



## **Curriculum Overview – Physics**

Building on the curriculum of Lower School Science, Year 9 focuses on the fundamental topics of Physics that will underlie all the other topics studied at GCSE – Forces, Energy and Motion. These are taught with explicit links made to the mathematical skills required for success in Physics such as algebraic manipulation, graphing skills and direct proportionality. During the year pupils are introduced to the basics of problem solving in physics and emphasis is put on the importance of resilience in problem solving and the advantages of adopting disciplined methodologies.

Physics in Years 10 and 11 uses the knowledge and skills acquired in Y9 to explore more complex topics such as Waves, Nuclear Physics and Electromagnetism. All the topics are supported with practical work which allows pupils to explore the scientific method and the validity of experimental work. Pupils are encouraged and supported to make the move from a concrete model of thinking to an abstract one, where they can take physical ideas and concepts learned in one topic and apply them to a range of novel topics. The knowledge base accrued in previous years and skills learned allows pupils to progress on to higher order skills such as synthesis where they are encouraged to make connections between topics in Physics, and more widely between topics in Chemistry, Physics, Computer Science, Maths and indeed the whole of the curriculum.

Pupils are encouraged to frame the experiences of everyday life in scientific terms. We aim to develop critical thinking skills in our pupils so that they can make informed choices and judgements about the data they are exposed to in the modern world, particularly so that they can identify 'bad science' and mitigate against its promulgation.

Physics at Key Stage 4 has much to do with extending the breadth of pupils' Physics knowledge; Physics at Key Stage 5 concentrates on establishing depth. Topics first encountered at GCSE are extended and more rigorous mathematical models are established, again moving pupils from concrete to abstract thought. Physics is studied from the very small scale to the very big. Year 12 starts with an introduction to particle physics where pupils are introduced to a new and baffling way of interpreting the world, forcing them to confront the idea that there may not be a unique way of interpreting phenomena. At the other end of the scale cosmology is included in the Astrophysics topic and pupils must now consider in a more philosophical way whether there are explanations for everything, and even if there were, could they ever be found.

The Key Stage 5 curriculum is enhanced by an abundance of practical work, trips and opportunities for pupils to extend their work beyond the curriculum. This allows pupils to make informed decisions about their next moves, whether it be one of the many engineering disciplines, medicine, architecture mathematics or pure and applied physics.

We support pupils to achieve their goals of attending top Russel Group universities, including many applying to Oxford and Cambridge as well as those choosing apprenticeship routes. We have an excellent success rate in the Physics Olympiad competition with pupils regularly reaching the selection round and one previous pupil winning a silver medal with the British Physics Olympiad team.

### Key Stage 3

Year 7	Year 8	Year 9
		Forces and energy
		Energy and efficiency
		Static electricity, electric fields and an introduction to current electricity
		Speed and acceleration
		Density, Pressure and changes of state

## Key Stage 4 – GCSE Exam Board: AQA

Year 10	Year 11
Forces and acceleration	Electricity
Particle model of matter	Moments, levers and gears
Waves	Forces and momentum
Atomic structure	Electromagnetism
	Space

## Key Stage 5 – A Level/Pre U Exam Board: AQA

Year 12	Year 13
Particle physics	Simple harmonic motion
Introduction to quantum mechanics	Thermal physics
Waves	Gravitational fields
Forces	Electric fields and capacitance
Materials	Electromagnetism
Electricity	Radioactivity and nuclear physics
Circular motion	Astrophysics
Practical skills	Practical skills