Roundwood Park School

Physics A Level (AQA) Curriculum Map

Students study physics through a rich knowledge-based curriculum. They learn about fundamental physical concepts and how to apply these in everyday and technological settings. The course demonstrates the usefulness of the subject and illustrates the impact that discoveries in physics have had on the way people live. Practical skills are embedded within the specification and learners are expected to carry out practical work in preparation for a written examination that will specifically test these skills.

Aims and Learning Outcomes

The AQA physics specification aims to encourage learners to:

- develop essential knowledge and understanding of different areas of the subject and how they relate to each other
- develop and demonstrate a deep appreciation of the skills, knowledge and understanding of scientific methods
- develop competence and confidence in a variety of practical, mathematical and problem-solving skills
- develop their interest in and enthusiasm for the subject, including developing an interest in further study and careers associated with the subject
- understand how society makes decisions about scientific issues and how the sciences contribute to the success of the economy and society (as exemplified in 'How Science Works' (HSW)).

Assessment Objectives

The exams will measure how students have achieved the following assessment objectives:

AO1 Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures.

AO2 Apply knowledge and understanding of scientific ideas, processes, techniques and procedures:
• in a theoretical context
• in a practical context
• when handling qualitative data
• when handling quantitative data.

AO3 Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to: • make judgements and reach conclusions
• develop and refine practical design and procedures.

The order the curriculum is taught in has been refined over a number of years to build on content and understanding developed at KS4. After laying a solid foundation on fundamental analysis, students study the particle and radiation, and wave topics in parallel. Teacher 1 then focuses on the mechanics topic which overlaps strongly with the Maths A Level. In partnership with the maths department, we teach it first in physics, which has a brought based approach, ahead of students studying specific aspects in more depth in their Maths A Level. We believe this maximises the synergies between the two subjects. The vast majority of students studying physics also take maths. Additionally, the waves topics taught at the start of the course is engaging and give students an appreciation of the physical properties of everyday natural phenomena. Choosing to introduce the electricity topic later on allows students to reinforce the mathematical and data analysis skills already acquired to gain a deeper understanding. The summer term of Year 12 is used to teach circular motion and thermal physics, introducing Year 13 level of difficulty whilst remaining engaging and more accessible at a time when students may miss lessons for university visits and field work, but also to introduce the work on Fields which underpins much of the content taught in Year 13 and therefore provides an important foundation for the final year of study.

Super Curricular

In Year 12 we visit University of Cambridge Engineering Department (December) and invite alumni back to present their experiences of the university application process and discuss course choices (January). Students are also encouraged to participate in the British Physics Olympiads in both Years 12 and 13, as well as joining the Isaac physics mentoring scheme early in Year 12. Students are further encouraged to broaden their knowledge and interest in the subject via the whole school independent learning license tasks in Year 12.

In the summer holidays between Year 12 and 13, students are encouraged to participate in “Headstart” university taster courses run by The Engineering Development Trust.

A highlight of the course is the visit to CERN in Geneva, in Spring of Year 13. This provides great enrichment of students’ learning in relation to Electric and Magnetic Fields as well as the more obviously linked Particle Physics elements. The Year 13 delivery is structured so that students have sufficient prior knowledge to benefit fully from the trip.

Year 12 Course

Term	Teacher 1 3hrs / week	Teacher 2 2hrs / week	Assessment
Autumn 1	**Fundamental data analysis** **Particles and radiation**	**Waves**	**Baseline test to establish security of GCSE concepts (Mechanics and Electricity)** **Assessment: fundamental data analysis, early waves and particles**
Autumn 2	**Particles and radiation continued** **Mechanics**	**Waves continued**	**Assessment: Waves** **Assessment: particles and radiation** Pag 1: Investigation of stationary waves on a string Pag 2: Investigation of Young's double slit experiment and diffraction grating. Pag 3: Determination of *g* by a free-fall method
Spring 1	**Mechanics continued, materials**	**Electricity**	**Assessment: Mechanics and materials** Pag 4: Determination of the Young Modulus by a simple method Pag 5: Determination of the resistivity of a wire Pag 6: Investigation of emf and internal resistance
Spring 2	**Quantum (shared)**	**Quantum (shared)**	**Assessment: Electricity**
Summer	**Further mechanics** **Exam Skills**	**Research project** **Thermal physics**	Research Briefing **Assessment: End of Year Exams**

Year 13 Course

Term	Teacher 1 2hrs / week	Teacher 2 2hrs / week	Assessment / Practical Endorsement
Autumn 1	**Further mechanics**	**Thermal physics continued**	**Baseline Assessment (AS content + circular motion)** **Assessment: Further mechanics + mechanics**
Autumn 2	**Gravitational fields** **Electric fields**	**Nuclear physics**	PAG 8 Investigating Gases PAG 7: Investigating Simple Harmonic Motion **Assessment: Thermal physics and waves** **Mock Exams (all Year 12 content + further mechanics and thermal physics examined at full A2 level)**
Spring 1	**Electric fields continued** **Magnetic Fields**	**Nuclear physics continued** **Option B: Turning points**	PAG 9 Investigating Capacitors PAG 10: Force on a wire PAG 12: Investigating Ionising Radiation **Assessment: Nuclear physics + particles and radiation**
Spring 2	**Magnetic fields continued**	**Option B: Turning points**	PAG 11: Investigating flux linkage **Assessment: Fields and Electricity**
Summer	**Exam skills**	**Practical skills**	**Paper 3 Practice Assessment**