Thomas Mills
High School & Sixth Form

GCSE Physics Curriculum Intent Statement
At Thomas Mills High School, our GCSE Physics curriculum is designed to provide all pupils with a deep understanding of key physical principles, equipping them with the knowledge, skills, and confidence to explain the world around them. Following the OCR A specification, our curriculum builds upon prior learning, ensuring pupils develop scientific literacy and the ability to apply physics to real-world contexts.

Our intent is to:

Develop Scientific Knowledge and Understanding: We aim to ensure that pupils gain a thorough understanding of core physics topics, including forces, energy, waves, electricity, radioactivity, and space. These concepts are taught progressively, allowing pupils to make connections between topics and apply their knowledge to new and unfamiliar situations.

Enhance Mathematical, Problem-Solving, and Practical Skills: The study of Physics at GCSE level requires strong mathematical skills, including algebra, ratio, and graph work. We explicitly develop these skills alongside problem-solving strategies, enabling pupils to approach physics questions logically and systematically. Through required practicals and hands-on investigations, pupils refine their ability to design experiments, collect accurate data, and analyse results critically.

Prepare for A-Level and Beyond: Our curriculum ensures that pupils are well-prepared for further study in Physics and related disciplines, including engineering and other STEM fields. By emphasising the relevance of physics in modern technology and industry, we inspire pupils to appreciate its significance in shaping the future. Our focus on analytical thinking and scientific inquiry equips pupils with transferable skills that benefit them in further education and beyond.

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Year 10 Unit	Topic	Knowledge and Skills	Useful Links
1	**P3: Electricity**	**Knowledge and Understanding** Pupils will study electrical circuits, including series and parallel circuit arrangements, and understand key quantities such as current, potential difference (voltage), and resistance. Ohm's Law will be explored, showing the relationship between these variables and how to calculate resistance in circuits. Pupils will learn about power and energy transfers in electrical appliances, as well as the role of fuses, circuit breakers, and earthing for electrical safety. The study of static electricity will introduce concepts such as charge, electric fields, and electrostatic forces. **Skills Development** Pupils will develop circuit-building skills by constructing and analysing electrical circuits using ammeters, voltmeters, and variable resistors. They will improve their ability to interpret circuit diagrams, measure electrical quantities, and apply mathematical formulas. They will also enhance their practical skills by investigating resistance in different components, such as wires and resistors, and understanding energy dissipation in electrical systems.	Unit: Electric fields and circuit calculations | KS4 Physics | Oak National Academy Unit: Circuit components | KS4 Physics | Oak National Academy Electrical circuits and electromagnetism - GCSE Physics (Single Science) - BBC Bitesize
Assessments		**Standardised assessments:** Topic Summary Check Lists – Pupils use these to review progress and self-reflect on content taught. Online Homework Tasks – Pupils have their own online account with EDUCAKE, and online learning platform. End of Unit Test – Formal, in class, exam style assessment on content covered in this unit.	
2	**P4: Magnetism**	**Knowledge and Understanding**	Unit: Electromagnetism | KS4 Physics | Oak National Academy

		Pupils will explore magnetic fields, electromagnetism, and how electric currents produce magnetic effects. They will study the motor effect and how it applies to electric motors and loudspeakers. Electromagnetic induction will be introduced, covering how transformers work and the generation of electricity in power stations. **Skills Development** Pupils will develop experimental skills through investigations of magnetic fields using compasses and iron filings. They will improve their ability to apply the right-hand rule to determine current direction and learn how to manipulate variables to understand the factors affecting induced voltage.	Electrical circuits and electromagnetism - GCSE Physics (Single Science) - BBC Bitesize
Assessments		**Standardised assessments:** Topic Summary Check Lists – Pupils use these to review progress and self-reflect on content taught. Online Homework Tasks – Pupils have their own online account with EDUCAKE, and online learning platform. End of Unit Test – Formal, in class, exam style assessment on content covered in this unit.	
3	**P5: Waves**	**Knowledge and Understanding** Pupils will study the properties of transverse and longitudinal waves, including frequency, wavelength, amplitude, and wave speed. They will explore sound waves, electromagnetic waves, and applications such as ultrasound and radio waves. Reflection, refraction, and diffraction will be covered, along with the dangers and uses of different parts of the electromagnetic spectrum. **Skills Development** Pupils will develop experimental techniques to measure wave speed, frequency, and wavelength. They will apply mathematical equations to wave calculations and analyse wave behaviours using ray diagrams.	Unit: Measuring waves | KS4 Physics | Oak National Academy Unit: Electromagnetic waves | KS4 Physics | Oak National Academy Waves - GCSE Physics (Single Science) - BBC Bitesize

Assessments		**Standardised assessments:** Topic Summary Check Lists – Pupils use these to review progress and self-reflect on content taught. Online Homework Tasks – Pupils have their own online account with EDUCAKE, and online learning platform. End of Unit Test – Formal, in class, exam style assessment on content covered in this unit.	
4	**P6: Radioactivity**	**Knowledge and Understanding** Pupils will learn about atomic structure, radioactive decay, half-life, and the different types of radiation (alpha, beta, gamma). They will explore nuclear fission and fusion, as well as the uses and dangers of radiation. **Skills Development** Pupils will interpret radioactive decay graphs, understand the principles of nuclear equations, and evaluate the risks and benefits of using nuclear energy.	Unit: Nuclear physics | KS4 Physics | Oak National Academy Nuclear, electromagnetic and infrared radiation - GCSE Physics (Single Science) - BBC Bitesize
Assessments		**Standardised assessments:** Topic Summary Check Lists – Pupils use these to review progress and self-reflect on content taught. Online Homework Tasks – Pupils have their own online account with EDUCAKE, and online learning platform. End of Unit Test – Formal, in class, exam style assessment on content covered in this unit.	