

SCIENCE CURRICULUM MAP

Intent: The science curriculum aims to develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics. Developing an understanding of the nature, processes and methods of science through different modes of inquiry helps students to answer scientific questions about the world around them. The core of the science curriculum deals with science in our everyday lives. We aim for our students to see science all around them, and to utilise these knowledge and skills in ways that enhance their destinations and outcomes. With rigorous cross-curricular links to the STEM disciplines, our curriculum also aims to develop students into well-rounded scientific professionals who demonstrate the core ALET values of empowerment, enterprise, connectedness and transformation, so that they may apply, extend and create new paradigms in the future.

Year/Term	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Year 12 (AS Physics)	<ul style="list-style-type: none"> • Maths for Physics AS (transition material) • Matter and radiation • Particles & antiparticles • Forces in equilibrium • Vectors and scalars 	<ul style="list-style-type: none"> • Quarks & Leptons • Quantum phenomena (photoelectric effect, line spectra) • Wave-particle duality • Moments and turning forces • Statics calculations • Motion graphs • Newton's laws of motion 	<ul style="list-style-type: none"> • Projectile motion • Waves and optics • Wave properties • Stationary and progressive waves • Work, energy and power calculations • Kinetic energy and potential energy 	<ul style="list-style-type: none"> • Terminal speed • Vehicle safety • Momentum and impulse • Impact forces • Elastic & inelastic collisions • Reflection & refraction • Interference & diffraction (single slit, double slit) 	<ul style="list-style-type: none"> • Deformation of solids • Stress, strain and Young's modulus of materials • Electric current and circuit rules • Resistance and resistivity • EMF and the potential divider circuit 	<ul style="list-style-type: none"> • Revision and consolidation of prior content (Paper 1) • Preparation for AS exams • Uniform circular motion • Centripetal forces and their applications • Oscillating systems and simple harmonic motion

Year 13 (A2 Physics)	<ul style="list-style-type: none"> • Uniform circular motion • Centripetal forces and their applications • Oscillating systems and simple harmonic motion • Thermal Physics & Ideal Gas Laws • Kinetic theory of gases 	<ul style="list-style-type: none"> • Gravitational field strength and potential • Planetary fields and satellite motion • Electric field strength and potential • Coulomb's law and its application on moving charges 	<ul style="list-style-type: none"> • Capacitance • Charging and discharging capacitors • Magnetic fields due to moving charges • Electromagnetic Induction and AC current generation • Transformers 	<ul style="list-style-type: none"> • Astrophysics • Stellar classification • Types of telescope • Stellar magnitude and HR diagram • Redshift and Hubble's law Revision and consolidation of prior content (paper 1 and 2)	<ul style="list-style-type: none"> • Nuclear Physics & radioactivity • Alpha, beta and gamma radiation • Uses and dangers of radioactivity • Nuclear binding energy and energy-mass equivalence • Nuclear fusion and fission in reactors 	Final A2 Physics Exams
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Impact:

Measuring the impact of our curriculum is vital to the department and we strive to get more students transitioning on to A level science courses, thus boosting the school's pupil retention.

KS4 and KS5 students will be given marked assessments at the end of a topic; tests using exam questions or extended pieces of writing will be utilised to provide a clear idea of student progression. Students will be expected to answer exam questions using appropriate key scientific terminology, as well as by using appropriate mathematical skills (such as rearranging formula, drawing lines of best fit and calculating gradients). Extended pieces of writing will have a clearly defined success criteria that students would follow. Data for each assessment will be added to a tracker that the HoD can monitor to check the progress of classes or individual students. Analysis of assessment and mock data will help teachers decide which topics may need to be re-taught; teachers will make a decision on whether to teach topics again that students have performed badly on or challenge students by looking at topics from a different perspective (cross-linking across different subjects). The HoD will consult with teachers from other departments (such as Maths & Engineering) to compare student attainment in similar curriculum areas (for example, elastic forces are taught in Engineering, and algebraic manipulation is a key element in Maths). Data will also be used to make changes to class sets: those students that consistently perform well in assessments and KPI activities will be able to move up to a higher set where the work is more challenging.

The Science department will ensure that all key practical activities are carried out in thorough and comprehensive fashion, allowing students to develop their experimental skills, whilst continually linking theory to experimentation. Both KS4 and KS5 students will have separate practical lab books which they will maintain alongside their regular class work, and they will use these to hone their empirical skills. At KS4, teachers will set homework activities based on their class practical, and students will need to demonstrate knowledge and understanding of key words, formulas, calculations and data collection. At KS5, students will be provided with full documentation of their CPAC requirements per practical, and will be required to show proficiency in handling high-grade equipment like lasers and radioactive sources.

Extra curricular clubs and enrichment will tie in neatly to the curriculum. We will continue to provide our students with intervention and booster sessions, whilst also offering our students STEM opportunities that highlight the overlap in Science, Technology and Engineering. Year 10 students will also be offered a general science club that focuses on the KS4 curriculum and links the learning of information to fun, interactive science experiments.