

Academic Year <u>Year 11</u>	Content and rationale. Unit title and brief outline of content.	Skills taught in each unit.	Assessment – how will the knowledge and skills be assessed?
Autumn A	 P12 Wave properties Properties of waves Reflection and refraction Sound and ultrasound Seismic waves P13 Electromagnetic waves EM spectrum – uses and dangers C12 Chemical analysis Pure substances and mixtures Chromatograms Tests for gas and ions C13 The Earth's atmosphere Greenhouse gases Climate change B14 Variation and evolution Evolution and natural selection Selective breeding Cloning and ethics B15 genetics and evolution Evolution and specialisation Fossils and extinction 	Science has a spiral curriculum for scientific skills. All of the skills taught in Year 7-9 are delivered each half term in Year 11 with an increased focus on application of skills to an unfamiliar context. Science practical investigation skills. Using scientific equipment to build evidence towards a conclusion. Converting data to different formats – manipulating raw data to create an appropriate graph. Understand how scientific methods and theories develop over time. Appreciate the power and limitations of science and consider any ethical issues which may arise. Use scientific theories and explanations to develop hypotheses. Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena. Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. Make and record observations and measurements using a range of apparatus and methods. Use scientific vocabulary, terminology and definitions. Evaluate the accuracy, reliability & validity of data. Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts. Recognise the importance of peer review of results and of communicating results to a range of audiences. Evaluate methods and	Each science is assessed half termly using GCSE questions, meaning that each student will sit 3x45 minute assessments for each of the Sciences studied that half term. As the terms progress, each subject will add more questions from previously taught content to ensure that the students retain a body of knowledge. Lessons and homework will be tailored to facilitate the interleaving of previous work. The assessments will carry the same weighting of content, science as the real GCSEs. Though the grade boundaries will be similar to the GCSEs, grades will be capped at a 6 if the students do not achieve high marks in the level 7 and above style guestions
	 Antibiotic resistant bacteria 		



	classification	the importance of scientific quantities and understand how they are	will be indicated as such on the
Autumn B	Mock preparation	determined. Evaluate risks both in practical science and the wider cov	cover of the assessment paper.
	Mock Preparation	societal context, including perception of risk in relation to data and	
		consequences. Evaluate the accuracy, precision, reproducibility,	
	B15 Genetics and evolution (finish)	reliability & validity of data and experimental technique of others.	
	Mock preparation	Apply mathematical principles to evaluate unfamiliar investigations.	
Spring A	P14 Light	Explain everyday and technological applications of science; evaluate	
	reflection refraction	associated personal, social, economic and environmental implications;	ns; ent. sure km.
	• colour	and make decisions based on the evaluation of evidence and	
	lenses	arguments. Apply a knowledge of a range of techniques, instruments,	
	P15 Electromagnetism	apparatus, and materials to select those appropriate to the experiment. Recognise when to apply a knowledge of sampling techniques to ensure	
	 magnetic fields 	any samples collected are representative. Use SI units (eg kg, g, mg; km,	
	 electromagnets 	m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate.	
	the motor effect	Use prefixes and powers of ten for orders of magnitude (eg tera, giga,	
	• the generator effect	mega, kilo, centi, milli, micro and nano), interconvert units and use an	
	transformers	appropriate number of significant figures in calculation.	
	C14 The Farth's resources		
	finite and renewable resources		
	water treatment		
	extracting metals		
	recycling		
	C15 Using our resources		
	rusting		
	 alloys, polymers, ceramics and 		
	composites		
	haber process		
	B16 Adaptations, interdependence and		
	competition		
	competition, adaptation in animals		
	and plants		
	B17 Organising an ecosystem		



Spring B	 feeding relationships materials cycling carbon cycle P16 Space solar system evolution of stars the expanding universe B18 Biodiversity in ecosystems population pollution biodiversity biodiversity biomass transfer sustainability 		
Summer term: End of KS readiness for the 6 th form	Key Knowledge studied at KS4 that will be useful for the 6 th form	Summary of the main core skills taught at KS4 that can be reactivated at KS5	

Key Stage 2 content summary; Scientific enquiry principles. Plant biology, forces and magnets, rocks, Light, living things and their habitat, animals (inc. humans), states of matter, sound, electricity, properties and change of materials, Earth and space, evolution and inheritance.



science. Without teaching these units, students would not have the basic knowledge to build upon over time. Working scientifically, Cells, Particles and their behaviour, Forces, Structure of the body system, Elements, atoms and compounds, Reactions, Sound, Reproduction, Chemical reactions, Acids and Alkalis, Light, Space. Year 8 Content These units build upon the foundations of science and deliver the key principles that can then be layered upon with more complexity in the next key stage. Health and Lifestyle, The periodic table, Electricity and magnetism, Ecosystems, Separating techniques, Energy, Adpatation and inheritance, Metals and Acids, Motion and Pressure, The Earth. Year 8 Ontent These units map out the start of GCSE and understanding of the science. Cell Structure and transport, Conservation and dissipation of energy, Energy transfer by heating, Cell Division, Organisation and the digestive system, Atomic Structure, The periodic table, Structure and Bonding, Organising animals and plants, Energy resources, Electri- chemical calculations, Preventing and treating disease, Chemical changes.	Year 7 Content These units form the foundations of	Skills taught. Are the skills taught in a spiral curriculum? What is the rationale for your sequencing of skills
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Bioenergetics, Homeostasis and response, Inheritance, variation and evolution, Ecology, Quantitative chemistry, Chemical changes, Energy changes, The rate and extent of chemical change, Organic chemistry, Chemical analysis, Chemistry of the atmosphere, Using resources, Particle model of matter, Atomic structure, Electrolysis, Forces, Waves, Magnetism and electromagnetism.	Recognise when to apply a knowledge of sampling techniques to ensure any samples collected are representative. Use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate. Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano), interconvert units and use an appropriate number of significant figures in calculation. Year 10 & 11 focus on all of the skills with a stronger emphasis on application of scientific techniques.	
Veer 11 Centent	Diagona balaw far aposific mathe skills required in Year 0.11	
Is all of the NC Ks3 content taught in Year 7 & 8? If not, where is this made up? The NC Ks3 content is delivered in Year 7-8 in Science, with students moving to Double and Triple science classes in Year 10. In Year 9, students start the GCSE course, building on the skills and content from Year 7 and 8.		
Science asks questions and finds the answers using scientific techniques. We the challenge the reliability of any		
conclusions made. Using this, we lift the veil on how the world around our students, from their phones to their heart, really works.		
Science is the application of earned knowledge for the empowerment of our students.		
Students will use practical or research methods to investigate a question or observed phenomena and then critically evaluate the conclusions made and get		
a clearer understanding of the science underpinning the question. Question $ ightarrow$ investigate $ ightarrow$ evaluate $ ightarrow$ understand $ ightarrow$ Apply.		



Maths skill requirements in Year 9, 10 and 11

1 Arithmetic and numerical computation

a Recognise and use expressions in decimal form b Recognise and use expressions in standard form c Use ratios, fractions and percentages d Make estimates of the results of simple calculations

2 Handling data

a Use an appropriate number of significant figures b Find arithmetic means c Construct and interpret frequency tables and diagrams, bar charts and histograms d Understand the principles of sampling as applied to scientific data (biology only) e Understand simple probability (biology only) f Understand the terms mean, mode and median g Use a scatter diagram to identify a correlation between two variables (biology and physics only) h Make order of magnitude calculations

3 Algebra

a Understand and use the symbols: =, <, <<, >>, >, \propto , \sim b Change the subject of an equation c Substitute numerical values into algebraic equations using appropriate units for physical quantities (chemistry and physics only) d Solve simple algebraic equations (biology and physics only)

4 Graphs

a Translate information between graphical and numeric form b Understand that y = mx + c represents a linear relationship c Plot two variables from experimental or other data d Determine the slope and intercept of a linear graph e Draw and use the slope of a tangent to a curve as a measure of rate of change (chemistry and physics only) f Understand the physical significance of area between a curve and the x-axis and measure it by counting squares as appropriate (physics only)

5 Geometry and trigonometry

a Use angular measures in degrees (physics only) b Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects (chemistry and physics only) c Calculate areas of triangles and rectangles, surface areas and volumes of cubes

Serviam; Developing our gifts and talents for the good of others.

