

SCIENCE CURRICULUM MAP 2024 – 2025

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	<p><u>Chemistry</u></p> <p>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.</p> <p><u>Topics Covered</u></p> <ul style="list-style-type: none"> • Atoms and Elements • The periodic table • Materials 	<p><u>Biology</u></p> <p>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.</p> <p><u>Topics Covered</u></p> <ul style="list-style-type: none"> • Cells and Cell Structure • Skeletal and Muscular System • Drugs and Health 	<p><u>Physics</u></p> <p>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.</p> <p><u>Topics Covered</u></p> <ul style="list-style-type: none"> • Waves • Electromagnetic Spectrum 	<p><u>Chemistry</u></p> <p>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.</p> <p><u>Topics Covered</u></p> <ul style="list-style-type: none"> • Particle Theory • Pure & Impure Substances • Elements & Compounds 	<p><u>Biology</u></p> <p>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</p> <p><u>Topics Covered</u></p> <ul style="list-style-type: none"> • Photosynthesis • Relationships in an Ecosystem 	<p><u>Physics</u></p> <p>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.</p> <p><u>Topics Covered</u></p> <ul style="list-style-type: none"> • Electricity and Electromagnetism • Space Physics
8	<p><u>Biology</u></p> <p>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</p>	<p><u>Physics</u></p> <p>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</p>	<p><u>Chemistry</u></p> <p>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</p>	<p><u>Biology</u></p> <p>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</p>	<p><u>Chemistry</u></p> <p>In this half term, the students return to Chemistry and study Changes in the Atmosphere. The students are taught changes in the</p>	<p><u>Physics</u></p> <p>In this term, students return to Physics and study Forces. Here they start with basic principles of motion and forces, specifically an introductory</p>

	<p>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.</p> <p>Topics Covered</p> <ul style="list-style-type: none">• Cells and Organisation• Respiration• Gas Exchange Systems• Reproduction• Nutrition & Digestion• Circulatory System	<p>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.</p> <p>Topics covered</p> <ul style="list-style-type: none">• Conduction, Convection and Radiation• Energy stores• Energy transfers• Non-renewable energy resources• Renewable energy resources	<p>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.</p> <p>Topics covered:</p> <ul style="list-style-type: none">• Chemical and Physical changes• Atoms, molecules and balancing equations• Acids and Alkalis• Neutralisation	<p>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.</p> <p>Topics Covered:</p> <ul style="list-style-type: none">• Structure of DNA• History of DNA• Inheritance• Mutations• Variation• Natural selection	<p>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.</p> <p>Topics covered</p> <ul style="list-style-type: none">• The early atmosphere• The modern atmosphere• The changing atmosphere• Greenhouse effect• Complete and incomplete combustion	<p>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.</p> <p>Topics Covered</p> <ul style="list-style-type: none">• Speed, distance and time• Newton's first Law• Forces• Friction• Pressure
<p>9</p> <p>Subject specialist teachers on rotation each term. Therefore, the order may vary. All students cover the same material by the of the academic year.</p>	<p>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.</p> <p>Topics covered</p> <ul style="list-style-type: none">• Topic 1 – Key Concepts in Chemistry• Topic 2 – States of Matter & Separation Techniques• Topic 8 – Fuels and the Atmosphere	<p>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.</p> <p>Topics covered</p> <ul style="list-style-type: none">• Topic 1 – Key Concepts in Biology• Topic 2 – Cells and Control• Topic 3 – Genetics• Topic 4 – Natural Selection and Genetic Modification	<p>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.</p> <p>Topics covered</p> <ul style="list-style-type: none">• 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.	<p align="center"><u>Combined - Chemistry</u></p> <p>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 Chatelier's principle.</p> <p><u>Topics Covered:</u></p> <ul style="list-style-type: none"> • Topic 1 – Key Concepts of Chemistry • Topic 6 – Groups in the Periodic Table • Topic 7 – Rates of reaction • Topic 3 – Chemical changes 	<p align="center"><u>Combined – Biology</u></p> <p>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.</p> <p><u>Topics Covered:</u></p> <ul style="list-style-type: none"> • Topic 1 – Key Concepts of Biology • Topic 4 – Natural selection and genetic modification • Topic 5 – Health, disease and the development of Medicine 	<p align="center"><u>Combined - Physics</u></p> <p>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.</p> <p><u>Topics Covered:</u></p> <ul style="list-style-type: none"> • Topic 4 – Waves • Topic 5 – Light and the electromagnetic spectrum • Topic 6 – Radioactivity
	<p align="center"><u>Separate – Chemistry</u></p> <p>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 Chatelier's principle.</p> <p><u>Topics Covered:</u></p> <ul style="list-style-type: none"> • Topic 1 – Key Concepts of Chemistry • Topic 6 – Groups in the Periodic Table • Topic 7 – Rates of reaction • Topic 3 – Chemical changes 	<p align="center"><u>Separate – Biology</u></p> <p>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.</p> <p><u>Topics Covered:</u></p> <ul style="list-style-type: none"> • Topic 1 – Key Concepts of Biology • Topic 4 – Natural selection and genetic modification • Topic 5 – Health, disease and the development of Medicine 	<p align="center"><u>Separate – Physics</u></p> <p>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.</p> <p><u>Topics Covered:</u></p> <ul style="list-style-type: none"> • Topic 4 – Waves • Topic 5 – Light and the electromagnetic spectrum • Topic 6 – Radioactivity

<p>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</p>	<p style="text-align: center;"><u>Combined - Physics</u></p> <p>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.</p> <p><u>Topics:</u></p> <ul style="list-style-type: none"> • 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 <p>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.</p>	<p style="text-align: center;"><u>Combined – Biology</u></p> <p>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.</p> <p><u>Topics:</u></p> <ul style="list-style-type: none"> • 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. <p style="text-align: center;"><u>Combined - Chemistry</u></p> <p>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 Chetallier's principle.</p> <p><u>Topics:</u></p> <ul style="list-style-type: none"> • Topic 3 – Chemical Changes • Topic 4 – Extracting metals and equilibria 	<p style="text-align: center;"><u>Combined – Revision</u></p> <p>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.</p>
	<p style="text-align: center;"><u>Separate – Physics</u></p> <p>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.</p> <p><u>Topics:</u></p> <ul style="list-style-type: none"> • 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 	<p style="text-align: center;"><u>Separate – Biology</u></p> <p>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.</p>	<p style="text-align: center;"><u>Separate – Chemistry and Revision</u></p> <p>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 help students to consolidate their learning ahead of GCSE exams in June.</p>

		<p>Topics:</p> <ul style="list-style-type: none"> • 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. <p><u>Separate - Chemistry</u></p> <p>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 Chatelier'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.</p> <p>Topics:</p> <ul style="list-style-type: none"> • Topic 3 – Chemical Changes • Topic 4 – Extracting metals and equilibria • Topic 5 – Separate Chemistry I • Topic 9 – Separate Chemistry II 	
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Enrichment Opportunities:

Science Club: Attending Science Club allows pupils to engage in exciting hands-on experiments, deepening their understanding of scientific concepts in a fun and interactive way. By exploring different areas of science beyond the classroom, they develop critical thinking, problem-solving skills, and a natural curiosity for how the world works. Participating in experiments also helps to build teamwork and confidence, inspiring pupils to pursue further learning and a passion for scientific discovery.

Eco Club: Attending Eco Club helps pupils develop their knowledge of the environment and learn practical ways to be more ecological. Through hands-on activities and projects, they explore topics such as sustainability, conservation, and climate change, gaining a deeper understanding of how their actions impact the planet. Eco Club also empowers pupils to take positive steps towards protecting the environment, both in school and in their communities, fostering a sense of responsibility and environmental awareness.

Online Learning: Online learning tools, such as Educake, are used to help pupils to embed knowledge of key components in their long-term memory, so that they can build on this knowledge over time.

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.