The Hart School - Faculty of Science
A Level Physics (Year 12 and 13) Curriculum Overview

Curriculum Intent: Science encompasses everything that we are and allows us to make sense of the world around us. Science at The Hart School is more than just a core subject. We believe an outstanding science education should develop students' curiosity and scientific knowledge to question the world in which we live, enable critical-thinking and encourage students to become socially aware global citizens.

Our Science faculty has planned an inspiring, inclusive, and diverse curriculum that is designed to engage and enthuse students with the real-life applications of the subject whilst promoting ambition and aspirations for their future.

In an ever-changing world, in which STEAM subjects are at the forefront of advancements for the future, we want to prepare our students for this by not only looking at the knowledge of the subject, but also the methods, processing skills and applications associated with it. This ensures that our students are scientifically literate, able to evaluate what they see in the news and the world around them and make informed decisions that will affect their future lives and the planet.

Useful Links:

Specification: AQA A Level Physics	Past Exam Papers & Mark Schemes
Practise Exam Questions	Revision Notes

Yr12	Topic	Knowledge Overview	Topic	Knowledge Overview
Autumn	**3.1 Measurements and their Errors**	Content in this section is a continuing study for a student of physics. A working knowledge of the specified fundamental (base) units of measurement is vital. Likewise, practical work in the subject needs to be underpinned by an awareness of the nature of measurement errors and of their numerical treatment. The ability to carry through reasonable estimations is a skill that is required throughout the course and beyond.	**3.2.1 Particles**	This section introduces students both to the fundamental properties of matter, electromagnetic radiation and quantum phenomena. Teachers may wish to begin with this topic to provide a new interest and knowledge dimension beyond GCSE. Through a study of these topics, students become aware of the way ideas develop and evolve in physics. They will appreciate the importance of international collaboration in the development of new experiments and theories in this area of fundamental research.
	3.3.1 Progressive and Stationary Waves	GCSE studies of wave phenomena are extended through a development of knowledge of the characteristics, properties, and applications of travelling waves and stationary waves. Topics treated include refraction, diffraction, superposition and interference.	**3.2.2 EM Radiation and Quantum Phenomena**	
	3.3.2 Refraction, Diffraction and Interference			
Spring	**3.5.1 Current Electricity**	This section builds on and develops earlier study of these phenomena from GCSE. It provides opportunities for the development of practical skills at an early stage in the course and lays the groundwork for later study of the many electrical applications that are important to society.	**3.4.1 Force, Energy and Momentum**	Vectors and their treatment are introduced followed by development of the student's knowledge and understanding of forces, energy and momentum. The section continues with a study of materials considered in terms of their bulk properties and tensile strength. As with earlier topics, this section and also the following section Electricity would provide a good starting point for students who prefer to begin by consolidating work.
Summer			**3.4.3 Materials**	

Yr13	Topic	Knowledge Overview	Topic	Knowledge Overview
Autumn	**3.7.1 Fields**	The concept of field is one of the great unifying ideas in physics. The ideas of gravitation, electrostatics and magnetic field theory are developed within the topic to emphasise this unification. Many ideas from mechanics and electricity from earlier in the course support this and are further developed. Practical applications considered include: planetary and satellite orbits, capacitance and capacitors, their charge and discharge through resistors, and electromagnetic induction. These topics have considerable impact on modern society.	**3.6.1 Periodic motion**	The earlier study of mechanics is further advanced through a consideration of circular motion and simple harmonic motion (the harmonic oscillator). A further section allows the thermal properties of materials, the properties and nature of ideal gases, and the molecular kinetic theory to be studied in depth.
	3.7.2 Gravitational fields		**3.6.2 Thermal physics**	
	3.7.3 Electric fields			
	3.7.4 Capacitance			
	3.7.5 Magnetic fields			
Spring	**3.9 Astrophysics (Option A)**	Fundamental physical principles are applied to the study and interpretation of the Universe. Students gain deeper insight into the behaviour of objects at great distances from Earth and discover the ways in which information from these objects can be gathered. The underlying physical principles of the devices used are covered and some indication is given of the new information gained by the use of radio astronomy. The discovery of exoplanets is an example of the way in which new information is gained by astronomers.	**3.8.1 Radioactivity**	This section builds on the work of Particles and radiation to link the properties of the nucleus to the production of nuclear power through the characteristics of the nucleus, the properties of unstable nuclei, and the link between energy and mass. Students should become aware of the physics that underpins nuclear energy production and also of the impact that it can have on society.