

# Roundwood Park School



## KS4 AQA Combined Science

As an alternative to the Separate Science course, we are confident that this is an excellent 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. The real-world application of new break throughs in science such as the use of Stem Cells, Drug testing and Genetic Engineering 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, the KS4 science curriculum refines the understanding of experimental design and consolidates the application of mathematical skills. We also have embedded 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.

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

- AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures.
- AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.
- AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.

**Year 10 (current)**

<b>Year / term</b>	<b>Unit of work Biology</b>	<b>Unit of work Chemistry</b>	<b>Unit of work Physics</b>	<b>Assessment</b>
<b>Year 10 Autumn Term – first half</b>	B2.1 Principles of organisation B2.2.1 Human digestive system B2.2.2 Heart and blood vessels B2.2.3- B2.2.4 CHD B2.2.5 Health issues B2.2.6- B2.2.7 Lifestyle, non-communicable disease and cancer	C5.3.1.1 Conservation of mass and C5.3.1.3 mass change when product is a gas. Balancing equations (in C5.3.1.1 and in C1) C5.3.1.2 Relative formula mass C5.3.2.1 Moles and Avogadro's number	P1.1-1.4 recap P3.1-3.2 review, linking to P1 P3.3 pressure review P2.1.1 Circuit Diagram Symbols, P2.1.2 Electrical Charge and Current P2.1.2 Electrical Charge and Current P2.1.3 Current, Resistance, and Potential Difference P2.1.3 Current, Resistance, and Potential Difference	Biology required practical – Food tests Biology required practical – PH and enzymes Biology required practical – photosynthesis B2 assessment C1+C3a assessment P1+3 assessment

<b>Year / term</b>	<b>Unit of work Biology</b>	<b>Unit of work Chemistry</b>	<b>Unit of work Physics</b>	<b>Assessment</b>
<b>Year 10 Autumn Term – second half</b>	No biology topics are taught in this half term. It is worth noting that our Year 9 transition year covers a significant amount of the biology	C5.2.2.1 Three states of matter C5.2.2.2 State symbols C5.2.1.5 Metallic bonding C5.2.2.7 Properties of metals and alloys C5.2.2.8 Metals as conductors C5.2.1.2 Ionic bonding C5.2.1.3 Ionic compounds C5.2.2.3 Properties of Ionic compounds C5.2.1.4 Covalent bonding C5.2.2.4 Properties of small molecules C5.2.2.6 Giant covalent structures C5.2.3.1 Diamond C5.2.3.2 Graphite	P2.1.3 Current, Resistance, and Potential Difference P2.1.4 Resistors P2.1.4 Resistors – LDRs and Thermistors P2.2 Series and Parallel P2.3.1 Direct and Alternating Potential Difference P2.3.2 Mains Electricity	Physics required practical - Length of wire Physics required practical - IV characteristics Physics required practical - combinations of resistors

Year / term	Unit of work Biology	Unit of work Chemistry	Unit of work Physics	Assessment
<b>Year 10</b>  <b>Spring</b>  <b>Term – first</b>  <b>half</b>	Recap (B4 - photosynthesis) B4.1.1 Photosynthetic reaction B4.1.2 Rate of photosynthesis B4.1.3 Uses of glucose from photosynthesis B2.3.1 Plant tissues B2.3.2 Plant organ system	C5.2.2.5 Polymers C5.2.3.3 Graphene and fullerenes C5.4.1.2 The reactivity series C5.4.1.1 Metal oxides C5.4.1.3 Extraction of metals and reduction C5.4.2.3 Soluble salts C5.4.1.4 Oxidation and reduction in terms of electrons (HT only) C5.4.2.1 Reactions of acids with metals C5.4.2.2 Neutralisation of acids	P2.4.1 Power P2.4.2 Energy Transfers in Everyday Appliances P4.4.1.1 The structure of an atom P4.4.1.2 Mass number, atomic number and isotopes P4.4.1.3 The development of the model of the atom P4.4.2.1 Radioactive decay and nuclear radiation P4.4.2.2 Nuclear equations P4.4.2.3 Half-lives and the random nature of radioactive decay P4.4.2.4 Radioactive contamination	B2 assessment Chemistry required practical soluble salts C2 assessment C4 so far assessment P2 Assessment P4 assessment

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<b>Year 10 Spring Term – second half</b>	No biology topics are taught in this half term. It is worth noting that our Year 9 transition year covers a significant amount of the biology.	C4.3.1 The process of electrolysis C4.3.2 Electrolysis of molten ionic compounds C4.3.3 Using electrolysis to extract metals C4.3.4 Electrolysis of aqueous solutions C3.5 Half equations (HT only)	P5.1 Scalar and Vector Quantities, P5.6.1 Distance and Displacement P5.1.2 Contact and Non-Contact Forces P5.13 Gravity P5.1.4 Resultant Forces	Chemistry required practical - Electrolysis Chemistry required practical - Temperature Changes

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<b>Year 10 Summer Term – first half</b>	No biology topics are taught in this half term. It is worth noting that our Year 9 transition year covers a significant amount of the biology.	C5.1.1 Energy transfer during exothermic and endothermic reactions C5.1.2 Reaction profiles C5.1.3 The energy change of reactions (HT) (bond energy calculations) C7.1.1 Crude oil, hydrocarbons and alkanes C7.1.2 Fractional distillation and petrochemicals C7.1.3 Properties of hydrocarbons C7.1.4 Cracking and alkenes	P5.2 Work Done and Energy Transfer P5.2 Work Done and Energy Transfer (continued) P5.3 Forces and Elasticity P5.4 Forces and Elasticity & reprise P1.1.2 Changes in Energy - EPE	Year 10 Mock Exams in biology, chemistry and physics  Chemistry required practical - Temperature Changes Physics required practical - Hooke's Law a

Year / term	Unit of work Biology	Unit of work Chemistry	Unit of work Physics	Assessment
<b>Year 10</b>  <b>Summer Term – second half</b>	No biology topics are taught in this half term. It is worth noting that our Year 9 transition year covers a significant amount of the biology.	Recap: C1.1.1/2 Atoms, elements and compounds + mixtures C8.1.1 Pure substances C8.1.2 Formulations C8.1.3 Chromatography C8.2.1 Test of hydrogen (with practical) C8.2.2 Test of Oxygen (with practical) C8.2.3 Test for carbon dioxide (with practical and C8.2.4 Test for chlorine (teacher demo)	P5.4.1.3 Velocity P5.4.1.2 Speed P5.4.1.4 The distance–time relationship P5.4.1.5 Acceleration P5.4.2.1 Newton’s First Law	Chemistry required practical - Chromatography P5 mid topic test (self-assessment) Physics required practical - Investigate the effect of varying the force on the acceleration of an object C5 and C7 test C8 test

**Year 11 (current)**

Year / term	Unit of work Biology	Unit of work Chemistry	Unit of work Physics	Assessment
<b>Year 11</b>  <b>Autumn</b>  <b>Term –</b>  <b>first half</b>	Intro and B4.1.1 Photosynthetic reaction B4 review (studied in Y10) B4 review (studied in Y10) B6.1.1 sexual and asexual reproduction B6.1.2 - B6.1.4 Meiosis, DNA+ the genome, genetic inheritance and genetic disorders B6.1.6 Sex determination Mock exam revision	Writing balancing equations. C3.1.1 Conservation of mass and balanced equations C3.1.3 Mass changes when a reactant or product is a gas C3.1.4 Chemical measurements C3.1.2 Relative formula mass C3.2.1 Moles C3.2.2 Amounts of substances in equations C3.2.3 Using moles to balance equations C3.2.4 Limiting reactants C3.2.5 Concentration of solutions Mock exam revision	P5 review to date P5.6.3.2 Reaction time P5.6.3.3 Factors affecting braking distance 1 P5.6.3.4 Factors affecting braking distance 2 Mock exam revision	

<b>Year / term</b>	<b>Unit of work Biology</b>	<b>Unit of work Chemistry</b>	<b>Unit of work Physics</b>	<b>Assessment</b>
<b>Year 11 Autumn Term – second half</b>	B6.2.1 – B6.2.2 Variation and evolution B6.2.3 Selective breeding B6.2.4 + B6.3.4 Genetic engineering and antibiotic resistance B6.4 Classification B7.1.1 Communities B7.1.2 – B7.1.3 Biotic and abiotic factors	C6.1.3 Collision theory and activation energy C6.1.2 Factors which affect the rates of chemical reactions C6.1.1 Calculating rates of reactions C6.1.4 Catalysts C6.2.1 Reversible reactions C6.2.2 Energy changes C6.2.3 Equilibrium C6.2.4 The effect of changing conditions on equilibrium C6.2.5 The effect of changing concentration C6.2.6 The effect of temperature changes on equilibrium C6.2.7 The effect of pressure changes on equilibrium	P5.7.1 Momentum is a property of moving objects P5.7.2 Conservation of momentum P6.1 Waves in air, fluids and solids P6.1.1 Transverse and longitudinal waves P6.1.2 Properties of waves P6.1.2 Properties of waves	SCIENCE MOCKS  P5 assessment  Biology required practical – field investigations  Chemistry required practical – rates of reaction  Physics required practical - Investigating plane waves in a ripple tank and waves in a solid

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<b>Year 11 Spring Term – first half</b>	B7.1.4 Adaptations B7.2.1 Levels of organisation B7.2.2 Material recycling B7.3.1 Biodiversity B7.3.2 Waste management Revision for paper 2 mock	C8.1.1 Pure substances C8.1.2 Formulations C8.1.3 Chromatography C8.2.1 – C8.2.4 Identification of common gases	P6.1.2 Properties of waves P6.2 Electromagnetic waves P6.2.1 Types of electromagnetic waves P2.3 Properties of electromagnetic waves 2 P2.4 Uses and applications of electromagnetic waves	B6 assessment  C6 assessment  Chemistry required practical - chromatography

		C.10.1 Using the Earth's resources and sustainable development Revision for paper 2 mock	Revision for paper 2 mock	Physics required practical - measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid  Physics required practical - Investigating infrared radiation  Mock paper 2 in each of the sciences
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<b>Year / term</b>	<b>Unit of work Biology</b>	<b>Unit of work Chemistry</b>	<b>Unit of work Physics</b>	<b>Assessment</b>
<b>Year 11 Spring Term – second half</b>	B7.3.3 Land use B7.3.4 Deforestation B7.3.5 Global warming B7.3.6 Maintaining biodiversity	C10.1.3 Potable water C10.1.3 Waste water treatment C10.1.4 Alternative methods of extracting metals C10.2.1 Life cycle assessment C10.2.2 Ways of reducing the use of resources Revision	P7 Magnetism and electromagnetism P7.1 Permanent and induced magnetism, magnetic forces and fields P7.1.1 Poles of a magnet P7.1.2 Magnetic fields P7.2 The motor effect P7.2.1 Electromagnetism	Chemistry required practical – water purification

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<b>Year 11 Summer Term – first half</b>	Past paper practice and revision	Past paper practice and revision	Past paper practice and revision	Final GCSE examinations – AQA Combined Science (Higher or Foundation tier papers)



