SCIENCE CURRICULUM MAP
2026 – 2027

Intent:

The Science curriculum has been designed to enable our students to develop the scientific knowledge, understanding and skills which will equip them to critically evaluate the world around them. As they move through each Key Stage students will utilise key skills and components they have already developed to help them acquire new knowledge. To enable this, the curriculum has been designed as a spiral curriculum with opportunities for students to revisit key knowledge repeatedly and at each exposure the students will expand their current learning.

Implementation:

Year	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
7	**Chemistry** Students start KS3 Science by learning about the fundamental components in Chemistry which they will need later on in KS3 and KS4. Students evaluate scientific models, analyse data to predict the properties of materials and begin to develop their mathematical reasoning skills. **Topics Covered** • Atoms and Elements • The periodic table • Materials	**Biology** This half term, students develop a strong understanding of the structure of plant and animal cells, cell functions and cell adaptations. Students study the skeletal system and muscles, which is built upon further in Year 8. Students will also learn how to convert between different units, understand standard form and how to rearrange equations. **Topics Covered** • Cells and Cell Structure • Skeletal and Muscular System • Drugs and Health	**Physics** Year 7 students are introduced to KS3 Physics with Waves and the EM spectrum. They first begin learning about the properties of waves and practise wave speed calculations that require rearrangement, including standard form and converting between units. Students will then learn about Light and sound, building on what they have learned previously in Year 6 during the topic on Light. **Topics Covered** • Waves • Electromagnetic Spectrum	**Chemistry** Students build on their knowledge of atomic structure and the periodic table and learn about mixtures and different separation techniques. This topic links to prior concepts learned in KS2. Across several practicals, students develop their scientific inquiry skills and evaluate results. They will also develop their graph drawing skills. **Topics Covered** • Particle Theory • Pure & Impure Substances • Elements & Compounds	**Biology** In this half-term, students build on their knowledge of biological concepts from Half Term 2. We begin by learning the basics of photosynthesis, and students are able to investigate this further through a series of core practicals. Students expand their knowledge by learning about plant adaptations and ecosystems. This unit builds on their knowledge of living things and their habitats from KS2 **Topics Covered** • Photosynthesis • Relationships in an Ecosystem	**Physics** Students build on their knowledge of Earth, Space and Electricity learned in KS2. Here, they begin learning the basics of static electricity and circuit diagrams and understanding current, voltage and resistance in a circuit. Students will also learn the basics of magnetism and link this to electromagnets. We later move on to astronomy where students learn more about the solar system and gravity. **Topics Covered** • Electricity and Electromagnetism • Space Physics

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<tr><td>8</td><td><u>Biology</u>
In the first half term, students will start with Organ Systems, which builds on prior knowledge of KS2 and Year 7. The understanding of cells and how they are adapted for a particular role is crucial for building a strong foundation for scientific understanding. This will help students access Biology Topic 1 in GCSE 9-1 in later years.

<u>Topics Covered</u>
• Cells and Organisation
• Respiration
• Gas Exchange Systems
• Reproduction
• Nutrition & Digestion
• Circulatory System</td><td><u>Physics</u>
This half term, students move onto Energy, which is new content. Students will build an understanding of the fundamental components in this topic. Students revisit and build on these ideas at GCSE, allowing them to deepen their understanding of the concepts. This opportunity is used to also address misconceptions so that incorrect ideas are not carried forward. This will support students with Physics Topic 3 in GCSE 9-1 in following years.

<u>Topics covered</u>
• Conduction, Convection and Radiation
• Energy stores
• Energy transfers
• Non-renewable energy resources
• Renewable energy resources</td><td><u>Chemistry</u>
This half term, students move onto Chemical Reactions. This topic develops the students' understanding of atoms and the periodic table, first covered in year 7. Prior knowledge is built on in order to demonstrate how atoms interact. This is followed by an introduction to acids and alkalis so that students have a strong understanding of equations before expanding their understanding for neutralisation. This will help students with Chemistry Topic 3 in GCSE 9-1.

<u>Topics covered:</u>
• Chemical and Physical changes
• Atoms, molecules and balancing equations
• Acids and Alkalis
• Neutralisation</td><td><u>Biology</u>
This half term, students study the topic of Genetics. They start by developing their understanding of a specific cell component, the nucleus. This is built on to teach students how cells are able to contain the information needed for life. Students learn about basic inheritance rules, allowing them to further their understanding of evolution and inheritance as taught in KS2. This will prepare them for Biology Topic 4 in GCSE 9-1, where they will further build on these ideas.

<u>Topics Covered:</u>
• Structure of DNA
• History of DNA
• Inheritance
• Mutations
• Variation
• Natural selection</td><td><u>Chemistry</u>
In this half term, the students return to Chemistry and study Changes in the Atmosphere. The students are taught changes in the atmosphere and the effects of this on the planet. This opportunity is used to show students the impact that human activity can have on the environment through the use of fossil fuels. This allows students to re-evaluate their energy choices and how they can help. It also prepares students for Chemistry Topic 8 in GCSE 9-1.

<u>Topics covered</u>
• The early atmosphere
• The modern atmosphere
• The changing atmosphere
• Greenhouse effect
• Complete and incomplete combustion</td><td><u>Physics</u>
In this term, students return to Physics and study Forces. Here they start with basic principles of motion and forces, specifically an introductory understanding of Newton's laws. These ideas are introduced in Year 8 so students can build on and deepen their understanding of components originally introduced during the teaching of Forces in KS2. This will also help them prepare for Physics Topic 2 in GCSE 9-1.

<u>Topics Covered</u>
• Speed, distance and time
• Newton's first Law
• Forces
• Friction
• Pressure</td></tr>
<tr><td>9
Subject specialist teachers on rotation each term. Therefore, the order may vary. All students cover the same material by the of the academic year.</td><td colspan="2">In the first term, Chemistry is the focus. This includes fundamental chemical principles required for GCSE Chemistry. Students revisit concepts covered in KS3 including atomic structure, periodic table, chemical bonding, states of matter and separation techniques. Students deepen their understanding of this subject matter and start to apply it to more challenging contexts. Students study composite ideas such as ionic, covalent and metallic bonding which will form the foundation of knowledge which they require for topics later on in their GCSE studies. Later on in the term, students study Topic 8 chemistry where they revisit components covered in KS3, such as composition of the atmosphere and combustion, and then extend this knowledge by learning about the effects of different fuels and properties of hydrocarbons.</td><td colspan="2">In the second term, Biology is the focus. This begins with topic 1 key concepts including fundamental biological principles required for other topics covered later in the GCSE. Microscopes, Cells and Diffusion are components revisited from year 8 before building on this knowledge and studying topics such as osmosis, active transport and enzymes. The journey continues with Topic 2 which builds on the topic 1 cell content. Topic 3 follows which revisits genetics, previously covered in Year 8, and students deepen their understanding of these concepts and are exposed to more challenging composites such as sex inheritance. Lastly topic 4 is studied in which natural selection and genetic modification, continuous and discontinuous variation are revisited and further built upon from KS3.</td><td colspan="2">In the final term of the year, Physics is the focus. Beginning with topic 2 as topic 1 (key concepts) is skills based and is embedded throughout topic 2. Topic 2 (Motion and forces) is revisited and built upon from KS3. Students move onto Topic 3 where they further develop their understanding from KS3 of components such as conservation of energy, energy sources and energy calculations. Finally, students study topic 4 waves where they revisit basic wave principles from KS3 before deepening their understanding of refraction. Students are also introduced to more complex components such as how sound waves travel through different mediums. Studying these three topics in Year 9 allows students to secure the foundational knowledge required for topics later on in the GCSE including EM spectrum, Work Done and Vectors.</td></tr>
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	Topics covered • Topic 1 –Key Concepts in Chemistry • Topic 2 – States of Matter & Separation Techniques • Topic 8 –Fuels and the Atmosphere	**Topics covered** • Topic 1 –Key Concepts in Biology • Topic 2 –Cells and Control • Topic 3- Genetics • Topic 4-Natural Selection and Genetic Modification	**Topics covered** • Topic 2 –Forces and Motion • Topic 3-Conservation of Energy • Topic 4 -Waves
10 Subject specialist teachers on rotation each term. Therefore, the order may vary. All students cover the same material by the of the academic year.	**Combined - Chemistry** Students will begin with Chemistry, starting by revisiting atomic structure, electron configuration and the Periodic table, all of which are found within Topic 1. Students have been taught this content in KS3 and Year 9, however revisiting these components will students to build upon this knowledge when they begin studying Chemistry Topic 6 (Groups within the Periodic Table). A strong understanding of electronic configuration will enable students to successfully explain properties of elements in group 1, 7 and 8. Students will progress onto Topic 7 (Rates of Reaction) where they will deepen their understanding of chemical reactions. The students will then move onto the more challenging topics of Topic 3 (chemical changes) and Topic 4 (extracting metals and equilibria) where students are exposed to concepts such as neutralisation, ionic equations and Le Chetalier's principle. **Topics Covered:** • Topic 1 – Key Concepts of Chemistry • Topic 6 – Groups in the Periodic Table • Topic 7 – Rates of reaction • Topic 3 – Chemical changes	**Combined – Biology** Students will move on to Biology by revisiting Topic 1 (Key Concepts) with a specific focus on cells and microscopes to ensure students secure the fundamental components needed to understand concepts in Biology Topic 4. In topic 4, students will learn about natural and artificial selection which was initially developed in KS3. Topic 5 is then completed with a focus on concepts such communicable diseases, immunity and how medicines can be developed to treat these diseases. **Topics Covered:** • Topic 1 – Key Concepts of Biology • Topic 4 – Natural selection and genetic modification • Topic 5 – Health, disease and the development of Medicine	**Combined - Physics** Initially, students revisit components from Topic 4 (Waves) before deepening their understanding of wave behaviours such as refraction. An understanding of Topic 4 will support students as they begin their study of Physics Topic 5 (Light and the Electromagnetic Spectrum). Students then move onto Topic 6 (Radioactivity) which is new content for the students where they will develop knowledge of processes like nuclear decay and half-life. **Topics Covered:** • Topic 4 – Waves • Topic 5 – Light and the electromagnetic spectrum • Topic 6 – Radioactivity
	Separate – Chemistry Students will begin with Chemistry, starting by revisiting atomic structure, electron configuration and the Periodic table, all of which are found within Topic 1. Students have been taught this content in KS3 and Year 9, however revisiting these components will students to build upon this knowledge when they begin studying Chemistry Topic 6 (Groups within the Periodic Table). A strong understanding of electronic configuration will enable students to successfully explain properties of elements in group 1, 7 and 8. Students will progress onto Topic 7 (Rates of Reaction) where they will deepen their understanding of chemical reactions. The students will then move onto the more challenging topics of Topic 3 (chemical changes) and Topic 4 (extracting metals and equilibria) where students are exposed to concepts such as neutralisation, ionic equations and Le Chetalier's principle.	**Separate – Biology** Students will move on to Biology by revisiting Topic 1 (Key Concepts) with a specific focus on cells and microscopes to ensure students secure the fundamental components needed to understand concepts in Biology Topic 4. In topic 4, students will learn about natural and artificial selection which was initially developed in KS3. Topic 5 is then completed with a focus on concepts such communicable diseases, immunity and how medicines can be developed to treat these diseases. **Topics Covered:** • Topic 1 – Key Concepts of Biology • Topic 4 – Natural selection and genetic modification • Topic 5 – Health, disease and the development of Medicine	**Separate – Physics** Initially, students revisit components from Topic 4 (Waves) before deepening their understanding of wave behaviours such as refraction. An understanding of Topic 4 will support students as they begin their study of Physics Topic 5 (Light and the Electromagnetic Spectrum). Students then move onto Topic 6 (Radioactivity) which is new content for the students where they will develop knowledge of processes like nuclear decay and half-life. Students then apply this knowledge to explain uses of ionising radiation and nuclear fission and fusion. **Topics Covered:** • Topic 4 – Waves • Topic 5 – Light and the electromagnetic spectrum • Topic 6 – Radioactivity

	Topics Covered: • Topic 1 – Key Concepts of Chemistry • Topic 6 – Groups in the Periodic Table • Topic 7 – Rates of reaction • Topic 3 – Chemical changes		
11 **Subject specialist teachers on rotation each term. Therefore, the order may vary. All students cover the same material by the of the academic year**	**Combined - Physics** Students are entering Year 11 having completed a full Physics Paper 1. In this half term, they are therefore targeting Physics Paper 2, as this content will deepen their understanding of previous Physics content. They will begin the term with revisiting Physics Topic 8 (Forces and Work Done) content from Year 10 and then will work systematically through the Topics on this paper to develop their skills of the exam. Students will need to draw upon knowledge of forces and states of matter to explore concepts such as vector diagrams, Fleming's left-hand rule and pressure. **Topics:** • Topic 9 – Forces and their effects • Topic 12 – Magnetism and the motor effect • Topic 13 – Electromagnetic induction • Topic 14 – Particle Model • Topic 15 – Forces and Matter In the latter half of half term 2, the students continue studying Biology Paper 1 content. They are beginning this part of the half term by revisiting previously learnt content in Topic 1 as this contains important components necessary for future topics. Topic 3 follows which revisits genetics, previously covered in Year 8, and students deepen their understanding of these concepts and are exposed to more challenging composites such as sex inheritance. Lastly topic 4 is studied in which natural selection and genetic modification, continuous and discontinuous variation are revisited and further built upon from KS3.	**Combined – Biology** Students will move on to Biology by starting with Topic 6, where students learn about photosynthesis and other plant centred processes such as Transpiration. Students then begin Topic 7 which allows students to develop knowledge of homeostasis, hormones and their effects on various organs including insulin, adrenaline, thyroxine and the hormones of the menstrual cycle. In topic 8, students will study exchange and transport systems in animals including the structure of the heart and the process of respiration where students will deepen their understanding which was initially developed in KS3. Topic 9 is then completed with a focus on concepts such as nutrient cycles and interdependence in ecosystems. **Topics:** • Topic 6 – Plant structures and their functions • Topic 7 – Animal Coordination, control & homeostasis • Topic 8 – Exchange and transport in animals • Topic 9 – Ecosystems and material cycles. **Combined - Chemistry** The students will then move onto the more challenging topics of Topic 3 (chemical changes) and Topic 4 (extracting metals and equilibria) where students are exposed to concepts such as neutralisation, ionic equations and Le Chetalier's principle. **Topics:** • Topic 3 – Chemical Changes • Topic 4 – Extracting metals and equilibria	**Combined – Revision** During the summer term students undertake tailored revision that will be chosen by their subject lead and class teacher to make sure students are exam ready. This will help students to consolidate their learning ahead of GCSE exams in June.
	Separate – Physics Students are entering Year 11 having completed a full Physics Paper 1. In this half term, they are therefore targeting Physics Paper 2. The students in separate previously learnt Topic 10 and 11 and the content covered this year will build on these topics. Students will need to draw upon knowledge of forces and states of matter to explore concepts such as vector diagrams, Fleming's left-hand rule and pressure.	**Separate – Biology** Students will move on to Biology by starting with Topic 6, where students learn about photosynthesis and other plant centred processes such as Transpiration. Students then begin Topic 7 which allows students to develop knowledge of homeostasis, hormones and their effects on various organs including insulin, adrenaline, thyroxine and the hormones of the menstrual cycle. In topic 8, students will study exchange and transport systems in animals including the structure of	**Separate – Chemistry and Revision** During this term, students are finishing their content on Separate Chemistry II in which they will finalise learning concepts on practical skills such as titrations and develop understanding of organic chemistry further. Finally, during the summer term students undertake tailored revision that will be chosen by their subject lead and class teacher to make sure students are exam ready. This will

	Topics: • Topic 9 – Forces and their effects • Topic 12 – Magnetism and the motor effect • Topic 13 – Electromagnetic induction • Topic 14 – Particle Model • Topic 15 – Forces and Matter	the heart and the process of respiration where students will deepen their understanding which was initially developed in KS3. Topic 9 is then completed with a focus on concepts such as nutrient cycles and interdependence in ecosystems. **Topics:** • Topic 6 – Plant structures and their functions • Topic 7 – Animal Coordination, control & homeostasis • Topic 8 – Exchange and transport in animals • Topic 9 – Ecosystems and material cycles. **Separate - Chemistry** The students will then move onto the more challenging topics of Topic 3 (chemical changes) and Topic 4 (extracting metals and equilibria) where students are exposed to concepts such as neutralisation, ionic equations and Le Chetalier's principle. During half term 4, students will begin to develop their knowledge of the separate only content in which they will deepen their understanding of calculations, equations and organic chemistry as well as developing their understanding of practical skills. **Topics:** • Topic 3 – Chemical Changes • Topic 4 – Extracting metals and equilibria • Topic 5 – Separate Chemistry I • Topic 9 – Separate Chemistry II	help students to consolidate their learning ahead of GCSE exams in June.
Year 11 Astronomy	Students begin the course by gaining knowledge of the planet Earth and its internal structure. They will learn about the major divisions on Earth's surface and latitude and longitude, the major divisions of its atmosphere and how it affects observations. Students learn about the Moon and its surface formations, and become familiar with and should be able to identify some of the main features on its surface. Students will study the rotation and revolution of the Moon and the effect of libration on observing the Moon from Earth. From here students discuss and determine the effects of the relationship between the Earth, Moon, and Sun and how this relationship leads to tides, precession, and eclipses. Students will gain an understanding of astronomical definitions and measurements of time with study of synodic and sidereal time, solstices and equinoxes, and the need for time zones. Students will then gain an understanding of how to observe the Sun and planets, including the relative locations of the planets in relation to the Earth and the Sun. Students will learn the theory of how to safely observe the	Students will begin the spring term learning about the Moon, its internal structure and features on the far side. They will study how the constant drive to improve the accuracy, detail, and range of observations has provided a context for the exploration of the Moon. From here students will learn of the structure of the Sun, its energy transfer processes and the creation of the solar wind. Students will also use sunspot data to determine information about the Sun's rotation period and to learn about the solar cycle. Students will next learn about the main bodies in the Solar System and their differing characteristics. They will gain an understanding of how the constant drive to improve the accuracy, detail and range of observations has provided a context for the invention of the telescope, the development of the space telescope and probes to the outer reaches of our Solar System and use this knowledge to discuss the crewed exploration of the Moon. Students will next gain an understanding of how the interaction of gravitational and tidal forces led to the formation of our Solar System. They will use this information	Finally, during the summer term, students undertake tailored revision that will be chosen by their subject lead and class teacher to make sure students are exam ready. This will help students to consolidate their learning ahead of GCSE exams in May.

	Sun. From here, Students will gain an understanding of how to observe a variety of naked-eye astronomical phenomena. They will learn how to plan their observations to be at the best time and location, taking into account effects such as weather and light pollution. Using knowledge of naked eye observations, students will gain an understanding of how ancient civilisations observed the Solar System and they will also study how early astronomers modelled the Solar System. Students will gain an understanding of the motion of the planets around the Sun and the role of gravity learning how to apply Kepler's laws of planetary motion and Newton's law of universal gravitation. Observations are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics** Topic 1 – Planet Earth Topic 2 – The lunar disc Topic 3 – The Earth-Moon-Sun system Topic 4 – Time and the Earth-Moon-Sun cycles Topic 5 – Solar System observation Topic 6 – Celestial observation Topic 7 – Early models of the Solar System Topic 8 – Planetary motion and gravity	to study exoplanets and the possibility of life existing elsewhere. Students will follow on from this to learn of how stars are observed and how we can obtain information about them from just observing the different light they emit. They will study the evolution of stars and different types of stars. Students will also find out why we observe stars in different parts of the electromagnetic spectrum and where telescopes are located to enable better observations to be made. They will study how stars form and how they end their life, depending on their size. Students will learn the details of the Milky Way, our place in it and how it fits into the Universe. They will study different types of galaxies and the main theories for their evolution. Students will then study and gain knowledge of redshift and Hubble's law for distant galaxies. They will also study the evidence and explanation for the expanding Universe. Students will explore dark matter and dark energy and how the pertain to the possible fate of the Universe. Observations are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics** Topic 9 – Exploring the Moon Topic 10 – Solar astronomy Topic 11 – Exploring the Solar System Topic 12 – Formation of planetary systems Topic 13 – Exploring starlight Topic 14 – Stellar evolution Topic 15 – Our place in the Galaxy Topic 16 – Cosmology	
KS5 Biology	**AS** The students start the course by studying Topic 1 because the content of this topic builds on their knowledge from GCSE Biology This topic covers a range of content with the overarching themes of cardiovascular disease and biological molecules linking to most of the concepts. The scheme of work has been designed in such a way as to allow synoptic links to be made within topics, for example linking the structure blood vessels and the process of atherosclerosis, to help strengthen students' understanding of the wider topics. Once topic 1 is completed, students move onto Topic 2. The topic initially focuses on key foundational	**AS** Students start the term, finishing Topic 2 by studying genetics and exploring the processes and ethics involved in genetic screening. Students will then move onto studying Paper 2 content which begins with Topic 3 which focuses on cells, growth and development. The topic is taught in a sequence that enables the students to understand how multicellular organisms grow and develop from a single cell to complex organisms. For example, after students have learnt mitosis they are taught about stem cells and differentiation. They then study meiosis before applying their knowledge of this concept to explain gene linkage. Students then move onto	**AS** Students complete their studies of Topic 4 before undertaking tailored revision that will be chosen by their subject lead and class teacher to make sure students are exam ready. This will help students to consolidate their learning ahead of AS exams in May. After students sit the AS exams in Summer term 2, they will progress onto Topic 5 which is A2 content. The initial part of this topic focuses on global warming and succession which strongly links to the Topic 4 so students will be able to build on their knowledge from this topic.

	components such as DNA, DNA replication and protein synthesis before moving onto composites such as mutations and cystic fibrosis. Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics:** • Topic 1: Lifestyle, Health and Risk • Topic 2: Genes and Health	Topic 4 which explores biology in the natural environment and concepts such as biodiversity, conservation and plant cell wells. Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics:** • Topic 2: Genes and Health • Topic 3: Voice of the Genome • Topic 4: Biodiversity and Natural Resources	Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully. **Topics:** • Topic 4: Biodiversity and Natural Resources • Revision • Topic 5 On the Wild Side
	A2 Students begin the term by studying Topic 5. The initial part of this topic focuses on global warming, succession and sampling which strongly links to the Topic 4 so students will be able to build on their knowledge from this topic. Students then explore the biochemistry involved in the process of photosynthesis. Once Topic 5 has been completed, students move onto Topic 6 which focuses on forensics, diseases and immunity. This topic builds on students' prior knowledge from GCSE Biology Topic 5 and AS Topic 2 and 3. They start Topic 6 by revisiting protein synthesis before moving onto post-transcriptional modification. By understanding this process, students are then able to apply this knowledge to processes such as PCR and gel electrophoresis. Students apply knowledge of the carbon cycle learnt in Topic 5 to study decomposition of human bodies. Students deepen their understanding of processes previously covered in GCSE Biology such as immunity, vaccinations and viruses by studying HIV and TB. Students will then begin Topic 7. Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics:** • Topic 5: On the Wild Side • Topic 6: Immunity, Infection and Forensics • Topic 7: Run for your Life	**A2** Topic 7 allows students to deepen their understanding of their process of respiration which was previously covered in KS3 and KS4. Students are focused on developing their understanding of the biochemical pathway. Students build on their knowledge from AS Topic 1 and 2, to then study homeostatic mechanisms such as the control of heart and breathing rates. Finally, students begin Topic 8, where they build on their knowledge of transport processes to study the nervous system. Students develop a detailed knowledge of the processes of neurotransmission and nerve potentials. This knowledge is deepened when students study the causes of neurological diseases and habituation. Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics:** • Topic 7: Run for your Life • Topic 8 Grey Matter	**A2** Students complete the remainder of Topic 8 before beginning to study their Paper 3 Scientific article. During the summer term students undertake tailored revision that will be chosen by their subject lead and class teacher to make sure students are exam ready. This will help students to consolidate their learning ahead of A2 exams in June.

KS5 Chemistry	AS	AS	AS
	The curriculum is sequenced so that Topic 1 is taught first. In this way we ensure students have a firm underpinning of key chemical concepts such as atomic structure and ionisation energies prior to asking them to expand their knowledge. Topic 5 (quantitative skills and calculations) is taught next as it is incorporated into many different composites across the course. By tackling it early on, students are allowed to build their competence and confidence in this area. The topic is then interleaved through all others including Core Practicals, reinforcing the concepts taught and ensuring the students develop durable learning in this area. Topics 1 and 5 form the essential backbone on which students can then begin to build and broaden their knowledge. After finishing Topic 5, Paper 1 topics are taught sequentially (Topics 2, 3 and 4). Teaching these in the first half of the year gives teachers the opportunity to make learning stick through regular repetition of the content. Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics:** Topic 1: Atomic Structure and the Periodic Table Topic 5: Moles, Formulae & Amounts of Substance Topic 2: Bonding & Structure Topic 3: Redox Topic 4: Inorganic Chemistry	Topic 6 (Organic Chemistry) is taught first as it is a large topic full of new concepts and information. By teaching this first as much time as possible is preserved to recap this topic in starters and quizzes, meaning learning is embedded. This is supported by the sequential teaching of Topic 7, which relies heavily on Topic 6 content to understand and explain different analytical techniques. Students then study Topic 8, 9 & 10 which build on GCSE knowledge of bond energies, rates of reaction and equilibrium. Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics:** Finish Topic 4: Inorganic Chemistry Topic 6: Organic I Topic 7: Modern Analytical Techniques I Topic 8: Energetics I Topic 9: Kinetics I Topic 10: Equilibrium I	Finally, during the summer term students undertake tailored revision that will be chosen by their subject lead and class teacher to make sure students are exam ready. This will help students to consolidate their learning ahead of AS exams in May. Following the exams, the A2 specification is begun by teaching Topic 11 (Equilibrium II). Students build directly on their pre-existing knowledge from Topic 10 to strengthen and deepen understanding here. Topic 13 is then covered which builds on learning from Topic 8. Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics:** Half term 5: Revision Topic 11: Equilibrium II Topic 13: Energetics II
	A2	**A2**	**A2**
	Students revisit Topic 8 in order to support the teaching of Topic 13 as it builds on similar principles, allowing students to make rapid progress through the trickier mathematical aspects of Topic 13. Topic 11 is also reviisted before moving on to Topic 12 (Acid-Base Equilibria) and Topic 14 (Redox II). Both of these topics build on Topics 10 & 11 as they require a solid grasp of the concept of equilibrium and Le Chatelier's principle. Placing them here allows students to apply their knowledge of equilibrium to more specialised contexts and thus consolidate. Topic 15 (Transition Metals) follows to complete the paper 1 content before the end of term 1. The paper 2 topic 16	Topics 17 (Organic Chemistry II) and 18a & b (Organic Chemistry III – Aromatics and Nitrogen Compounds respectively) form a large block of new organic content. This year, Topic 6 (Organic I) and Topic 7 (Modern Analytical Techniques I) are placed before them as students have not covered this content in their AS year. Putting the AS topics here ensures students cover the required content before deepening their understanding during Topics 17 and 18. Topic 19 (Modern Analytical Techniques II) is taught straight after. Questions on these three topics tend to be of a synoptic nature thus mandating they are taught together. By teaching these concepts together students are quickly able to see the links between the three sections which allows for more fluent	During the summer term students undertake tailored revision that will be chosen by their subject lead and class teacher to make sure students are exam ready. This will help students to consolidate their learning ahead of A2 exams in June. **Topics:** • Revision

	(Kinetics II) builds on Topic 9 (Kinetics) and also contains information regarding rates and orders of reactions that are referred to heavily in the organic Chemistry topics that follow next term. Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics:** • Topic 8: Energetics • Topic 13: Energetics II • Topic 12: Acid-Base Equilibria • Topic 14: Redox II • Topic 15: Principles of Transition Metals • Topic 16: Kinetics	learning. Topic 18c (Organic Chemistry III – Organic Synthesis) is then taught to students to complete this term. Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics:** • Topic 6: Organic Chemistry I • Topic 7: Modern Analytical Techniques I • Topic 17: Organic II • Topic 18: Organic IIIa, b & c (Grignards) • Topic 19: Modern Analytical Techniques II	
KS5 Physics	**AS** Students begin their AS studies by revisiting, and expanding on key physics components and skills such as; units, measurement, magnitude and vectors so that they can secure the foundational knowledge needed for the rest of the course. Students then move onto the study of Mechanics. Here there are many opportunities to develop higher standards of physics reasoning, combining the mathematical with the qualitative. Students revisit and deepen their understanding of free body diagrams and motion graphs from GCSE. Misconceptions of motion can be identified and challenged through use of free body diagrams with application of Newton's laws. When moving onto motion graphs, the concept is taught from both a very mathematical perspective and qualitatively using Newton's laws, supporting students to form firm foundations for their understanding of equations of motion, momentum, and energy, which follow. Once Topic 2 is completed students move on to Electrical circuits, where first priority is given to understanding the key electrical quantities such as current and resistance are studied in isolation first, in order for these components to be effectively embedded before students move on to analysing full circuits. Students are taught to use circuit analysis skills to evaluate and design simple circuits using common electrical components.	**AS** Students begin the spring term by moving on to the study of materials. Students learn first the concepts of simple solid materials using ideas of stress and strain to evaluate systems under compression and tension. The key knowledge around the difference between strength, toughness, and hardness is embedded here to empower students to be able to evaluate the use of different materials in a range of circumstances. Students are taught to embed the links between mechanical energy from the autumn term to these ideas at this stage. Students then move on to fluid materials, to evaluate fluid flow comparing laminar and turbulent flow, and applying this foundational knowledge to a range of contexts such as wind effects and aerodynamics. Students next move on to the study of waves, beginning with the key concepts of waves such as the difference between mechanical and EM waves in order to facilitate later evaluation. They then begin the study of optics, which applies these key ideas to light and its effects on lenses. Moving forward from here students learn the dynamics of light and its duality. The use of the photoelectric effect and its application in the modern energy landscape is explored at this stage allowing students to link the theoretical concepts with wider societal challenges.	**AS** Finally, during the summer term, students undertake tailored revision that will be chosen by their subject lead and class teacher to make sure students are exam ready. This will help students to consolidate their learning ahead of AS exams in May. Once the AS exams are completed students move on to the study of further mechanics, this heavily relies on and expands upon the knowledge learnt in the autumn term. First taking students through further momentum with students applying the concepts of momentum now in two dimensions rather than just one and applying ideas around impulse to a range of situations. The students move on to circular motion reapplying the ideas of Newton's Laws to new concepts, specifically situations where the resultant force is perpendicular to the velocity, for example for bodies in orbit. Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics** Topic 4: Materials Topic 6: Further Mechanics

	Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics** Topic 1: Working as Physicist Topic 2: Mechanics Topic 3: Electrical Circuits	Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics** Topic 4: Materials Topic 5: Waves and the Particle Nature of Light	
	A2 Students begin the autumn term learning about the concept of electrical fields. Here students understanding of forces from AS are expanded by considering the model of interacting fields leading to forces. The understanding of fields is covered here allowing students to apply this to a range of concepts throughout the year. Students move on to the study of capacitors, in order to see the link between capacitors and electrical fields and applying this to a large range of concepts from microphones to touch screens. Students then begin to learn about magnetic fields, and magnetic forces using this understanding to describe and explain the interaction that leads to electromagnetic induction. From here students move on to the study of nuclear and particle physics, specifically beginning with a focus on the atom, the changing models of the atom over time and the strengths and weaknesses of the current model. Students build on this knowledge by studying subatomic particles and a broad introduction to the particle zoo. Students are then well placed to learn how physicists currently measure, detect, and investigate particles and the fundamental forces of the universe. Once this knowledge is secured the students move on to the study of thermodynamics beginning with key concepts such as the difference between heat and temperature. Students then use these concepts to study the transfer of heat and the effect of heat on gases as their temperatures, and pressures vary. Students move from here onto the study of nuclear radiation, building upon the study of the atom from earlier in the term to further their understanding of the effect of energy on atoms and nuclei. Learning next about the effects caused by the decay of nuclei and the differences and	**A2** At the beginning of the spring term students learn about the effects of gravitational fields on bodies with mass, this learning builds and expands on the learning around electrical and magnetic fields in the autumn term comparing and contrasting these fields. Students are asked to apply these concepts to large bodies in space and compare their effects with much smaller bodies to understand the relative weakness of the gravitational force compared to the other fundamental forces. From the knowledge students have gained they begin to learn about space, the life cycle of stars and the different star classes are foundational knowledge here, which allows students to then expand into learning about the different methods of measuring the stars and the stellar ladder. This knowledge expands into dark matter and its role in determining the fate of the universe. Students move on to the study of oscillations, the study of simple harmonic motion and how this can be applied to of understand of a variety of concepts. Students apply this concept to previous topics such as bond vibration in thermodynamics and binary star oscillations. Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics** Topic 12: Gravitational Fields Topic 10: Space Topic 13: Oscillations	**A2** Finally, during the summer term, students undertake tailored revision that will be chosen by their subject lead and class teacher to make sure students are exam ready. This will help students to consolidate their learning ahead of AS exams in May.

	similarities between the different forms of nuclear decay and their uses, effects and applications. Core practicals are taught alongside the relevant content across all topics. This ensures that students are able to link the practical skills to the theoretical knowledge more successfully **Topics** Topic 7: Electromagnetic Fields Topic 8: Nuclear and Particle Physics Topic 9: Thermodynamics Topic 11: Nuclear Radiation		

Enrichment Opportunities:

The Science curriculum has been designed to ensure that our students acquire a deep understanding of the subject matter that they are learning about. To facilitate this, students will learn about contexts and content which goes beyond the exam specification and national curriculum and we believe that this will equip our students with the knowledge and skills to thrive in a modern society.

Online learning tools such as Seneca Learning and GCSEpod are used to help students embed knowledge of key components in their long-term memory so that they can build on this knowledge over time. We offer our KS3 students the opportunity to expand their scientific knowledge through the completion of research projects on a half-termly basis. Examples of previous research projects include designing the structure of their own atom and profiles of famous female scientists.

Additionally, all Year 7 students participate in the annual Step into The NHS Competition which requires students to investigate the wide range of career options available in the NHS. At the KS4 and KS5 level, students can compete in the Biology, Physics and Chemistry Olympiad competitions enabling the students to deepen their knowledge across all three Scientific disciplines.

Impact:

Formative assessment is an integral part of our approach to Teaching and Learning. Over the course of their study, we will use weekly cumulative formative diagnostic assessments (in class or for homework) to ensure that students are consistently retrieving their knowledge of different components. The purpose of this is to ensure all knowledge is retained (and any gaps are identified and addressed promptly) and also to inform teachers' planning. Using this style of assessment, we will make use of the advantages of spaced practice as well as allowing pupils to be able to apply their knowledge to a wide variety of contexts.

Students will also sit a summative assessment every term. This assessment will be cumulative and will assess not only what the students have learned over the previous term, but also their understanding of all relevant material previously taught. Staff are supported to mark these accurately and post assessment moderation also takes place to ensure the validity of the data. All data is analysed centrally (not by teachers) and each Subject Leader is given a report outlining the areas of strength and weakness. This is used to inform future planning, support with additional interventions and set changes.