Roundwood Park School

KS4 Physics Curriculum Map

Our curriculum follows the AQA Separate science and AQA Combined Science routes. We are confident that this is a good specification for RPS as it embraces the practical skills necessary to help our scientists develop and prepare them for the next stage of their education and helps the students develop their Science Capital. Stark real- world issues such as dwindling supplies of fossil fuels and global warming are critical problems for this century, and we aim to develop a passion in students for first understanding, then ultimately helping to address these through developing a love of independent study and problem solving. This curriculum allows students to evaluate the alternatives and options for a sustainable future. This, together with the opportunity to explore the basics of forces, waves and electricity and a taste of space physics, gives the students valuable insights to the potential careers and cultural applications of the scientific ideas discussed in lessons. These help our students grow their Science Capital, especially in terms of how they can pursue their scientific journey beyond RPS. By offering the option to follow the Separate Science or the Combined Science route, alongside the options of HT or FT we can tailor the approach on the individual level and suit each learner's needs.

Building on the skills and concepts introduced at KS3 including the Year 9 transition year, the KS4 science curriculum refines the understanding of experimental design and consolidates the application of mathematical skills. We also embed the ASPIRE skills throughout the KS4 curriculum, making sure that every opportunity is taken to link the ideas covered on the specification to opportunities to develop both ASPIRE and WS skills. Our well-resourced laboratories allow students to apply their theoretical understanding to practical scenarios. The use of demos and experiments allows students to appreciate the importance of control variables and validity of their conclusions. This is supported by our Required Practical booklets that give students clear guidance on the methods, gives the students support materials for the skills and gives them an opportunity to understand how these skills are to be assessed in their final examinations.

In Physics, the curriculum is for the most part taught in the order of the AQA specification. The theme of Energy stores and transfers between these stores is explored in depth in the transition year to establish solid fundamental concepts and core mathematical skills, before being reviewed in full, including more challenging mathematical skills, at the beginning of year 10. From then on we follow the AQA specification. By teaching in such a logical structure, we can ensure that the specification is comprehensively covered and that pupils are clear about what topics are to be assessed in which exam paper.

Year / Term	Unit of Work	Assessment
Year 10 **Autumn Term**	**P1 Energy + P3 Particle model of matter review and completion** P1.1.1 Energy Stores and Systems P1.1.2 Changes in Energy P1.1.3 Energy Changes in systems/ 3.2.2 Temperature changes in a system- SHC P1.1.4 Power P1.2 Energy Transfers in a System P1.2.2 Efficiency P1.3 National and Global Energy Resources P3.1.1 Density of Materials P3.1.2 Changes of State P3.2.1 Internal Energy P3.2.3 Changes of Heat and Specific Latent Heat P3.3.1 Particle Motion in Gases P3.3.2 Pressure in gases (physics only) P3.3.3 Increasing the pressure of a gas (physics only) (HT only) **P2 Electricity** 2.5.1 Static charge (physics only) 2.5.2 Electric fields (physics only) 2.1.1 Standard circuit diagram symbols 2.1.2 Electrical charge and current 2.1.3 Current, resistance and potential difference 2.1.4 Resistors 2.2 Series and parallel circuits 2.3 Domestic uses and safety 2.3.1 Direct and alternating potential difference 2.3.2 Mains electricity 2.4 Energy transfers 2.4.1 Power 2.4.2 Energy transfers in everyday appliances 2.4.3 The National Grid	**P1 and P3 assessment (end of September)** **Required practical activity 2: Thermal conductivity (physics only)** **Required practical activity 4: Investigating electrical components** **Required practical activity 3: Investigating resistance** **P2 Assessment (December)**
Super Curricular	Find out how you could reduce the energy consumption in your house. Can you reduce your electricity and gas bills? Where does the UK's power come from? What is proportion of renewable v non-renewable energy? Read "Human Universe" by Brian Cox	

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Year 10 **Spring Term**	**P4 – Atomic Structure** P4.1.1 The structure of an atom P4.1.2 Mass number, atomic number and isotopes P4.1.3 The development of the model of the atom P4.2.1 Radioactive decay and nuclear radiation 4.2.2 Nuclear Equations 4.2.3 Half Lives 4.2.4 Radioactive contamination 4.3.1 Background Radiation (physics only) 4.3.2 Different Half lives (physics only) 4.3.3 Uses of Nuclear Radiation (physics only) 4.4.1 Nuclear Fission (physics only) 4.4.2 Nuclear Fusion (physics only) **P5 - Forces** 5.1.1 Scalar and vector quantities 5.1.2 Contact and non-contact forces 5.1.3 Gravity 5.1.4 Resultant forces 5.2 Work done and energy transfer 5.3 Forces and elasticity – Intro 5.3 Forces and elasticity - EPE 5.4 Moments, levers and gears (physics only)	**P4 Assessment (February)** **Required Practical 6: Forces and Elasticity** **P5 mid topic Assessment (April)**
Super Curricular	Live off grid for 24hrs! Can you survive without using shops, electricity or the internet for a day? Find out what are the alternatives to using fossil fuels. Is there a realistic alternative to meet our energy demands? Research an element with several radioactive isotopes; make a poster to include their different half-lives and medical (or other) uses	

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Year 10 **Summer Term**	**P5 Forces (continued)** 5.5 Pressure (Physics only) 3.2.3 / 3.3.3 Increasing pressure in a gas 5.5.1.1 Pressure in a fluid 1 – floating and sinking 5.5.1.2 Pressure in a fluid 2 (HT only) pressure in a column of fluid 5.5.2 Atmospheric pressure 5.6.1.1 and 2 describing motion along a line, Speed 5.6.1.1-4 Motion, Speed Velocity, Distance-Time 1 Distance Speed Time Calculations x2 5.6.1.1-4 Motion, Speed Velocity, Distance-Time – speed, velocity acceleration practical 5.6.1.5 Acceleration – graphs and calculations x2 5.6.1.5 Acceleration – follow up F=ma practical 5.6.2.1,2,3 Newton's Laws (& Terminal Velocity) 5.6.3.1-4 Stopping distance, reaction time and braking distance 5.7.1 Momentum (HT only) 5.7.1/2 Momentum & Conservation of Momentum 4.5.7.3 Changes in momentum (physics only)	**Required Practical 7: F=ma** **End of year – Year 10 mocks P1-4**
Super Curricular	Watch the film 'Gravity' – can you spot any 'impossible' physics? Visit the science museum	

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Year 11 **Autumn Term**	**P1-5 review interleaved throughout year 11** **Complete P5 Forces:** 5.6.2.1,2,3 Newton's Laws (& Terminal Velocity) 5.7.1 Momentum (HT only) 5.7.1/2 Momentum & Conservation of Momentum 4.5.7.3 Changes in momentum (physics only) **P6 Waves** 6.1.1 Transverse and longitudinal waves 6.1.2 Properties of waves 6.1.3 Reflection of waves (physics only) 6.1.4 Sound waves (physics only) (HT only) 6.1.5 Waves for detection and exploration (physics only) (HT only) 6.2.1 Types of electromagnetic waves 6.2.2 Properties of electromagnetic waves 1 6.2.3 Properties of electromagnetic waves 2 6.2.4 Uses and applications of electromagnetic waves	**Baseline Assessment** **P5 assessment** **Required practical activity 8: Investigating plane waves in a ripple tank and waves in a solid** **Required practical activity 9: Investigate the reflection and refraction of light.** **Mock exam paper 1 (P1-4) (November)**
Super Curricular	Research the use of P and S waves detection in earthquakes to deduce the composition of the Earth below the crust. Read Stephen Hawkins: 'Brief answers to the big questions'.	

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Year 11 **Spring Term** **Year 11** **Summer Term**	**P6 Waves continued** 6.2.5 Lenses (physics only) 6.2.6 Visible light (physics only) 6.3.1 Emission and absorption of infrared radiation (physics only) 6.3.2 Perfect black bodies and radiation (physics only) **P7 Magnetism and Electromagnetism** 7.1.1 Poles of a magnet 7.1.2 Magnetic fields 7.2.1 Electromagnetism 7.2.2 Fleming's left-hand rule (HT only) 7.2.3 Electric motors (HT only) 7.2.4 Loudspeakers (physics only) (HT only) 7.3 Induced potential, transformers and the National Grid (physics only) (HT only) 7.3.1 Induced potential (HT only) 7.3.2 Uses of the generator effect (HT only) 7.3.3 Microphones (HT only) 7.3.4 Transformers (HT only) **P8 Space Physics (Physics only)** 8.1.1 Our Solar System 8.1.2 The Life Cycle of a Star 8.1.3 Orbital Motion, natural and artificial satellites 8.2 Red-shift (physics only) Exam skills/ revision time	**Required practical activity 10: Investigating infrared radiation.** **P6 Assessment (January/February)** **Paper 2 mock examination paper 2 (P5-7) (End April)** **P8 assessment (May)**
Super Curricular	Read “The world according to physics” by Jim Al-Khalili. Is there life on another planet? Find out what research has been done and what is the probability – explain the Drake equation.	