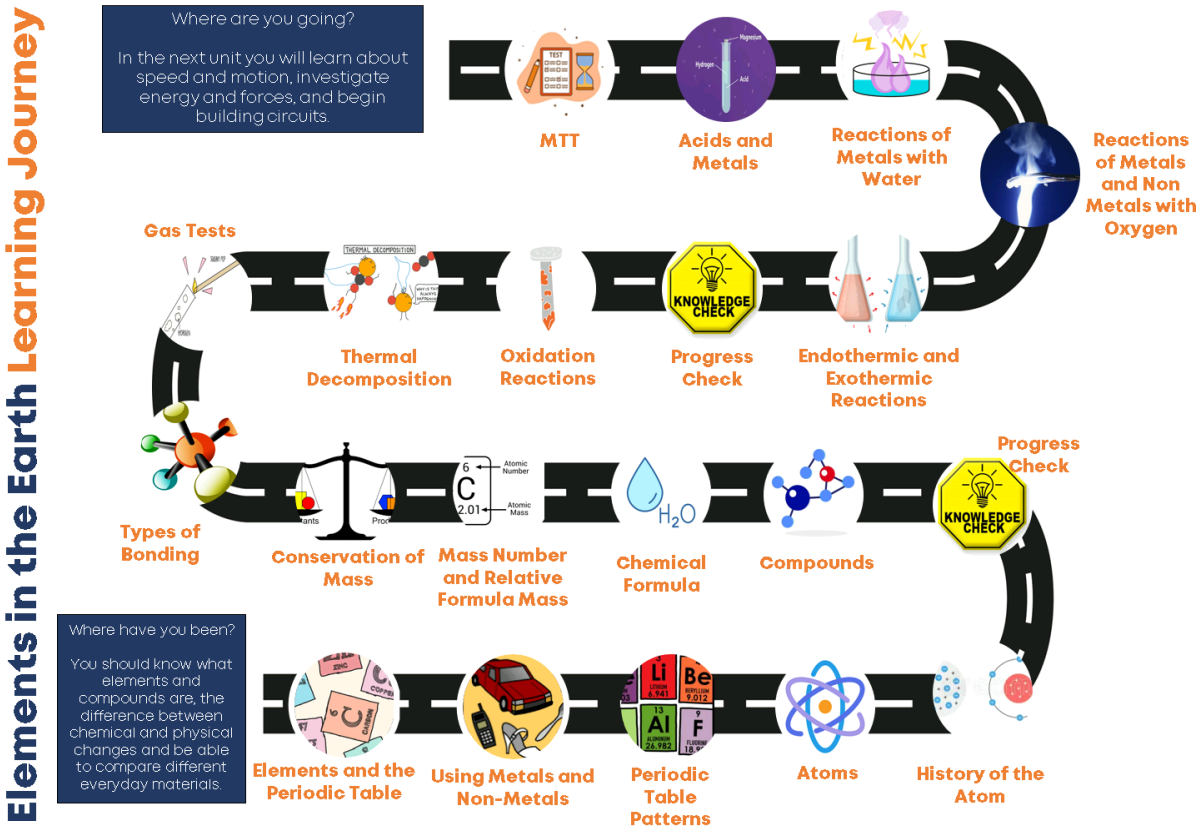
Throughout both themes, pupils develop essential scientific skills including data analysis, graph interpretation, experimental design, and the use of models to explain physical phenomena. These skills are embedded in engaging, real-world contexts that support long-term retention and prepare pupils for the more complex and mathematical aspects of GCSE Physics.

By the end of Year 8, pupils have developed a strong understanding of motion, forces, energy, electricity, waves, and light. They are equipped with the knowledge, skills, and confidence to tackle the challenges of Key Stage 4 physics and to appreciate the role of physics in the world around them.

Year 8 Chemistry

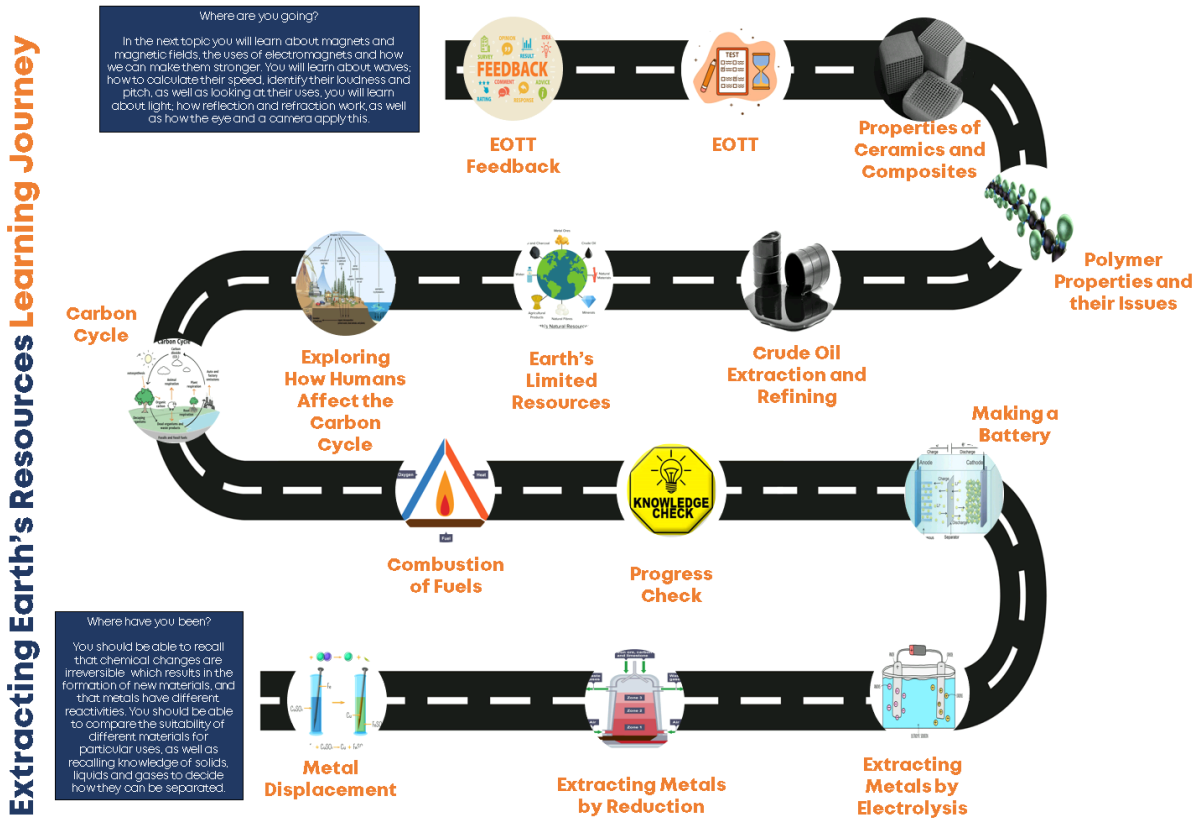
In Year 8 Chemistry, pupils deepen their understanding of the material world through two interconnected themes: *Elements in the Earth* and *Extracting Earth's Resources*. These themes build on the foundations laid in Year 7 and guide pupils through the structure of matter, chemical reactions, and the impact of chemistry on the planet. The curriculum is designed to develop both conceptual understanding and practical skills, while preparing pupils for the more rigorous demands of Key Stage 4.

The first theme, *Elements in the Earth*, introduces pupils to the periodic table as a powerful tool for organising elements and predicting their properties. They explore the history of the atom, learning how scientific models have evolved over time, and begin to understand the structure of atoms and how this relates to chemical bonding. Pupils investigate the formation of compounds, write chemical formulae, and apply the principle of conservation of mass to chemical reactions. Through practical work and real-world examples, they explore key reactions such as oxidation, reactions of metals with acids and water, thermal decomposition, and the differences between exothermic and endothermic changes. This theme helps pupils build a secure understanding of how substances interact and change, knowledge that is essential for success in GCSE Chemistry.



The second theme, *Extracting Earth's Resources*, applies pupils' understanding of chemical reactions to the context of Earth's materials and sustainability. Pupils explore displacement reactions, reduction, and electrolysis as methods for extracting metals, and consider the energy and environmental implications of each.

They study combustion and the carbon cycle, linking chemical processes to global issues such as climate change and the finite nature of Earth's resources. The theme also introduces materials science, with a focus on polymers, ceramics, and composites—helping pupils understand how chemistry contributes to the development of everyday materials.



The curriculum is carefully sequenced to move from the structure and behaviour of atoms and elements to the practical and environmental applications of chemistry. This progression supports pupils in making meaningful connections between abstract concepts and real-world challenges, while reinforcing key ideas such as chemical change, energy transfer, and sustainability.

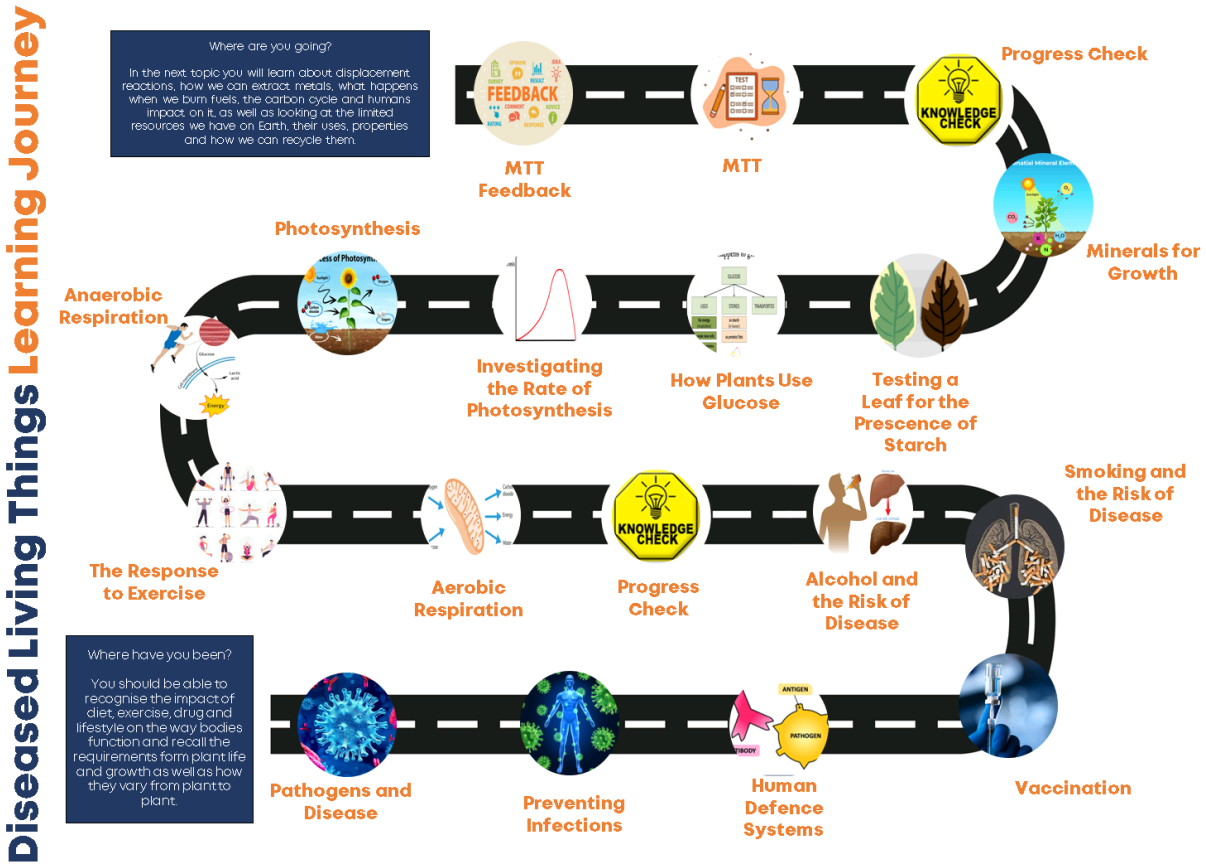
Throughout both themes, pupils develop essential scientific skills including writing word and symbol equations, interpreting data, and evaluating evidence. They carry out practical investigations, analyse results, and begin to think critically about the role of chemistry in society. These experiences not only prepare them for the quantitative and theoretical demands of Key Stage 4 but also encourage them to see chemistry as a dynamic and relevant science.

By the end of Year 8, pupils have a strong grasp of the structure of matter, the nature of chemical reactions, and the importance of chemistry in addressing global challenges. They are well-prepared to build on this knowledge in GCSE Chemistry and to approach the subject with confidence, curiosity, and a sense of purpose.

Year 8 Biology

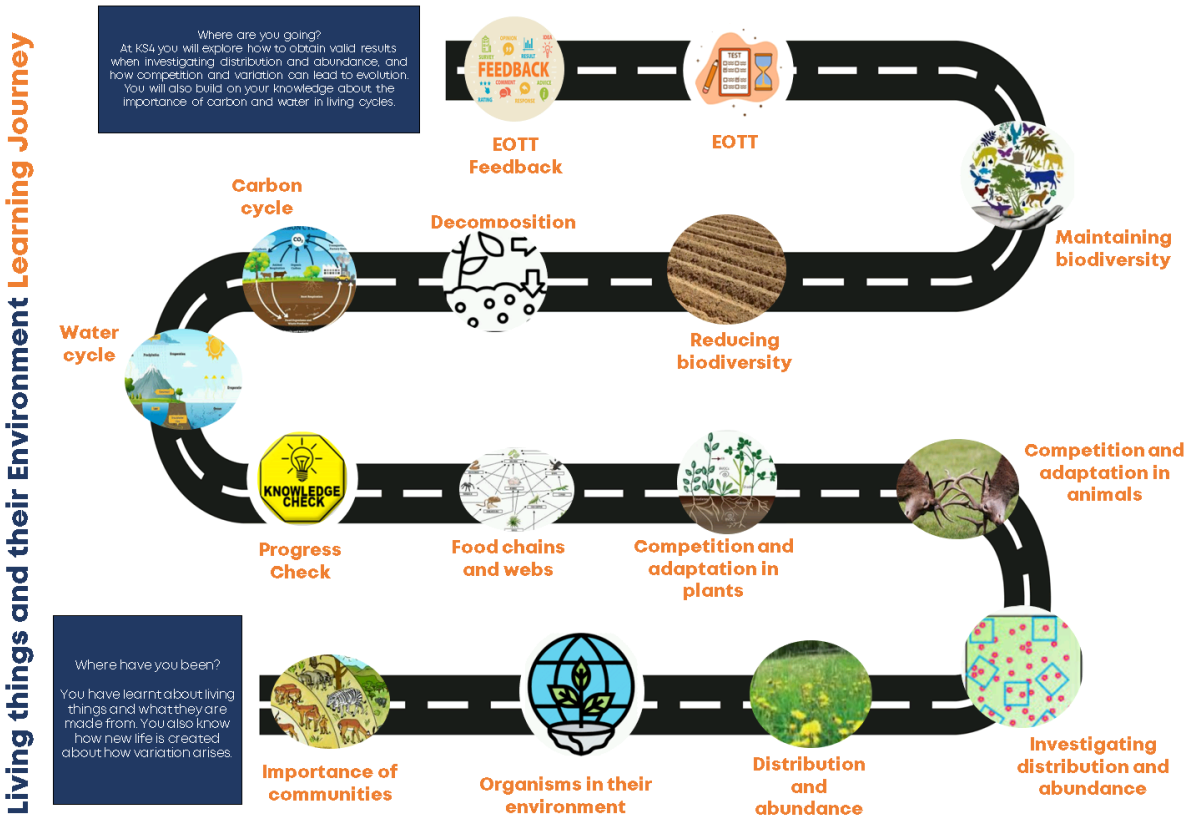
In Year 8 Biology, pupils explore the complexity of life through two interconnected themes: *Diseased Living Things* and *Living Things and Their Environment*. These themes build on the foundational knowledge from Year 7 and guide pupils through the interactions between organisms, their health, and the ecosystems they inhabit. The curriculum is designed to deepen scientific understanding, develop investigative skills, and prepare pupils for the biological concepts they will encounter at Key Stage 4.

The first theme, *Diseased Living Things*, focuses on the causes and prevention of disease, as well as the biological processes that keep organisms alive and healthy. Pupils begin by learning about pathogens: bacteria, viruses, fungi, and protists, and how they spread. They explore how infections can be prevented through hygiene, vaccination, and the body's own defence systems. This leads into a study of lifestyle factors such as smoking and alcohol, and their effects on health. Pupils then investigate respiration, comparing aerobic and anaerobic processes, and linking these to energy release in cells. The theme concludes with a deep dive into photosynthesis, where pupils learn how plants produce glucose, how they use it, and how to test leaves for starch. They also explore the role of minerals in plant growth and carry out practical investigations into the rate of photosynthesis.



The second theme, *Living Things and Their Environment*, shifts the focus to ecology and the interactions between organisms and their habitats. Pupils explore the importance of biodiversity and the structure of communities, learning how organisms are distributed and how they compete for resources. They study adaptations in plants and animals, and how these contribute to survival in different environments.

Food chains and food webs are introduced to show how energy flows through ecosystems, and pupils investigate key biogeochemical cycles such as the water cycle and the carbon cycle. The theme also covers decomposition and the role of microorganisms in nutrient cycling, before concluding with a look at human impacts on biodiversity and strategies for conservation.



The curriculum is carefully sequenced to move from the internal workings of organisms and their responses to disease, to the external relationships between living things and their environments. This progression helps pupils make meaningful connections between cellular processes, health, and ecological systems, while reinforcing key ideas such as energy transfer, interdependence, and sustainability.

Throughout both themes, pupils develop essential scientific skills including planning and conducting investigations, analysing data, and evaluating evidence. These skills are embedded in real-world contexts that make biology relevant and engaging, while also preparing pupils for the more detailed and quantitative study of biology at GCSE.

By the end of Year 8, pupils have a well-rounded understanding of how living things function, how they interact with their environment, and how human activity can influence both. They are equipped with the knowledge, curiosity, and scientific thinking needed to succeed in Key Stage 4 biology and beyond.

Year 9 Physics

In Year 9 Physics, pupils bring together and extend their understanding of forces, energy, waves, and electricity through the ambitious and inspiring theme *Launching a Space Telescope*. This unit is designed to consolidate key concepts from Years 7 and 8 while preparing pupils for the demands of the AQA GCSE Physics course. Set against the backdrop of one of humanity's most advanced scientific endeavours, the theme provides a rich and engaging context for deepening scientific knowledge and applying it to real-world challenges.

The theme begins with the physics of rocket science, as pupils explore how rockets are fuelled and launched. They investigate the forces involved in launching the Ariane 5 rocket, including thrust, weight, and atmospheric drag, and consider how energy is transferred and conserved during lift-off. This leads into a study of atmospheric pressure and how it changes with altitude, an essential concept for understanding the conditions a space telescope must endure on its journey beyond Earth's atmosphere.

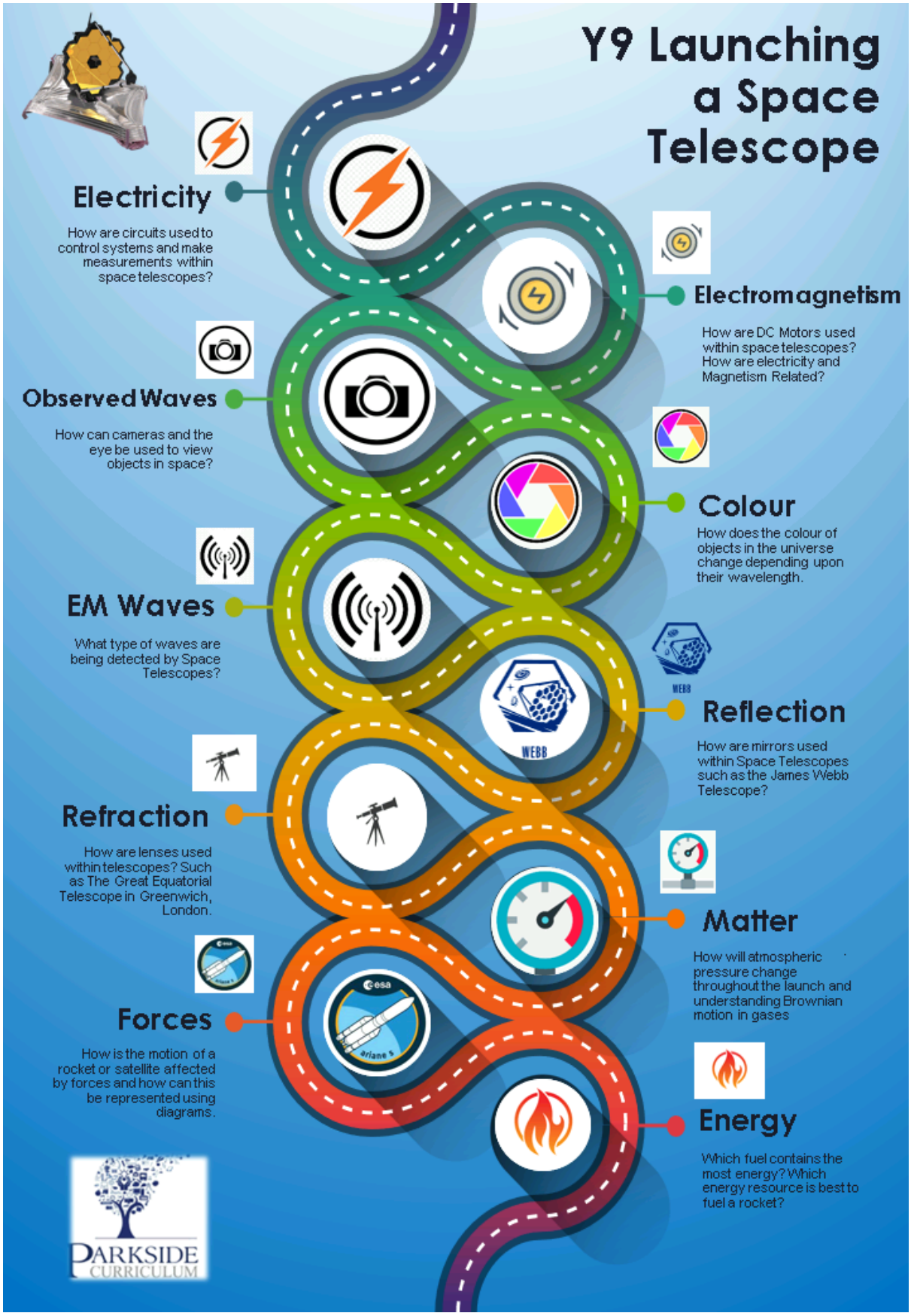
As the telescope reaches space, pupils explore the role of waves in space science. They learn how different types of electromagnetic waves are used to observe the universe, and how the colour of stars provides information about their temperature and composition. Pupils investigate how waves are detected, and how telescopes like the James Webb and the historic Great Equatorial Telescope are designed to capture and interpret this data. The theme also includes a study of how the James Webb Space Telescope unfolds in space, linking engineering design to physics principles.

The unit concludes with a focus on the electrical systems that power and control space telescopes. Pupils revisit and extend their understanding of electrical circuits, including current, potential difference, resistance, and the function of components in complex systems. They apply this knowledge to understand how circuits operate in the harsh conditions of space, and how they are used to transmit data and control instruments remotely.

The curriculum is carefully sequenced to build on prior learning while introducing more advanced and abstract concepts. Pupils move from familiar ideas about forces and energy into more complex applications involving wave behaviour and electrical systems. This progression supports a smooth transition into GCSE Physics, where these topics are explored in greater depth and with increased mathematical rigour.

Throughout the theme, pupils develop key scientific skills such as modelling, interpreting data, and evaluating evidence. They are encouraged to think critically about how physics is used to solve real-world problems and to appreciate the role of science in expanding our understanding of the universe.

By the end of this topic, pupils have not only explored the physics behind space exploration and telescope technology but have also built a strong conceptual foundation for success in the AQA GCSE Physics course. They are equipped with the knowledge, skills, and curiosity to continue their scientific journey with confidence and ambition.


Y9 Launching a Space Telescope
Electricity
How are circuits used to control systems and make measurements within space telescopes?
Electromagnetism
How are DC Motors used within space telescopes? How are electricity and Magnetism Related?
Observed Waves
How can cameras and the eye be used to view objects in space?
Colour
How does the colour of objects in the universe change depending upon their wavelength.
EM Waves
What type of waves are being detected by Space Telescopes?
Reflection
How are mirrors used within Space Telescopes such as the James Webb Telescope?
Refraction
How are lenses used within telescopes? Such as The Great Equatorial Telescope in Greenwich, London.
Matter
How will atmospheric pressure change throughout the launch and understanding Brownian motion in gases
Forces
How is the motion of a rocket or satellite affected by forces and how can this be represented using diagrams.
Energy
Which fuel contains the most energy? Which energy resource is best to fuel a rocket?
PARKSIDE CURRICULUM

Year 9 Chemistry

In Year 9 Chemistry, pupils consolidate and extend their understanding of the material world through the theme *Chemistry of the Future*. This unit is designed to revisit and deepen key concepts introduced in Years 7 and 8, while preparing pupils for the more rigorous and quantitative demands of the AQA GCSE Chemistry course. Set within the context of how chemistry shapes innovation and sustainability, the theme encourages pupils to think critically about the role of science in solving future global challenges.

The theme begins by revisiting the fundamental building blocks of matter: atoms, elements, and compounds. Pupils explore how substances are represented using chemical symbols and formulae, and how the periodic table is used to organise elements and predict their properties. They apply the principle of conservation of mass to chemical reactions and learn how to balance equations, laying the groundwork for the stoichiometric thinking required at Key Stage 4.

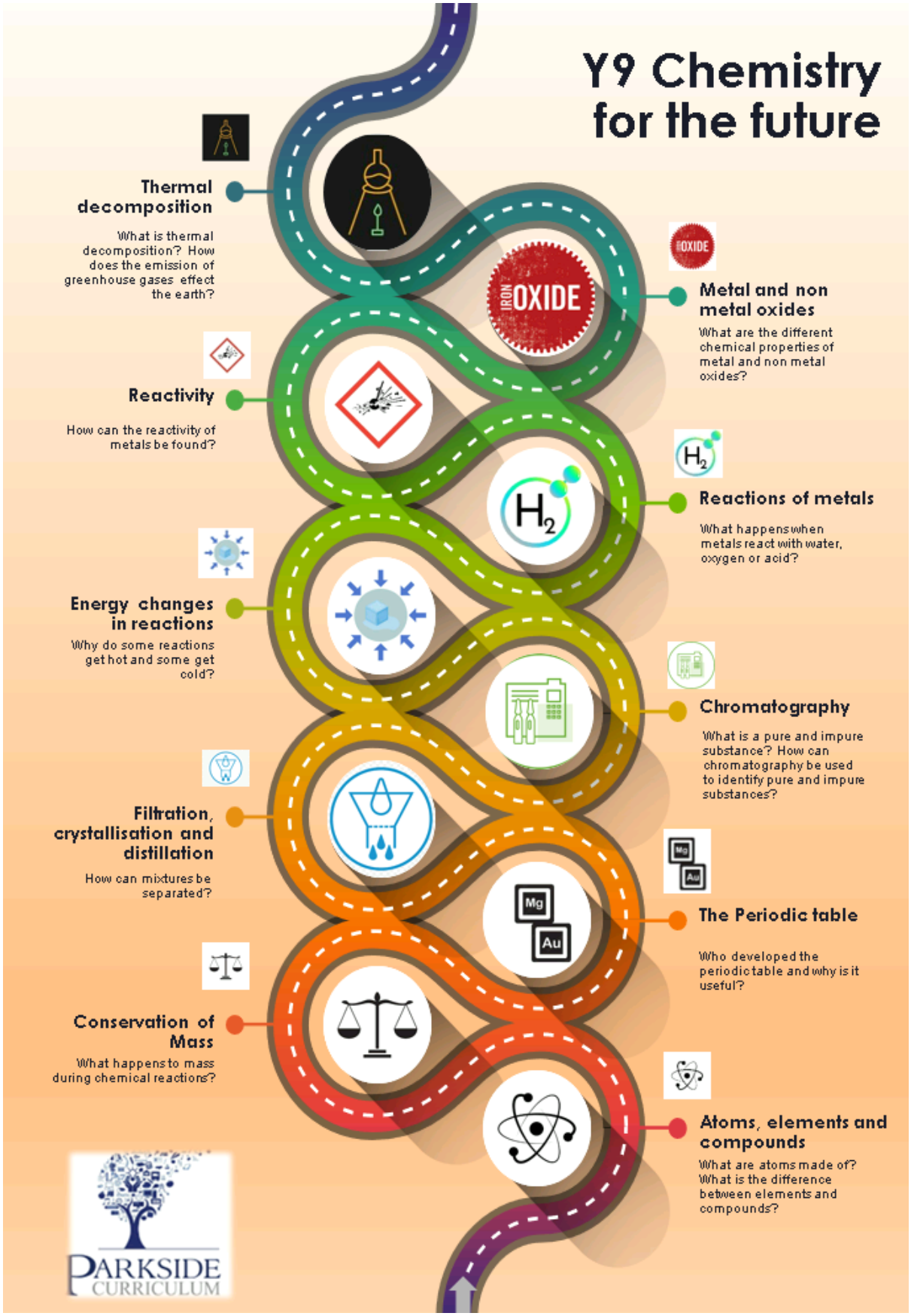
Pupils then investigate methods for separating mixtures, including filtration, distillation, and chromatography, linking these techniques to real-world applications such as water purification and forensic science. The theme also introduces energy changes in chemical reactions, including exothermic and endothermic processes, and how these are measured and represented. This leads into a study of reactivity, where pupils explore the reactions of metals with acids, oxygen, and water, and begin to understand the reactivity series and its implications for industrial processes.

The unit concludes with a focus on reactions involving metal and non-metal oxides, including the formation of salts and the process of thermal decomposition. These topics not only reinforce pupils' understanding of chemical change but also introduce them to the types of reactions they will encounter in GCSE Chemistry, such as redox and acid-base reactions.

The curriculum is carefully sequenced to build from core concepts, such as atomic structure and conservation of mass, towards more complex ideas about reactivity and energy changes. This progression ensures that pupils develop a coherent and connected understanding of chemistry, while also building the practical and analytical skills needed for success at Key Stage 4.

Throughout the theme, pupils engage in hands-on investigations, develop their ability to interpret data, and learn to communicate their findings using scientific language. They are encouraged to think about how chemistry can be used to develop cleaner energy sources, new materials, and sustainable technologies, linking classroom learning to the challenges and opportunities of the future.

By the end of this topic, pupils have a strong grasp of the fundamental principles of chemistry and are well-prepared to begin the AQA GCSE Chemistry course. They are equipped with the knowledge, skills, and curiosity to explore the role of chemistry in shaping the world of tomorrow.


Y9 Chemistry for the future
Thermal decomposition
What is thermal decomposition? How does the emission of greenhouse gases effect the earth?
Reactivity
How can the reactivity of metals be found?
Energy changes in reactions
Why do some reactions get hot and some get cold?
Filtration, crystallisation and distillation
How can mixtures be separated?
Conservation of Mass
What happens to mass during chemical reactions?
IRON OXIDE
Metal and non metal oxides
What are the different chemical properties of metal and non metal oxides?
H_2
Reactions of metals
What happens when metals react with water, oxygen or acid?
Chromatography
What is a pure and impure substance? How can chromatography be used to identify pure and impure substances?
Mg
Au
The Periodic table
Who developed the periodic table and why is it useful?
Atoms, elements and compounds
What are atoms made of? What is the difference between elements and compounds?
PARKSIDE CURRICULUM

Year 9 Biology

In Year 9 Biology, pupils explore the complexity and interconnectedness of life through the theme *Scaling Up*. This unit is designed to consolidate and extend the foundational biological knowledge developed in Years 7 and 8, while preparing pupils for the conceptual depth and analytical demands of the AQA GCSE Biology course. From the microscopic world of cells to the global impact of human activity, pupils investigate how biological systems grow, interact, and respond to change.

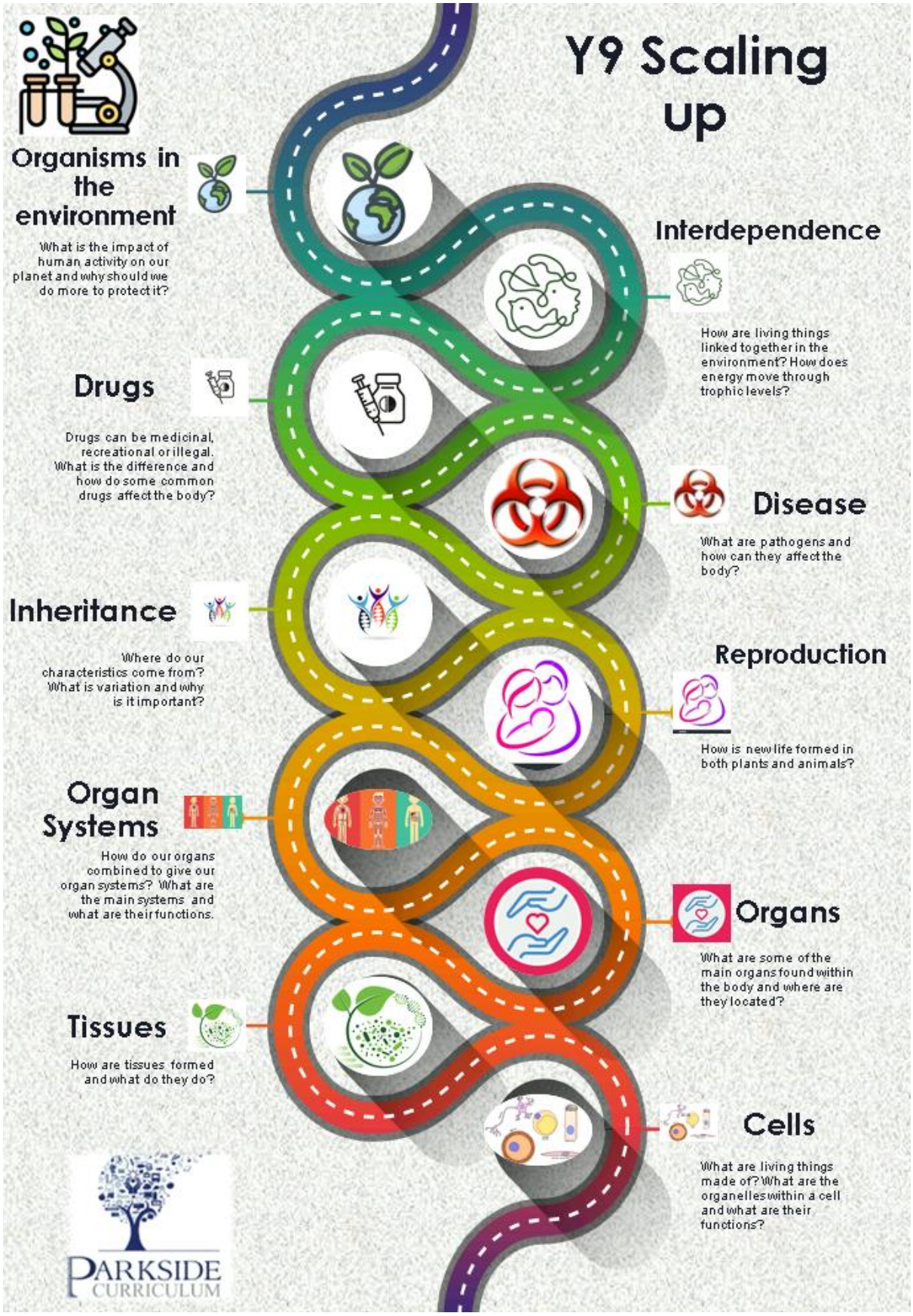
The theme begins by revisiting the organisation of living organisms, moving from cells to tissues, organs, and organ systems. Pupils deepen their understanding of how specialised cells work together to maintain life, and how the structure of biological systems supports their function. This leads into a study of reproduction and inheritance, where pupils explore how genetic information is passed from one generation to the next, and how variation arises through sexual reproduction. They begin to understand the principles of heredity and the role of DNA, laying the groundwork for more detailed genetics work at Key Stage 4.

Pupils then examine the causes and effects of disease, including the role of pathogens, the body's defence mechanisms, and the impact of lifestyle choices. They explore how drugs are used to treat illness, and how scientific research contributes to the development of new medicines. This is followed by a broader look at how organisms interact with each other and their environment. Pupils investigate ecosystems, food webs, and the importance of biodiversity, before considering the impact of human activity on the natural world. Topics such as pollution, deforestation, and climate change encourage pupils to think critically about sustainability and their role as global citizens.

The curriculum is carefully sequenced to move from the internal workings of organisms to their interactions within ecosystems and the wider environment. This progression helps pupils build a coherent understanding of biological systems at multiple scales, while reinforcing key ideas such as adaptation, interdependence, and the impact of human behaviour on the planet.

Throughout the theme, pupils develop essential scientific skills including microscopy, data analysis, experimental design, and evaluation of evidence. These are embedded in real-world contexts that make biology relevant and engaging, while also preparing pupils for the more quantitative and conceptual challenges of GCSE Biology.

By the end of this topic, pupils have a well-rounded understanding of how living systems function, how traits are inherited, and how organisms, including humans, affect and are affected by their environment. They are equipped with the knowledge, skills, and curiosity to succeed in the AQA GCSE Biology course and to explore the living world with confidence and purpose.


Y9 Scaling up
Organisms in the environment
What is the impact of human activity on our planet and why should we do more to protect it?
Interdependence
How are living things linked together in the environment? How does energy move through trophic levels?
Drugs
Drugs can be medicinal, recreational or illegal. What is the difference and how do some common drugs affect the body?
Disease
What are pathogens and how can they affect the body?
Inheritance
Where do our characteristics come from? What is variation and why is it important?
Reproduction
How is new life formed in both plants and animals?
Organ Systems
How do our organs combined to give our organ systems? What are the main systems and what are their functions.
Organs
What are some of the main organs found within the body and where are they located?
Tissues
How are tissues formed and what do they do?
Cells
What are living things made of? What are the organelles within a cell and what are their functions?
PARKSIDE CURRICULUM

PARKSIDE COMMUNITY SCHOOL

EMBARK FEDERATION

Year 9 Lesson Overview

Year 9	Biology	Chemistry	Physics
Week 1	Cells	Atoms Elements and Compounds	Fuelling a rocket
Week 2	Tissues	Conservation of Mass	Launching the Ariane 5
Week 3	Organs	The Periodic Table	Journey on the Ariane 5
Week 4	Organ Systems	Filtration, Crystallisation and Distillation	Atmospheric Pressure
Week 5	Reproduction	Chrmomatography	The Great Equitorial Telescope
Week 6	Inheritance	Energy Changes in Reactions	James Webb Telescope
Week 7	Diseases	Reactions of Metals	Waves in Space
Week 8	Drugs	Reactivity	Colour of Stars
Week 9	Interactions of Organisms	Metal and Non-Metal Oxides	Detecting Waves
Week 10	Organisms in the Environment	Thermal Decomposition	Unfolding a Space Telescope
Week 11	The Impact of Human Activity	Revision	Electrical Circuits in a Space Telescope
Week 12	Revision	Revision	Revision
Week 13	RP1 Summative Assessment	RP1 Summative Assessment	RP1 Summative Assessment
Week 14	Assessment Feedback	Assessment Feedback	Assessment Feedback
Week 15	Eukaryotes and prokaryotes	C1.1 Atoms	P1.1 Changes in energy stores
Week 16	Animal and plant cells	C1.2 Chemical equations	P1.2 Conservation of energy
Week 17	Required Practical 1: use a light microscope to observe, draw and label a selection of plant	C1.2 Chemical equations	P1.3 Energy and work
Week 18	Cell specialisation	C1.3 Separating mixtures	P1.4 Gravitational potential energy stores
Week 19	Cell differentiation	C1.3 Separating mixtures	P1.5 Kinetic energy and elastic energy stores
Week 20	Microscopy	C1.4 Fractional distillation and paper	P1.6 Energy dissipation
Week 21	Chromosomes	C1.4 Fractional distillation and paper	P1.7 Energy and efficiency
Week 22	Mitosis and the cell cycle	C1.5 History of the atom	P1.8 Electrical appliances
Week 23	Stem cells	C1.6 Structure of the atom	P3.1 Energy demands
Week 24	Diffusion	C1.7 Ions, atoms, and isotopes	P3.2 Energy from wind and water
Week 25	Osmosis	**C1.7 Ions, atoms, and isotopes H**	P3.3 Power from the Sun and the Earth
Week 26	Required practical 3: Investigate the effect of salt or sugar solutions on plant tissue	C1.8 Electronic structures	P3.4 Energy and the environment
Week 27	Analysis of results and retrieval practice	C2.1 Development of the periodic table	P3.5 Big energy issues
Week 28	Active transport	C2.2 Electronic structures and the periodic table	P6.1 Density
Week 29	Principles of Organisation	C2.3 Group 1 – the alkali metals	P6.1 Density RP
Week 30	RP2 Summative Assessments	RP2 Summative Assessments	RP2 Summative Assessments
Week 31	Assessment Feedback	Assessment Feedback	Assessment Feedback
Week 32	The human digestive system	C2.4 Group 7 – the halogens	P6.1 Density RP continued
Week 33	Required practical 4: use qualitative reagents to test for a range of carbohydrates, lipids and	C2.4 Group 7 – the halogens	P6.2 States of matter
Week 34	Enzymes 1	C2.5 Explaining trends	P6.3 Changes of state
Week 35	Enzymes 2	C3.1 States of matter	P6.4 Internal energy
Week 36	Required practical 5: Investigate the effect of a factor on the rate of an enzyme-controlled	C3.1 States of matter	P6.5 Specific latent heat
Week 37	Blood	C3.2 Atoms into ions	P6.6 Gas pressure and temperature
Week 38	Blood vessels		

Science at Key Stage 4: GCSE Pathways

At the end of Year 9, pupils at Parkside can continue their study of science by choosing between two AQA GCSE pathways: Combined Science: Trilogy or Separate Sciences (also known as Triple Science). Both routes provide a strong foundation in biology, chemistry, and physics, and are taught by subject specialists. The choice allows pupils to tailor their science education to their interests, aspirations, and future goals.

AQA GCSE Combined Science: Trilogy

This is a double award GCSE, meaning pupils receive two GCSE grades based on their performance across all three sciences. Pupils have 10 science lessons per fortnight, covering biology, chemistry, and physics. The Trilogy course includes a broad and balanced curriculum that prepares pupils for further study in science and supports a wide range of post-16 pathways.

- Assessment: Six exams at the end of Year 11 (two for each science), each lasting 1 hour 15 minutes.
- Grades awarded: A double grade (e.g. 6-6, 5-4) on the 9–1 scale.

AQA GCSE Separate Sciences (Triple Science)

Pupils who opt for Separate Sciences study GCSE Biology, Chemistry, and Physics as three distinct qualifications, earning a separate grade for each subject. This route is ideal for pupils with a strong interest in science or those considering science-related A-levels and careers in medicine, engineering, research, or environmental science.

Pupils have 15 science lessons per fortnight: five each for biology, chemistry, and physics, allowing for greater depth, additional content, and more practical work.

- Assessment: Six exams at the end of Year 11 (two for each science), each lasting 1 hour 45 minutes.
- Grades awarded: Three separate GCSEs, one for each subject, graded 9–1.

Why Choose Separate Science

- It provides the most comprehensive preparation for A-level sciences and science-based careers.
- Pupils explore additional content not covered in Trilogy, including more advanced topics and practicals.
- It supports high academic challenge and is well-suited to pupils who enjoy science and are ready to commit more curriculum time to it.
- Universities and sixth forms often view Separate Sciences favourably for competitive STEM pathways.

By offering both pathways, we ensure that all pupils can access a high-quality science education that matches their interests and ambitions. Whether pupils choose Combined Science or Separate Sciences, they will be supported by expert teachers, a rich curriculum, and a strong foundation for future success.

Key Stage 4 Biology

Biology is the science of living organisms. It explores how life functions at every level, from microscopic cells to complex ecosystems and helps pupils understand the processes that sustain life, the causes of disease, and the impact of human activity on the natural world.

Substantive Knowledge

Pupils study a broad range of biological content, including:

- The structure and function of cells, including prokaryotic and eukaryotic cells, cell division, and transport across membranes
- The organisation of multicellular organisms, including the digestive, circulatory, and respiratory systems
- The role of enzymes in metabolism and the biochemical processes of photosynthesis and respiration
- The immune system, vaccination, and the development of antibiotics and drug testing
- Hormonal control, homeostasis, and the nervous system
- Inheritance, including the structure of DNA, genetic crosses, inherited disorders, and genetic engineering
- Evolution by natural selection, variation, and selective breeding
- Ecosystems, biodiversity, and the impact of human activity on the environment

This knowledge is cumulative and builds on prior learning from Key Stage 3, with increasing depth and complexity.

Disciplinary Knowledge

Pupils develop an understanding of how biological knowledge is generated and validated through:

- Planning and conducting investigations, including the use of controls and repeatability
- Analysing data from experiments and fieldwork, such as investigating the effect of light intensity on photosynthesis
- Evaluating the reliability and validity of evidence, including peer-reviewed research and ethical considerations in genetics
- Using models to explain complex systems, such as the reflex arc or the carbon cycle
- Applying biological knowledge to unfamiliar contexts, such as interpreting data on disease transmission or evaluating conservation strategies

This disciplinary knowledge is embedded through required practicals and reinforced through extended writing, data interpretation, and problem-solving tasks.

Skills Development

Pupils develop a wide range of scientific skills that are embedded throughout the curriculum and revisited in increasingly complex contexts. These include:

- Microscopy and observation: Beginning in Year 7 with basic cell structure, pupils progress to using light microscopes to calculate magnification and interpret images of specialised cells at GCSE.
- Experimental design and data collection: Pupils plan and carry out investigations such as testing the effect of pH on enzyme activity or measuring the rate of photosynthesis using gas collection. They learn to identify variables, ensure fair testing, and collect accurate data.
- Analysis and evaluation: Pupils interpret graphs, calculate means and rates, and evaluate the reliability of their results. For example, they assess the validity of conclusions drawn from fieldwork on biodiversity or from experiments on antibiotic resistance.
- Application of models: Pupils use and critique models such as the lock-and-key theory for enzymes or genetic crosses for inheritance. They learn to apply these models to unfamiliar scenarios, developing transferable problem-solving skills.

These skills are explicitly taught, practised through required practicals, and assessed through both formative and summative tasks. By the end of the course, pupils can confidently design investigations, analyse biological data, and apply their understanding to real-world issues.

Key Stage 4 Chemistry

Chemistry is the science of substances and their interactions. It explains the composition, structure, and behaviour of matter, and plays a central role in developing new materials, medicines, and sustainable technologies.

Substantive Knowledge

Pupils study a wide range of chemical content, including:

- Atomic structure, the periodic table, and the development of atomic models
- Chemical bonding (ionic, covalent, and metallic) and how bonding affects properties
- The conservation of mass and quantitative chemistry, including moles and reacting masses
- Types of chemical reactions, including neutralisation, redox, displacement, and thermal decomposition
- The reactivity series and methods of metal extraction, including electrolysis
- Energy changes in reactions, including exothermic and endothermic processes
- Rates of reaction and factors affecting them, including catalysts and surface area
- Organic chemistry, including hydrocarbons, polymers, and functional groups
- Chemical analysis techniques such as chromatography and flame tests
- The chemistry of the atmosphere and sustainable use of Earth’s resources

This content builds on Key Stage 3 foundations and prepares pupils for further study in science and applied fields.

Disciplinary Knowledge

Pupils learn how chemical knowledge is developed and tested through:

- Designing and conducting experiments, such as titrations or investigating rates of reaction
- Using scientific models to explain phenomena, such as particle theory or collision theory
- Interpreting and evaluating data from practical work and secondary sources
- Applying mathematical skills to calculate concentrations, yields, and energy changes
- Critically assessing the environmental and societal impact of chemical processes, such as combustion or plastic production

Disciplinary knowledge is developed through required practicals, structured problem-solving, and opportunities to evaluate the role of chemistry in real-world contexts.

Skills Development

Pupils develop a range of practical and analytical skills that are essential for scientific enquiry and chemical understanding:

- Practical techniques: Pupils learn to carry out key techniques such as filtration, crystallisation, titration, and chromatography. These are introduced in Key Stage 3 and refined at GCSE through required practicals, such as preparing a pure, dry sample of a soluble salt or separating inks using paper chromatography.
- Quantitative chemistry: Pupils build fluency in using chemical formulae, balancing equations, and performing calculations involving moles, concentration, and percentage yield. These skills are developed incrementally, with scaffolded practice and real-world applications.
- Data interpretation and evaluation: Pupils analyse experimental results, identify anomalies, and evaluate the accuracy and precision of their methods. For example, they assess the energy changes in exothermic and endothermic reactions using temperature data.
- Scientific communication: Pupils are taught to use chemical terminology accurately, construct balanced symbol equations, and explain chemical phenomena using particle models and bonding diagrams.

These skills are embedded across the curriculum and revisited in different contexts to ensure mastery. By the end of the course, pupils are confident in handling data, conducting experiments, and explaining chemical processes with clarity and precision.

Key Stage 4 Physics

Physics is the science of energy, matter, and the fundamental forces that govern the universe. It explains how objects move, how energy is transferred, and how physical laws underpin the technologies we use every day.

Substantive Knowledge

Pupils study a broad range of physical content, including:

- Energy stores and transfers, specific heat capacity, and efficiency
- Electrical circuits, resistance, current, potential difference, and power
- The particle model of matter, including changes of state and internal energy
- Atomic structure, radiation, and nuclear decay
- Forces and motion, including Newton's laws, momentum, and stopping distances
- Waves, including properties of transverse and longitudinal waves, the electromagnetic spectrum, and sound
- Magnetism and electromagnetism, including magnetic fields, motors, and transformers
- Space physics (Separate Science only), including the life cycle of stars and orbital motion

This content builds on Key Stage 3 topics and introduces more abstract and quantitative concepts.

Disciplinary Knowledge

Pupils develop an understanding of how physical knowledge is constructed and applied through:

- Using mathematical models and equations to describe physical relationships, such as $F = ma$ or $E = mc\Delta\theta$
- Designing and conducting investigations, such as measuring resistance or investigating Hooke's Law
- Analysing and interpreting data using graphs, gradients, and proportional reasoning
- Evaluating the accuracy and precision of measurements and identifying sources of error
- Applying physical principles to unfamiliar contexts, such as explaining how seatbelts reduce injury or how satellites remain in orbit

Disciplinary knowledge is embedded through required practicals, problem-solving exercises, and the use of real-world applications to contextualise abstract ideas.

Skills Development

Physics places a strong emphasis on mathematical reasoning, modelling, and precision in measurement. Pupils develop the following key skills:

- Mathematical application: Pupils learn to apply equations to calculate quantities such as speed, acceleration, force, energy, and power. These skills are introduced in Key Stage 3 and developed through scaffolded practice and real-world examples, such as calculating braking distances or energy efficiency.
- Graphical analysis: Pupils interpret and construct line graphs, including motion graphs and IV characteristic curves. They use gradients to determine rates and identify patterns in data.
- Practical investigation: Pupils carry out required practicals such as investigating the relationship between force and extension (Hooke's Law) or measuring the specific heat capacity of materials. They learn to use scientific equipment accurately, record data systematically, and evaluate sources of error.
- Modelling and explanation: Pupils use models to explain phenomena such as wave behaviour, electric circuits, and atomic structure. They are encouraged to critique and refine models as their understanding deepens.

These skills are taught explicitly and reinforced through regular low-stakes assessment, practical work, and problem-solving tasks. By the end of the course, pupils are equipped to think critically, apply physics to unfamiliar contexts, and approach quantitative problems with confidence.

Year 10 Biology Overview

Year 10	Combined Science Lesson 1	Combined Science Lesson 2	Combined Science Lesson 3	Seperate Science Lesson 1	Seperate Science Lesson 2
Week 1	The heart	Coronary heart disease: a non-communicable disease	Gas exchange	Feeding relationships (preteach combined content)	Trophic levels
Week 3	Health issues	The effect of lifestyle on some non-communicable diseases	Cancer	Pyramids of biomass	Transfer of biomass
Week 5	Plant tissues and organs	Plant organ systems	Communicable (infectious) diseases	Factors affecting food security	Farming techniques
Week 7	Viral diseases	Bacterial diseases	Fungal & protist diseases	Sustainable fisheries	Role of biotechnology
Week 9	Human defence systems	Vaccination	Antibiotics and painkillers	Culturing microorganisms	Set up Required practical 2: Investigate the effect of antiseptics or antibiotics on bacterial growth
Week 11	Discovery and development of drugs	**Photosynthetic reaction H**	RP1 Assessment	Revisit Required practical 2: Investigate the effect of antiseptics or antibiotics on bacterial growth	**Detection and identification of plant diseases H**
Week 13	**Rate of photosynthesis H**	Required practical 6: Investigate the effect of a factor on the rate of photosynthesis	Uses of glucose from photosynthesis	**Producing monoclonal antibodies H**	**Uses of monoclonal antibodies H**
Week 15	**Aerobic respiration H**	**Anaerobic respiration H**	**Response to exercise H**	**DNA structure**	protein synthesis
Week 17	Metabolism	Nervous system structure and function	Required practical 5: Investigate the effect of a factor on human reaction time	mutations	Set up Required practical 8: Investigate the effect of light on the growth of newly germinated shoots
Week 19	Homeostasis and endocrine system	Blood glucose and diabetes	**Hormones in human reproduction H**	**The brain H**	The eye
Week 21	**Hormones in menstrual cycle H**	Contraception	**The use of hormones to treat infertility H**	problems with the eye	**Control of body temperature H**
Week 23	**Negative feedback H**	Communities & competition	Biotic & Abiotic factors	**Maintaining water and nitrogen balance in the body H**	**Kidney function H**
Week 25	Required practical 9: Investigate the population size of a common species in a habitat	Adaptations	Extremophiles & retrieval	**Kidney failure H**	Dialysis
Week 27	Sexual and asexual reproduction	Meiosis	DNA and the genome	Advantages and disadvantages of sexual and asexual reproduction	**Plant hormones (control and coordination) H**
Week 29	**Genetic inheritance H**	Inherited disorders & sex determination	Variation	observe/conclude Required practical 8: Investigate the effect of light on the growth of newly germinated shoots	**Use of plant hormones H**
Week 31	Revision	Revision	Revision	Revision	Revision
Week 33	Mock Exmas	Mock Exmas	Mock Exmas	Mock Exmas	Mock Exmas
Week 35	Work Experience	Work Experience	Work Experience	Work Experience	Work Experience
Week 37	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback

Year 10 Chemistry Overview

Year 10	Combined Science Lesson 1	Combined Science Lesson 2	Combined Science Lesson 3	Combined Science Lesson 4	Seperate Science Lesson 1
Week 1	Retrieval Lesson	C3.3 Ionic bonding	C3.3 Ionic bonding	Empirical Formula	C2.6 The transition elements
Week 3	C3.5 Covalent bonding	C3.5 Covalent bonding	C3.6 Structure of simple molecules	Polymers	C3.11 Nanoparticles
Week 5	C3.7 Giant covalent structures	C3.8 Fullerenes and graphene	C3.9 Bonding in metals	C3.10 Giant metallic structures	C3.12 Applications of nanoparticles
Week 7	C4.1 Relative masses and **moles**	**C4.1 Relative masses and moles**	**C4.2 Equations and calculations**	**C4.3 From masses to balanced equations**	C4.5 Atom economy
Week 9	C4.6 Expressing concentrations	**C4.6 Expressing concentrations H**	C9.1 Hydrocarbons	C9.2 Fractional distillation of oil	C4.5 Titrations
Week 11	C9.2 Fractional distillation of oil	C9.3 Burning hydrocarbons	C9.4 Cracking hydrocarbons	C9.4 Cracking hydrocarbons	C4.6 Titration calculations
Week 13	C5.1 The reactivity series	C5.2 Displacement reactions	**C5.2 Displacement reactions**	C5.3 Extracting metals	C4.7 Volumes of gases
Week 15	C5.7 Neutralisation and the pH scale	**C5.8 Strong and weak acids**	**C5.8 Strong and weak acids**	C5.5 Salt from insoluble bases	C4.4 The yield of a chemical reaction
Week 17	C5.5 Salt from insoluble bases	C5.6 Making more salts	C6.1 Introduction to electrolysis	RP1 Assessment	C7.5 Chemical cells and batteries
Week 19	C6.2 Changes at the electrodes	C6.4 Electrolysis of aqueous solutions	C6.4 Electrolysis of aqueous solutions	C6.3 The extraction of aluminium	C7.6 Fuel cells
Week 21	C7.1 Exothermic and endothermic reactions	C7.2 Using energy transfers from reactions	C7.3 Reaction profiles	**C7.4 Bond energy calculation**	C10.1 Functional Groups
Week 23	**C7.4 Bond energy calculation**	C8.1 Rates of reaction	C8.1 Rates of reaction	C8.2 Collision theory and surface area	C10.2 Structure of alcohols, carboxylic acids, and esters
Week 25	C8.3 The effect of temperature	C8.4 The effect of concentration and pressure	C8.4 The effect of concentration and pressure	C8.5 The effect of catalysts	C10.3Structure of alcohols, carboxylic acids, and esters
Week 27	C8.6 Reversible reactions	**C8.8 Dynamic equilibrium**	**C8.9 Alterning Conditions**	C10.4Reactions of alkenes (SS only) CS Students Revise	C11.1 Addition polymerisation
Week 29	C12.1 Pure substances and mixtures	C12.2 Analysing chromatograms	C12.2 Analysing chromatograms	C11.2 Condensation polymerisation (SS only) CS Students Revise	C11.3 Natural polymers
Week 31	C12.3 Testing for gases	Revision	Revision	C11.4 DNA (SS only) CS Students Revise	C12.4 Tests for positive ions
Week 33	Mock Exmas	Mock Exmas	Mock Exmas	Mock Exmas	Mock Exmas
Week 35	Work Experience	Work Experience	Work Experience	Work Experience	Work Experience
Week 37	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback

Year 10 Physics Overview

Year 10	Combined Science Lesson 1	Combined Science Lesson 2	Combined Science Lesson 3	Seperate Science Lesson 1	Seperate Science Lesson 2
Week 1	Retrieval Lesson	P2.1 Energy transfer by conduction	P2.2 Infrared radiation	P6.7 Gas pressure and volume	P2.3 More about infrared radiation
Week 3	P2.4 Specific heat capacity	P2.4 Specific heat capacity RP	P2.5 Heating and insulating buildings	P2.5 Heating and insulating buildings RP	P2.5 Heating and insulating buildings RP
Week 5	P7.1 Atoms and radiation	P7.2 The discovery of the nucleus	P7.3 Changes in the nucleus	P7.6 Nuclear radiation in medicine	P7.7 Nuclear fission
Week 7	P7.4 More about alpha, beta, and gamma radiation	P7.5 Activity and half-life	Retrieval Practice	P7.8 Nuclear fusion	P7.9 Nuclear issues
Week 9	P4.2 Current and charge	P4.3 Potential difference and resistance	P4.3 Potential difference and resistance RP	P4.1 Electrical charges and fields	Retrieval Practice
Week 11	P4.4 Component characteristics RP	P4.5 Series circuits	RP1 Assessment	P16.1 Formation of the Solar System	Retrieval Practice
Week 13	P4.5 Series circuits	P4.6 Parallel circuits	P4.6 Parallel circuits	P16.2 The life history of a star	P16.3 Planets, satellites, and orbits
Week 15	P5.1 Alternating current	P5.2 Cables and plugs	P5.3 Electrical power and potential difference	P16.4 The expanding universe	P16.5 The beginning and future of the Universe
Week 17	P5.4 Electrical currents and energy transfer	P5.5 Appliances and efficiency	Retrieval Practice	RP1 Assessment Feedback	RP1 Assessment Feedback
Week 19	RP1 Assessment Feedback	RP1 Assessment Feedback	P8.1 Vectors and scalars	Retrieval Practice	Retrieval Practice
Week 21	P8.2 Forces between objects	P8.3 Resultant forces	P8.6 Centre of mass	P8.4 Moments at work	P8.5 More about levers and gears
Week 23	**P8.8 The parallelogram of forces H**	**P8.9 Resolution of forces H**	Retrieval Practice	Retrieval Practice	Retrieval Practice
Week 25	P9.1 Speed and distance–time graphs	P9.2 Velocity and acceleration	**P9.3 More about velocity–time graphs H**	Retrieval Practice	Retrieval Practice
Week 27	P10.1 Force and acceleration	P10.1 Force and acceleration RP	**P10.4 Momentum H**	P10.5 Using conservation of momentum	P10.6 Impact forces
Week 29	P10.2 Weight and terminal velocity	P10.3 Forces and braking	P10.8 Forces and Elasticity	P10.7 Safety first	P11.1 Pressure and surfaces
Week 31	P10.8 Forces and Elasticity RP	Mock Exam revision	Mock Exam revision	Mock Exam revision	P11.2 Pressure in a liquid at rest
Week 33	Mock Exmas	Mock Exmas	Mock Exmas	P11.3 Atmospheric pressure	P11.4 Upthrust and flotation
Week 35	Work Experience	Work Experience	Work Experience	Work Experience	Work Experience
Week 37	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback

Year 11 Biology Overview

Year 11	Combined Science Lesson 1	Combined Science Lesson 2	Combined Science Lesson 3	Seperate Science Lesson 1	Seperate Science Lesson 2
Week 1	Evolution	Selective breeding	**Genetic engineering H**	Plant defences	Cloning 1
Week 3	**Genetic engineering H**	Evidence for evolution	Fossils	Cloning 2	Theory of evolution - Darwin
Week 5	Extinction	Resistant bacteria	Classification	Theory of evolution - Wallace & Lamarck	Theory of evolution - Darwin controversy
Week 7	Levels of organisation (food chains)	How materials are cycled (water & carbon cycles)	How materials are cycled (decay)	Speciation	Understanding of genetics- Mendel
Week 9	Biodiversity	Waste management	Land use & peat bogs	Understanding of genetics	Decomposition
Week 11	Deforestation	Global warming	Maintaining biodiversity	Required practical 10: Investigate the effect of a factor on the rate of decay	Revision
Week 13	Mock Exams	Mock Exams	Mock Exams	Mock Exams	Mock Exams
Week 15	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback
Week 17	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention
Week 19	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention
Week 21	Mock Exams	Mock Exams	Mock Exams	Mock Exams	Mock Exams
Week 23	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback
Week 25	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention
Week 27	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention
Week 29	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams
Week 31	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams
Week 33	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams

Year 11 Chemistry Overview

Year 11	Combined Science Lesson 1	Combined Science Lesson 2	Combined Science Lesson 3	Combined Science Lesson 4	Seperate Science Lesson 1
Week 1	C13.1 History of our atmosphere	C13.2 Our evolving atmosphere	C13.3 Greenhouse gases	C12.4 Tests for positive ions (SS only) CS Students Revise	C12.5 Tests for negative ions
Week 3	C13.4 Global Climate change	C13.4 Global Climate change	C13.5 Atmospheric pollutants	C12.6 Instrumental analysis (SS only) CS Students Revise	C12.5 Tests for negative ions
Week 5	C14.1 Finite and renewable resources	C14.2 Water safe to drink	C14.2 Water safe to drink	C14.3 Treating waste water	C15.3 The properties of polymers
Week 7	**C14.4 Extracting metals from ores**	C14.5 Life cycle assessments	C14.6 Reduce, reuse, and recycle		C15.4 Glass and ceramics and composites
Week 9	Mock Exam Revision	Mock Exam Revision	Mock Exam Revision	Mock Exam Revision	C15.5 Making ammonia – The Haber process
Week 11	Mock Exam Revision	Mock Exam Revision	Mock Exam Revision	Mock Exam Revision	C15.6 The economics of the Haber Process
Week 13	Mock Exams	Mock Exams	Mock Exams	Mock Exams	Mock Exams
Week 15	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback
Week 17	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention
Week 19	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention
Week 21	Mock Exams	Mock Exams	Mock Exams	Mock Exams	Mock Exams
Week 23	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback
Week 25	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention
Week 27	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention
Week 29	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams
Week 31	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams
Week 33	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams

Year 11 Physics Overview

Year 11	Combined Science Lesson 1	Combined Science Lesson 2	Combined Science Lesson 3	Seperate Science Lesson 1	Seperate Science Lesson 2
Week 1	P12.1 The nature of waves	P12.2 The properties of waves	P12.3 Reflection and refraction	P12.5 Sound waves	P12.6 The uses of ultrasound
Week 3	P12.4 More about waves RP	P13.1 The electromagnetic spectrum	P13.2 Light, infrared, microwaves, and radio waves RP	P12.7 Seismic Waves	P14.1 Reflection of light RP
Week 5	P13.3 Communications	P13.4 Ultraviolet waves, X-rays, and gamma rays	P13.5 X-rays in medicine	P14.2 Refraction of light RP	P14.3 Light and colour
Week 7	P15.1 Magnetic fields	P15.2 Magnetic fields of electric currents	P15.4 The motor effect	P14.4 Lenses	P15.3 Electromagnets in devices
Week 9	Mock Exam Revision	Mock Exam Revision	Mock Exam Revision	P15.5 The generator effect	P15.6 The alternating-current generator
Week 11	Mock Exam Revision	Mock Exam Revision	Mock Exam Revision	P15.7 Transformers	P15.8 Transformers in action
Week 13	Mock Exams	Mock Exams	Mock Exams	Mock Exams	Mock Exams
Week 15	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback
Week 17	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention
Week 19	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention
Week 21	Mock Exams	Mock Exams	Mock Exams	Mock Exams	Mock Exams
Week 23	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback	Mock Exam Feedback
Week 25	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention
Week 27	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention	Revision and Intervention
Week 29	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams
Week 31	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams
Week 33	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams	GCSE Exams