

Swindon Academy Science Curriculum Map 2020-21

Intent


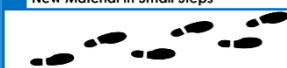

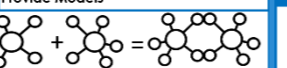






The intent of the Science Curriculum is to ensure that Swindon Academy pupils develop scientific knowledge and conceptual understanding through the disciplines of biology, chemistry and physics. Developing an understanding of the nature, process and methods of science through different types of scientific enquiries helps students to answer scientific questions about the world around them.

In KS3 we follow the United Learning Science Curriculum which is based on based on the national curriculum for Key Stage 3 science (Sept 2013) and looks at the core concepts from the three science disciplines, biology, chemistry and physics. This gives pupils a secure foothold of knowledge and understanding to begin to grasp a synoptic overview of science. KS4 builds on the foundations laid in KS3 and develops the students learning in preparation for KS5. There are two curriculum pathways available at Key Stage 5 to ensure all students wishing to continue with their science education in sixth form are able to. For high attaining students the Key Stage 5 curriculum enables students to extend their knowledge in their chosen discipline and provides the foundation knowledge to access Undergraduate science degrees. The second pathway offers less academic students the chance to further scientific knowledge and understanding whilst learning about the various scientific career opportunities through a vocational Applied Science course.

We use a mastery approach whereby lessons are learning cycles and content is reviewed and revisited throughout the units and terms, so that our knowledge bases are secured for most of our pupils before moving on. We have a spiralling curriculum so that foundations for Year 11 are laid down in Year 7 and built upon over each subsequent year. There are three routes to ensure that all students are able to access the curriculum. Students entering Year 7 who are well below national average follow a curriculum designed to embed the KS2 science curriculum before moving onto the KS3 and four curriculums. Students entering Year 7 well above national average follow a grammar curriculum, this involves the KS3 curriculum being delivered in separate disciplines, and these students follow the KS3 curriculum over Years 7 and 8 before starting the GCSE separate sciences curriculum in Years 9 to 11.

All curriculum routes aim to develop students who are equipped with the scientific knowledge required to understand the uses and implications of science today and in the future. We offer several visits to further broaden and develop student knowledge and understanding, in Year 7 we go to the Cotswold's wildlife park, in Year 8 the Natural History Museum, in Year 9 the Big Bang Fair. Throughout Years 7, 8 and 9 there are shows from the Explorer Dome which provided students with opportunity to review and extend their knowledge.

Implementation – Rosenshine principles of instruction – please write one or two sentences to describe the implementation for each of the Rosenshine principles below these must be subject specific and observable in lessons.

Daily Review	New Material in Small Steps	Ask Questions	Provide Models	Guide Student Practice	Check Student Understanding	Obtain High Success Rate	Scaffolds for Difficult Tasks	Independent Practice	Weekly and Monthly Review
 <p>Daily review is an important component of instruction. It helps strengthen the connections of the material learned. Automatic recall frees working memory for problem solving and creativity.</p>	 <p>Our working memory is small, only handling a few bits of information at once. Avoid its overload—present new material in small steps and proceed only when first steps are mastered.</p>	 <p>The most successful teachers spend more than half the class time lecturing, demonstrating and asking questions. Questions allow the teacher to determine how well the material is learned.</p>	 <p>Students need cognitive support to help them learn how to solve problems. Modelling, worked examples and teacher thinking out loud, help to clarify the specific steps involved.</p>	 <p>Students need additional time to rephrase, elaborate and summarise new material in order to store it in their long-term memory. More successful teachers build in more time for this.</p>	 <p>Less successful teachers merely ask "Are there any questions?" no questions are taken to mean no problems. False. By contrast, more successful teachers check on all students.</p>	 <p>A success rate of around 80% has been found to be optimal, showing students are learning and also being challenged. Better teachers taught in small steps followed by practice.</p>	 <p>Scaffolds are temporary supports to assist learning. They can include modelling, teacher thinking aloud, cue cards and checklists. Scaffolds are part of cognitive apprenticeship.</p>	 <p>Independent practice produces "overlearning" - a necessary process for new material to be recalled automatically. This ensures no overloading of students' working memory.</p>	 <p>The effort involved in recalling recently-learned material embeds it in long-term memory. And the more this happens, the easier it is to connect new material to such prior knowledge.</p>
<ul style="list-style-type: none"> Quizzing Do Now – based on previous content learnt Exam question practice – based on previous lessons content 	<ul style="list-style-type: none"> New content delivered in small chunks with practice in between 	<ul style="list-style-type: none"> Cold call is used to check for understanding Open and closed questioning Right is right No opt out 	<ul style="list-style-type: none"> Teacher models procedures using the visualiser Teachers use WTM techniques during exam question practice Visual aids used to illustrate abstract concepts 	<ul style="list-style-type: none"> Turn and talk opportunities provide students with the opportunity to rephrase and elaborate on their answers and understanding 	<ul style="list-style-type: none"> Pupil white boards are used to check for whole class understanding Tracking not watching Hot task used to feedforward content to be retaught. 	<ul style="list-style-type: none"> Content is delivered in small chunks followed by student practice including turn and talk, quizzing for understanding and application using exam questions SLOP/Fluency #AimHigh 	<ul style="list-style-type: none"> Use of MULES acronym for calculations KS3 ladder differentiation used to scaffold tasks WTM SLAP Textbook support 	<ul style="list-style-type: none"> Everybody writes tasks provide students with independent practice SLOP/Fluency KPI tasks Doddle prep 	<ul style="list-style-type: none"> Quizzing Do Now – based on previous content learnt Synoptic testing used in CEAT weeks, so revision covers all content covered not just recently covered content Doddle prep

Term	1	2		3		4	5	6		
Year 7	<p>Alternative Curriculum <u>Living Things</u> Students learn to classify animals, read and produce classification keys. Food chains, food webs and habitats are introduced to students. Then students study the plant life cycle, seed dispersal, pollination and plant reproduction. This is a foundation to be built on in 7BC, 7BR and 8BE. <u>Light</u> Students learn about light and properties of materials, shadows, reflection, colours and light intensity. This is a foundation to be built on in 8PL.</p>		Teacher Assessment	<p>Materials Students learn to describe the properties of the states of matter and changes between states. This is a foundation to build on in 7CP.</p>	Assessment 1	<p><u>Electricity</u> Students learn about safety relating to electricity, conductors and insulators. They also learn about circuits, batteries vs mains electricity, circuit symbols and diagrams. This is a foundation to build on in 8PE.</p>	<p><u>Animals</u> Students are introduced to the seven life processes. They learn about human organs and what happens when they go wrong. Then students learn about the importance and impact of diet and exercise. This is a foundation to build on in 7BC and 8BD. <u>Forces</u> Students learn about forces as pushes and pulls, the effects forces have on objects. Magnetism and gravity are introduced. This is a foundation to build on in 9PF. <u>Space</u> Students learn about the solar system and orbits.</p>		Assessment 2	Review and reteach
	<p>Mainstream <u>7CP Particles</u> In this module students learn the foundations chemistry and are introduced to the particle theory and use it identify pure and impure substances from particle diagrams and describe different separation techniques. <u>7BC Cells</u> In this module students learn the foundations of biology and are introduced to cells. They will learn the main cell components and the functions and use microscopes to observe cells. <u>7PE Energy</u> In this module students the foundations of physics and introduces the energy store model and the mechanisms of transfer between different energy stores.</p>			<p><u>7BR Reproduction</u> In this module learn the foundations of biology and are introduced to the topic of reproduction. Students learn the process of reproduction in mammals including humans.</p>		<p><u>7BR Reproduction (continued)</u> The module continues and students learn the process of reproduction in flowering plants. This module also introduces the concept of variation with respect to biological differences between species and statistical differences in data type e.g. continuous and discontinuous variation.</p>	<p><u>7CR Chemical Reactions</u> In this module students learn the foundations of chemistry and are introduced to simple chemical reactions. They also learn the basics of acids and alkalis and the pH scale. <u>7PF Forces</u> In this module students learn the foundations of physics and are introduced to forces and force diagrams. They also learn to calculate speed and interpret distance-time graphs. <u>8BE Ecological relationships</u> In this module students review and build on their knowledge from the 7BR Reproduction module by learning about the causes of variation.</p>			
Vocabulary Instruction	Distillation, separation, conservation, solute, solution, properties, chromatography, multicellular, unicellular organism.	Nucleus, magnification, cell, tissue, organ, membrane, energy, gravitational, renewable, mass, geothermal, potential, elastic, temperature.		Gamete, fertilisation, menstrual, reproduction.		Variation, pollination.	Reactant, product, salt, neutralisation, compound.	Pesticide, herbivore, biomass, weight, pressure.		
	<p>Grammar Biology <u>7BC Cells</u> In this module students learn the foundations of biology and are introduced to cells. They will learn the main cell components and the functions and use microscopes to observe cells.</p> <p>Chemistry <u>7CP Particles</u> In this module students learn the foundations of chemistry and are introduced to the particle theory and use it to identify pure and impure substances from particle diagrams and describe different separation techniques.</p> <p>Physics <u>7PE Energy</u> In this module students learn the foundations of physics and introduces the energy store model and the mechanisms of transfer between different energy stores.</p>			<p><u>7BR Reproduction</u> In this module learn the foundations of biology and are introduced to the topic of reproduction. Students learn the process of reproduction in mammals including humans.</p> <p><u>7CC Chemical Reactions</u> In this module students learn the foundations of chemistry and are introduced to simple chemical reactions.</p> <p><u>7PF Forces</u> In this module students learn the foundations of physics and are introduced to forces and force diagrams.</p>		<p><u>7BR Reproduction (continued)</u> The module continues and students learn the process of reproduction in flowering plants. This module also introduces the concept of variation with respect to biological differences between species and statistical differences in data type e.g. continuous and discontinuous variation.</p> <p><u>7CC Chemical Reactions (continued)</u> The module continues and students learn the basics of acids and alkalis and the pH scale.</p> <p><u>7PF Forces (continued)</u> They also learn to calculate speed and interpret distance-time graphs.</p>	<p><u>8BE Ecological relationships</u> In this module students review and build on their knowledge from the 7BR Reproduction module by learning about the causes of variation.</p> <p><u>8CM Materials and the Earth</u> In this module students learn the foundations of chemistry and are introduced to the structure and composition of the Earth before moving onto to look at the carbon cycle and the effects of human activity on the environment. <u>8CP Periodic Table</u> In this module students review and build on their knowledge from the 7CP Particles and 7CR Reactions modules and are introduced to the periodic table and how it links to the physical and chemical properties of elements and their compounds. <u>8PL Light and space</u> In this module students learn the foundations of physics and learn about the properties and behaviour light. It then moves on to look at space and planets.</p>			
Vocabulary Instruction	Multicellular, organism, nucleus, magnification, cell, tissue, organ, membrane, unicellular distillation, separation, conservation, solute, solution, properties, chromatography energy, gravitational, renewable, mass, geothermal, potential, elastic, temperature.		Gamete, fertilisation, menstrual, reproduction, reactant, product, compound.	Pollination, variation salt, neutralisation, weight, pressure.	Pesticide, herbivore, biomass, material, polymer, reactivity, atom, physical, chemical, element vacuum, refraction, absorption, transmission, wavelength, reflection.					

Term	1	2		3		4	5	6		
Year 8	Alternative Curriculum <u>7CP Particles</u> In this module students build on the changing state module from year 7 and are introduced to the concept of particles and the properties of solids, liquids and gases. There is a focus on literacy in all these lessons. <u>7BC Cells</u> In this module students build on their knowledge from the year 7 living things and their environment module to learn about the seven-life process. There is a focus on literacy in all lessons.		Teacher Assessment	<u>7PE Energy</u> This module introduces the different stores of energy then moves on to looking at the movement of energy between different stores. There is a focus on literacy in all lessons.	Assessment 1	<u>7BR Reproduction</u> In this module students build on their knowledge from the bodies and flowers modules in year 7 and learn about the process of reproduction in plants and animals. There is a focus on literacy in all lessons.	<u>7CC Chemical Reactions</u> In this module students learn the foundations of chemistry and are introduced to simple chemical reactions. There is a focus on literacy in all lessons. <u>7PF Forces</u> This module builds on the knowledge from the year 7 alternative curriculum module magnets and forces by looking at to forces and force diagrams. They also learn to calculate speed and interpret distance-time graphs. There is a focus on literacy in all lessons		Assessment 2	Review and reteach
Vocabulary Instruction	Distillation, separation, conservation, solute, solution, properties, chromatography	Multicellular, organism, nucleus, magnification, cell, tissue, organ, membrane, unicellular.		Energy, gravitational, renewable, mass, geothermal, potential, elastic, temperature.		Gamete, fertilisation, menstrual, reproduction, pollination.	Reactant, product, compound.	Weight, pressure.		
	Mainstream <u>8PL Light and space</u> In this module students learn the foundations of physics and learn about the properties and behaviour light. It then moves on to look at space and planets. <u>8CP Periodic Table</u> In this module students review and build on their knowledge from the 7CP Particles and 7CR Reactions modules and are introduced to the periodic table and how it links to the physical and chemical properties of elements and their compounds.			<u>8BN Digestion and nutrition</u> In this module students review and build on their knowledge from the 7BC Cells and focuses on the digestive system and diet. It introduces the action of enzymes in digestion. <u>8PE Electricity and magnetism</u> In this module students review and build on their knowledge from the 7PE Energy and 7PF Forces modules and are introduced to electricity.		<u>8PE Electricity and magnetism (continued)</u> The students then move on the study magnetism. <u>8CM Materials and the Earth</u> In this module students learn the foundations of chemistry and are introduced to the structure and composition of the Earth before moving onto to look at the carbon cycle and the effects of human activity on the environment.	<u>9BP Plants and photosynthesis</u> In this module students review and build on their knowledge from the 7BC Cells module and introduces the process of photosynthesis. <u>9PM Matter</u> In this module students review and build on their knowledge from 7CP Particles and 7PE energy and revisits the particle model and expands it to the concept of density. The students then move on to apply the particle model to the concept of pressure. <u>9PF Forces in action</u> In this module students review and build on their knowledge from the 7PE energy and 7PF Forces modules. The students apply the energy store model to a pendulum before moving on to moment and Hooke's Law.			
Vocabulary Instruction	Vacuum, refraction, absorption, transmission, wavelength, reflection.	Material, polymer, reactivity, atom, physical, chemical, element.		Carbohydrate, protein, villi, glucose, amino acid current, component, resistance.		Field, material, polymer.	Chloroplast, xylem, phloem, photosynthesis, density, compression.	Internal, work, equilibrium, deformation, moment.		
	Grammar Stream Biology <u>8BN Digestion and nutrition</u> In this module students review and build on their knowledge from the 7BC Cells and focuses on the digestive system and diet. It introduces the action of enzymes in digestion. Chemistry <u>8CP Periodic Table</u> In this module students review and build on their knowledge from the 7CP Particles and 7CR Reactions modules and are introduced to the periodic table and how it links to the physical and chemical properties of elements and their compounds. Physics <u>8PE Electricity and magnetism</u> In this module students review and build on their knowledge from the 7PE Energy and 7PF Forces modules and are introduced to the concept of electricity and magnetism.			Biology <u>9BP Plants and photosynthesis</u> In this module students review and build on their knowledge from the 7BC Cells module and introduces the process of photosynthesis. <u>9CR Reactivity</u> module students review and build on their knowledge from the 7CR Reactions and 8CP Periodic table modules and learn about the properties of metals. <u>8PE Electricity and magnetism (continued)</u> The students then move on the study magnetism.		<u>9BB Biological systems</u> In module students build on their knowledge from the 7BC Cells and 8BN modules and introduces the gas exchange, circulatory and skeletal systems. <u>9CR Reactivity (continued)</u> The students then move on to consider chemical reactions involving metals and introduces the idea of metal extraction. <u>9PM Matter</u> In this module students review and build on their knowledge from 7CP Particles and 7PE energy and revisit the particle model before expanding it to the concept of density. The students then move on to then moves on to apply the particle model to the concept of pressure.	<u>9BB Biological systems (continued)</u> The students are introduced to respiration. <u>9CE Energetics</u> In this module students review and build on their knowledge from the 7CC chemical reactions and 9CR reactivity and learn about oxidation, thermal decomposition and combustion reactions. Students use equations to represent chemical reactions before categorising reactions as endothermic or exothermic. <u>9PF Forces in action</u> In this module students review and build on their knowledge from the 7PE energy and 7PF Forces modules. The students apply the energy store model to a pendulum before moving on to moments and Hooke's Law.			
Vocabulary Instruction	Carbohydrate, protein, villi, glucose, amino acid, material, polymer, reactivity, atom, physical, chemical, element, current, component, resistance, field.		Chloroplast, xylem, phloem, photosynthesis Field.	Chromosome, exchange, cilia density, compression	Aerobic, anaerobic, respiration, decomposition, oxidation, exothermic, endothermic, displacement, internal, work, equilibrium, deformation, moment.					

Term	1	2	3	4	5	6
Year 9	Alternative Curriculum 7CC Chemical Reactions (continued) In this module students are introduced to simple neutralisation reactions. 8BE Ecological relationships In this module students review and build on their knowledge from the 7BR Reproduction module by learning about the causes of variation. 8BE Ecological relationships In this module students review and build on their knowledge from the 7BR Reproduction module by learning about the causes of variation. 8CP Periodic Table In this module students review and build on their knowledge from the 7CP Particles and 7CC Chemical Reactions modules and are introduced to the periodic table and how it links to the physical and chemical properties of elements and their compounds.		8PE Electricity and magnetism In this condensed module students review and build on their knowledge from the 7PE Energy and 7PF Forces modules and are introduced to electricity. 9BP Plants and photosynthesis In this module students review and build on their knowledge from the 7BC Cells module and introduces the process of photosynthesis.	9BP Plants and photosynthesis (continued) In this module students review and build on their knowledge from the 7BC Cells module and introduces the process of photosynthesis. 9PF Forces in action In this condensed module students review and build on their knowledge from the 7PE energy and 7PF forces modules. The students apply the energy store model to a pendulum before moving on to Hooke's Law. 9CE Energetics In this module students review and build on their knowledge from the 7CC chemical reactions and learn about oxidation, thermal decomposition and combustion reactions. Students use equations to represent chemical reactions before categorising reactions as endothermic or exothermic.	B1.1 Cells, structure and transport In this module students review and build on their knowledge from the 7BC cells and 7CP particles modules to included cell transport mechanisms, including diffusion, osmosis and active transport. C1.1 Atomic structure In this module students build on their knowledge from the 7CP particles and 8CP periodic table modules by developing their understanding of atoms. P1.1 Conservation and dissipation of energy In this module students review and build on their knowledge from the 7PE energy and 8PE Electricity and magnetism modules by describing processes, such as forces and electrical currents, through which energy can be transferred. B1.2 Cell division In this module students review and build on their knowledge from the 7BC cells module to describe cell division, growth and differentiation.	
Vocabulary Instruction	Salt, neutralisation.	Pesticide, herbivore, biomass, material, polymer, reactivity, atom, physical, chemical, element.	Current, component, resistance, chloroplast, xylem, phloem.	Photosynthesis, internal, work, equilibrium, deformation, decomposition, exothermic, endothermic, displacement.	Transport, osmosis, specialised, mitochondria, eukaryote, prokaryote, isotopes, protons, ionisation, dissipate, generation, efficiency.	Mitosis, differentiate.
	Mainstream 9CE Energetics In this module students review and build on their knowledge from the 7CC chemical reactions and 9CR reactivity and learn about oxidation, thermal decomposition and combustion reactions. Students use equations to represent chemical reactions before categorising reactions as endothermic or exothermic. 9PS Sound In this module students review and build on their knowledge from the 8PL Sound and Light module and introduces sounds waves. The students then compare sound and light waves before moving onto uses of ultrasound. 9BB Biological systems In this module students review and build on their knowledge from the 7BC Cells and 8BN modules and introduces the gas exchange, circulatory and skeletal systems. Finally, students are introduced to respiration.		B1.1 Cells, structure and transport In this module students review and build on their knowledge from the 7BC cells and 7CP particles modules to included cell transport mechanisms, including diffusion, osmosis and active transport.	B1.2 Cell division In this module students review and build on their knowledge from the 7BC cells module to describe cell division, growth and differentiation. C1.1 Atomic structure In this module students build on their knowledge from the 7CP particles and 8CP periodic table modules by developing their understanding of atoms. C1.2 The periodic table In this module students review and build on their knowledge from the 7CP particles and 8CP periodic table modules by describing the development of the periodic table and the trends in the properties of elements across the periodic table. P1.1 Conservation and dissipation of energy In this module students review and build on their knowledge from the 7PE energy and 8PE Electricity and magnetism modules by describing processes, such as forces and electrical currents, through which energy can be transferred. P1.2 Energy transfer by heating In this module students review and build on their knowledge from the 7PE energy by looking at heat energy transfer and applying it heating and insulating of buildings and introduces the concept of specific heat capacity. This module then extends to look at infrared radiation.	B1.3 Organisation and the digestive system In this module students review and build on their knowledge from the 8BN digestion and nutrition by explaining how different factors affect enzyme activity and the role of bile in digestion. B1.4 Organising plants and animals In this module students review and build on their knowledge from the 9BB biological systems and 9BP plants and photosynthesis describing the transport systems in mammals and plants. B2.5 Communicable diseases In this module students are introduced to the causes of communicable diseases, how they are spread and describe the body's defences to pathogens. C1.3 Structure and bonding In this module students review and build on their knowledge from the C1.1 atomic structure and C1.2 periodic table modules by describe different types of bonding and explaining the properties of ionic compounds, covalent compounds and metals. The concepts of nanoparticles is introduced. P1.3 Energy resources In this module students build on their knowledge from the 7PE energy by evaluating different methods of meeting the nation's energy demands.	
Vocabulary Instruction	Decomposition, oxidation, exothermic, endothermic, displacement, ultrasound, frequency, transverse.	Chromosome, exchange, cilia, aerobic, anaerobic, respiration.	Transport, osmosis, specialised, mitochondria, eukaryote, prokaryote, mitosis, differentiate, isotope, proton, ionisation, aqueous, residue.	Isotope, proton, ionisation, aqueous, residue, halogen, intermolecular, dissipate, generation, efficiency, specific.	Transpiration, cardiovascular, pulmonary, coronary, oxygenated, pathogen, antigen, delocalised, electrostatic, ionic, covalent.	

Teacher Assessment

Assessment 1

Review and reteach

Assessment 2

Review and reteach

	<p>Grammar Stream</p> <p>Biology</p> <p><u>B1.1 Cells, structure and transport</u> In this module students review and build on their knowledge from the 7BC cells and 7CP particles modules to included cell transport mechanisms, including diffusion, osmosis and active transport.</p> <p><u>B1.2 Cell division</u> In this module students review and build on their knowledge from the 7BC cells module to describe cell division, growth and differentiation.</p> <p>Chemistry</p> <p><u>C1.1 Atomic structure</u> In this module students review and build on their knowledge from the 7CP particles and 8CP periodic table modules by developing their understanding of atoms.</p> <p><u>C1.2 The periodic table</u> In this module students review and build on their knowledge from the 7CP particles and 8CP periodic table modules by describing the development of the periodic table and the trends in the properties of elements across the periodic table. This module then extends to look at transition elements.</p> <p>Physics</p> <p><u>P1.1 Conservation and dissipation of</u> In this module students review and build on their knowledge from the 7PE energy and 8PE Electricity and magnetism modules by describing processes, such as forces and electrical currents, through which energy can be transferred.</p> <p><u>P1.2 Energy transfer by heating</u> In this module students build on their knowledge from the 7PE energy by looking at heat energy transfer and applying it heating and insulating of buildings and introduces the concept of specific heat capacity.</p>	<p><u>B1.3 Organisation and the digestive system</u> In this module students review and build on their knowledge from the 8BN digestion and nutrition by explaining how different factors affect enzyme activity and the role of bile in digestion</p> <p><u>C1.3 Structure and bonding</u> In this module students review and build on their knowledge from the C1.1 atomic structure and C1.2 periodic table modules by describe different types of bonding and explaining the properties of ionic compounds, covalent compounds and metals. The concept of nanoparticles is introduced.</p> <p><u>P1.3 Energy resources</u> In this module students build on their knowledge from the 7PE energy by evaluating different methods of meeting the nation's energy demands</p>	<p>Assessment 1</p> <p>Review and reteach</p>	<p><u>B1.4 Organising plants and animals</u> In this module students review and build on their knowledge from the 9BB biological systems and 9BP plants and photosynthesis describing the transport systems in mammals and plants.</p> <p><u>C1.4 Chemical calculations</u> In this module students review and build on their knowledge from the C1.1 atomic structure and C1.2 periodic table modules by calculating atomic mass and relative formula mass, before going onto learn about moles. This module also reviews and builds on the 7CC chemical reactions module through titration experiments.</p> <p><u>P2.4 Electric circuits</u> In this module students review and build on their knowledge from the 7PE energy and 8PE Electricity and magnetism modules by describing static electricity before describing electrical fields and investigating the relationship between current, potential difference and resistance in different components.</p> <p><u>P2.5 Electricity in the home</u> In this module students review and build on their knowledge from the 7PE energy and P2.4 electrical circuits by looking at electrical safety in the home and calculating electrical power and efficiency.</p>	<p><u>B2.5 Communicable diseases</u> In this module students are introduced to the causes of communicable diseases, how they are spread and describe the body's defences to pathogens. This module then extends to look at the process of growing bacteria in the lab before introducing plant defence responses.</p> <p><u>B2.6 Preventing and treating disease</u> In this module students evaluate the use of vaccinations, antibiotics and pain killers before describing how drugs are discovered and developed before use.</p> <p><u>C2.5 Chemical changes</u> In this module students review and build on their knowledge from the 7CC chemical reactions, 9CR reactivity and 9CE energetics modules by explaining how the extraction of a metal from its ore depends on the reactivity of the metal and using ionic equations for neutralisation reactions</p> <p><u>P2.6 Molecules and matter</u> In this module students review and build on their knowledge from the 9PM Matter module and introduces the concept of internal energy and specific latent heat alongside describing the relationships between gas pressure and temperature and gas pressure and volume.</p> <p><u>P2.7 Radioactivity</u> In this module students are introduced to nuclear radiation by describing the different types of nuclear radiation, calculating half-life and explaining the processes of nuclear fission and fusion.</p>	<p>Assessment 2</p> <p>Review and reteach</p>	
<p>Vocabulary Instruction</p>	<p>Specialised, mitochondria, eukaryote, prokaryote, mitosis, differentiate, Isotope, proton, ionisation, aqueous, residue, halogen, intermolecular, Dissipate, generation, efficiency, specific.</p>	<p>Delocalised, electrostatic, ionic, covalent.</p>		<p>Transpiration, cardiovascular, pulmonary, coronary, oxygenated, Potential difference, thermistor.</p>	<p>Pathogen, antigen, clinical, placebo Crystallisation Internal energy, latent, irradiation, contamination, radioactive.</p>		

Term	1	2		3		4	5	6				
Year 10	Mainstream <u>B2.6 Preventing and treating disease</u> In this module students evaluate the use of vaccinations, antibiotics and pain killers before describing how drugs are discovered and developed before use. <u>B2.7 Non-communicable diseases</u> In this module students review and build on their knowledge from the 9BB biological systems module by learning the explaining risk factors associated with different non communicable diseases. <u>C1.4 Chemical calculations</u> In this module students review and build on their knowledge from the C1.1 atomic structure and C1.2 periodic table modules by calculating atomic mass and relative formula mass, before going onto learn about moles. This module also reviews and builds on the 7CC chemical reactions module through titration experiments. <u>B2.8 Photosynthesis</u> In this module students review and build on their knowledge from the 9BP plants and B1.4 Organising plants and animals' modules by describing how plants use glucose and explaining limiting factors for photosynthesis. <u>B2.9 Respiration</u> In this module students review and build on their knowledge from the 9BB biological systems and B1.4 organising plants and animals' modules by comparing aerobic and anaerobic respiration		Teacher Assessment	<u>P2.4 Electric circuits</u> In this module students review and build on their knowledge from the 7PE energy and 8PE Electricity and magnetism modules by describing electrical fields and investigating the relationship between current, potential difference and resistance in different components. <u>P2.5 Electricity in the home</u> In this module students review and build on their knowledge from the 7PE energy and P2.4 electrical circuits by looking at electrical safety in the home and calculating electrical power and efficiency. <u>C2.5 Chemical changes</u> In this module students review and build on their knowledge from the 7CR chemical reactions, 9CR reactivity and 9CE Energetics modules by explaining how the extraction of a metal from its ore depends on the reactivity of the metal and using ionic equations for neutralisation reactions <u>C2.6 Chemical changes</u> In this module students review and build on their knowledge from the 9CR reactivity module and are introduced to electrolysis		Assessment 1	<u>C2.7 Energy changes</u> In this module students review and build on their knowledge from the 9CE energetics module and draw reaction profile diagrams and complete bond energy calculations <u>P2.6 Molecules and matter</u> In this module students review and build on their knowledge from the 9PM Matter module and introduces the concept of internal energy and specific latent heat alongside describing the relationships between gas pressure and temperature. <u>P2.7 Radioactivity</u> In this module students are introduced to nuclear radiation by describing the different types of nuclear radiation and calculating half-life. <u>B3.10 The human nervous system</u> In this module students are introduced to the principles of homeostasis and the nervous system. <u>B3.11 Hormonal co-ordination</u> In this module students build on their knowledge from B3.10 the nervous system by introducing the principles of hormonal control and its role in maintaining blood glucose levels and reproduction.		Assessment 2	<u>C3.8 Rates and equilibrium</u> In this module students review and build on their knowledge from the 9CE energetics module by investigating and explaining how different factors affect the rate of chemical reactions. <u>C3.9 Crude oils and fuels</u> In this module students review and build on their knowledge from the 7PE energy, 7CP particles and 9CE energetics modules by describing hydrocarbon fuels and how they are obtained from crude oil. <u>B4.13 Reproduction</u> In this module students review and build on their knowledge from the 7BR reproduction and 8BE ecological relationships modules by comparing sexual and asexual reproduction. The module goes on to extend students' knowledge by introducing genetics <u>B4.14 Variation and evolution</u> In this module students review and build on their knowledge from the 8BE ecological relationships module by describing the processes of evolution, selective breeding and genetic engineering. <u>B4.15 Genetics and evolution</u> In this module students review and build on their knowledge from the 8BE ecological relationships module by describing the evidence to support evolution and the way organisms are classified.		Review and reteach
Vocabulary Instruction	Clinical, placebo, metabolism.	Mesophyll.		Potential difference, thermistor, crystallisation, electrolysis, electrolyte.			Activation energy, internal energy, latent, irradiation, contamination, radioactive, reflex.			Anhydrous, meiosis, phenotype, genotype, dominant, recessive.	Evolution, extinction, antibiotic resistance, fossil.	
	Grammar Stream <u>B2.7 Non-communicable diseases</u> In this module students review and build on their knowledge from the 9BB biological systems module by learning the explaining risk factors associated with different non communicable diseases. <u>B2.8 Photosynthesis</u> In this module students review and build on their knowledge from the 9BP plants and B1.4 Organising plants and animals' modules by describing how plants use glucose and explaining limiting factors for photosynthesis. <u>C2.6 Chemical changes</u> In this module students review and build on their knowledge from the 9CR reactivity module and are introduced to electrolysis. <u>C2.7 Energy changes</u> In this module students review and build on their knowledge from the 9CE energetics module and draw reaction profile diagrams and complete bond energy calculations. This module then extends to look at fuel cells. <u>C3.8 Rates and equilibrium</u> In this module students review and build on their knowledge from the 9CE energetics module by investigating and explaining how different factors affect the rate of chemical reactions. <u>P3.8 Forces in balance</u> In this module students review and build on their knowledge from the 7PF forces and 9PF forces and motion modules by introducing vectors and resolving forces.			Teacher Assessment	<u>B2.9 Respiration</u> In this module students review and build on their knowledge from the 9BB biological systems and B1.4 organising plants and animals' modules by comparing aerobic and anaerobic respiration. <u>B3.10 The human nervous system</u> In this module students are introduced to the principles of homeostasis and the nervous system. This module then extends to study the brain and eye. <u>C3.9 Crude oils and fuels</u> In this module students review and build on their knowledge from the 7PE energy, 7CP particles and 9CE energetics modules by describing hydrocarbon fuels and how they are obtained from crude oil. <u>C3.10 Organic reactions</u> In this module students review and build on their knowledge from the C3.9 crude oils and fuels module by learning the foundations of organic chemistry. <u>P3.9 Motion</u> In this module students review and build on their knowledge from the 7PF forces and 9PF forces and motion modules by calculating velocity and acceleration and analysing motion graphs. <u>P3.10 Forces in motion</u> In this module students review and build on their knowledge from the 7PF forces, 9PF and P3.9 motion forces and motion by describing the effect of forces acting on a falling body, during braking and introducing the concept of momentum. This module then extends to study the conservation of momentum and car safety.		Assessment 1	<u>B3.11 Hormonal co-ordination</u> In this module students build on their knowledge from B3.10 the nervous system module by introducing the principles of hormonal control and its role in maintaining blood glucose levels and reproduction. This module then extends to look at hormonal control in plants. <u>C3.11 Polymers</u> In this module students review and build on their knowledge from the C3.9 crude oils and fuels module by describing polymerisation reactions. <u>C4.12 Chemical analysis</u> In this module students review and build on their knowledge from the 7CP module by describing methods used to analyse chemicals. <u>P3.11 Force and pressure</u> In this module students matter and module by explaining pressure on liquids and gases. <u>P4.12 Wave Properties</u> In this module students review and build on their knowledge from the 8PL Light and space and 9PS Sound modules by looking at the nature and behaviour of waves.		Assessment 2	<u>B3.12 Homeostasis in action</u> In this module students build on their knowledge from B3.10 the human nervous system and B3.11 hormonal co-ordination by describing the processes of temperature control and waste removal in the human body. <u>B4.13 Reproduction</u> In this module students review and build on their knowledge from the 7BR reproduction and 8BE ecological relationships modules by comparing sexual and asexual reproduction. The module goes on to extend students' knowledge by introducing genetics. <u>C4.13 The Earth's atmosphere</u> In this module students review and build on their knowledge from the 8CM Materials and the Earth module by explaining the change so in the composition of the Earth's atmosphere. <u>C4.14 The Earth's resources</u> In this module students review and build on their knowledge from the 8CM Materials and the Earth module by describing the processing methods of different resources obtained from the Earth. <u>P4.13 Electromagnetic waves</u> In this module students review and build on their knowledge from the 8PL Light and space module by describing the electromagnetic spectrum and its uses. <u>P4.14 Light</u> In this module students review and build on their knowledge from the P4.12 wave properties module by describing the behaviour of light in more detail and applying it to the use of lenses.	

Vocabulary Instruction	Metabolism, electrolysis, electrolyte, activation energy.	Mesophyll, anhydrous, displacement, velocity.	Reflex, momentum.	Suspension.	Formulation.	Meiosis, Phenotype, Genotype, Dominant, Recessive, Potable, Finite, Desalination, effluent, Sustainable, Generator/
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Term	1	2	3	4	5
Year 11	<p>Mainstream <u>B5.16 Adaptations, interdependence and competition</u> In this module students review and build on their knowledge from the 8BE ecological relationships module by describing the factors that affect survival in a habitat. <u>B5.17 Organising the ecosystem</u> In this module students review and build on their knowledge from the 8BE ecological relationships module by describing feeding relationships and material cycling in ecosystems. <u>B5.18 Biodiversity and ecosystems</u> In this module students build on their knowledge from B5.17 by analysing the impact of humans on the environment. <u>P3.10 Forces in motion</u> In this module students review and build on their knowledge from the 7PF forces, 9PF and P3.9 motion forces and motion by describing the effect of forces acting on a falling body, during braking and introducing the concept of momentum.</p> <p>Vocabulary Instruction Quadrat, colonisation, abundance, distribution, transect, displacement, velocity, momentum.</p> <p>Grammar <u>B4.14 Variation and evolution</u> In this module students review and build on their knowledge from the 8BE ecological relationships module by describing the processes of evolution, selective breeding, cloning and genetic engineering. <u>B4.15 Genetics and evolution</u> In this module students review and build on their knowledge from the 8BE ecological relationships module by describing the evidence to support evolution and the process of speciation before moving on to the way organisms are classified. <u>P4.15 Electromagnetism</u> In this module students review and build on their knowledge from the 8PE Electricity and magnetism module by describing the motor effect. <u>P4.16 Space</u> In this module students review and build on their knowledge from the 8PL Light and space module by describing the origin and future of the universe and the evidence supporting it.</p> <p>Vocabulary Instruction Evolution, extinction, antibiotic resistance, fossil, generator.</p>	<p>C4.12 <u>Chemical analysis</u> In this module students review and build on their knowledge from the 7CP module by describing methods used to analyse chemicals. C4.13 <u>The Earth's atmosphere</u> In this module students review and build on their knowledge from the 8CM Materials and the Earth module by explaining the change so in the composition of the Earth's atmosphere. C4.14 <u>The Earth's resources</u> In this module students review and build on their knowledge from the 8CM Materials and the Earth module by describing the processing methods of different resources obtained from the Earth. P4.12 <u>Wave Properties</u> In this module students review and build on their knowledge from the 8PL Light and space and 9PS Sound modules by describing the nature and behaviour of waves. P4.13 <u>Electromagnetic waves</u> In this module students review and build on their knowledge from the 8PL Light and space module by describing the electromagnetic spectrum and its uses. P4.15 <u>Electromagnetism</u> In this module students review and build on their knowledge from the 8PE Electricity and magnetism module by describing the motor effect.</p> <p>Suspension, formulation, potable, finite, desalination, effluent, sustainable, generator.</p> <p><i>Mock 1</i></p> <p><i>Mock 2</i></p> <p>B5.16 <u>Adaptations, interdependence and competition</u> In this module students review and build on their knowledge from the 8BE ecological relationships module by describing the factors that affect survival in a habitat. B5.17 <u>Organising the ecosystem</u> In this module students review and build on their knowledge from the 8BE ecological relationships module by describing feeding relationships and material cycling and decomposition in ecosystems. B5.18 <u>Biodiversity and ecosystems</u> In this module students build on their knowledge from B5.17 by analysing the impact of humans on the environment and the impact of food security. C4.15 <u>Using resources</u> In this module students build on their knowledge from C4.14 The Earth's resources by describing the production of ammonia via the Haber cycle.</p> <p>Quadrat, colonisation, abundance, distribution, transect.</p>	<p>Revision and past paper practice to embed knowledge and apply skills</p> <p><i>Mock 3</i></p>	<p>Revision and past paper practice to embed knowledge and apply skills</p>	

Term	1	2	2	3	3	4	4	5	6	6
Year 12	Applied Science Cambridge Technical Science Fundamentals	Science Fundamentals	Laboratory Techniques	Laboratory Techniques	Control of hazards in the laboratory					
	Biology A Level Biological molecules Cell structure PAG 1 Microscopy	Biological molecules continued PAG 6 Chromatography PAG 9 tests for biological molecules Cell membranes PAG 8 Membranes	Enzymes PAG 4 Enzymes Nucleic acids Exchange surfaces	Animal transport PAG 2 Dissection PAG 11 Exercise and pulse rate Cell division, diversity & organisation Biodiversity Plant transport PAG 5 Potometer	Biodiversity continued Communicable diseases Classification & evolution Communication & homeostasis Cellular control					
	Chemistry A Level Atomic structure Bonding Periodicity	Amount of substance Introduction to organic chemistry Alkanes	Redox reactions Haloalkanes Group 2 elements Group 7 elements Alkenes	Energetics Alcohols Organic analysis	Kinetics Equilibria Equilibria & K _p Rate equations Revision & practical skills					
	Physics A Level Measurements and errors Particles and radiation	Waves Required practical 1 Required practical 2 Required practical 3	Mechanics and materials Required practical 4	Electricity Required practical 5 Required practical 6	Further mechanics Required practical 7 Gases Required practical 8 Nuclear					
	Assessment 1 Review and reteach	Assessment 2 Review and reteach	Assessment 3 Review and reteach	Assessment 4 Review and reteach	Assessment 5 Review and reteach					

Term	1	2	3	4	5
Year 13	Applied Science Cambridge Technical Microbiology	Microbiology	Product Testing	Product Testing	Revision and past paper practice to embed knowledge and apply skills
	Biology A Level Excretion Patterns of inheritance Nerves	Hormones Manipulating genomes Plant & animal responses Cloning and biotechnology PAG 7 Microbiology	Photosynthesis PAG 12 Photosynthesis Ecosystems Populations and sustainability	Respiration Revision	
	Chemistry A Level Equilibrium constant K _p Aromatic chemistry Rate equations Amines Aldehydes and ketones Elements Isomerism	Acids and bases Carboxylic acids & derivatives Thermodynamics Polymers	Electrochemistry Amino acids, proteins & DNA Spectroscopy	Transition metals Chromatography Reactions of ions in aqueous solutions Organic synthesis	
	Physics A Level Nuclear Further mechanics Required practical 7	Fields Required practical 9 Required practical 10 Required practical 11	Astrophysics Revision	Revision	
	Mock 1	Mock 2	Mock 3	Mock 4	

Impact

Exam results show an increase in attainment over the past three years and consistent outstanding progress in science GCSE's. GCSE results also show that all groups of learners are making positive progress (All 0.8, Boys 0.9, Girls 0.7, Pupil premium 0.6, SEN 0.7, EAL 1.9, Low ability 1.3, Mid ability 0.8, High ability 0.5).

Our curriculum regularly monitors and progress and addresses any misconceptions using pre (cold task) and post (hot ask) module testing. At KS3 students also show progress through a set of key performance indicators (KPI). Students are teacher assessed on these KPI tasks and given feedback to address any misconceptions. At KS4 students are given tasks to improve their knowledge of a module after the hot task, also teachers provide whole class feedback after a hot task and re-teach any class misconceptions.

All students continue with science from KS3 to KS4 and the number of students choosing to study at least one science subject at KS5 is increasing (13% to 20% from 2017-2019).