Physics Curriculum Intent

Department Physics: Our overarching aim in Physics is to develop well-rounded Physicists who can not only explain complex Physics ideas but are also confident in using mathematical skills to solve intricate physics problems. Furthermore, we aim to foster their ability to apply these ideas to investigate the world around them, both theoretically and practically. Throughout the curriculum, students are provided with opportunities to develop practical and investigative skills. Our curriculum strives to challenge all students and equipment them either for future scientific and engineering studies or apply their problem-solving skills to any career they choose.

By the end of Key Stage 4 our students will know:	By the end of Key Stage 5 our students will know:
1. *How to use mathematics effectively in Physics, including manipulating equations and drawing vectors diagrams.* 2. *How to use basic SI units correctly, including conversions & the selection of the correct number of significant figures to report an answer to.* 3. *How to follow a method to collect valid data, and then communicate this using graphs and mathematical processes.* 4. *How to explain physical processes logically and clearly, using the correct scientific vocabulary.* 5. *How to describe and analyse motion using equations and graph.* 6. *The basic properties of all waves, how these can be applied to sound and light and how to draw and analyse optical ray diagrams.* 7. *The key properties & uses of the electromagnetic spectrum and the role of electromagnetic radiation in global warming.* 8. *The basic principles behind radioactivity (including statistical approaches to describing them mathematically) and some uses and dangers of radioactive materials.* 9. *The evolution of stars and the Universe, and the role that evidence has to play in the construction/disproving of theories in Physics* 10. *How forces affect the world around us, including an understanding of Newton's three laws of motion, momentum conservation and the principle of moments.* 11. *The principle of the conservation of energy and how energy transfers in closed systems can be described both verbally and mathematically.* 12. *The particle model of matter, including an understanding of spring behaviour, density, kinetic theory and state changes.* 13. *How pressure can be calculated and changed in solids, liquids and gases.* 14. *How current, voltage and resistance varies for basic components in series and parallel circuits.* **15.** *The basic principles behind static electricity, magnetism and electromagnetic induction, and how these can be applied to real-life through motors, generators & transformers.*	1. *How to describe forces and motion mathematically through the application of mechanics.* 2. *Kirchhoff's laws and how these can be applied to all electric circuits.* 3. *Material behaviours for fluids and solids.* 4. *The basics of wave phenomena and how these are integral to wave-particle duality.* 5. *The underlying principles of electric, gravitational and magnetic fields.* 6. *The similarities and differences between circular motion and simple harmonic motion.* 7. *The structure of the atom including the standard model and the particle detection methods used to discover this.* 8. *The exponential nature of decay in radioactive materials and capacitors.* 9. *The basic principles of thermodynamics and kinetic theory.* 10. *Introductory ideas in astrophysics and cosmology.* 11. *How to manipulate equations and convert units, which will allow them to solve complex multi-step problem.* 12. *The SI system and Physics conventions, including how to present data correctly in tables and graphs and how to present solutions and derivations clearly.* 13. *How to design, carry out, analyse and evaluate experiments and investigations* 14. *How to determine constants & relationships through graphical methods and assess the accuracy of their results* 15. *How to logically apply their knowledge to unfamiliar situations, allowing them broaden their understanding of the wider reaching applications of Physics in the real world.*

At WHSG our curriculum intent is ambitious but always inclusive, composed of powerful knowledge and cultural capital, coherent and well-sequenced, and broad only specialising when necessary