

Roundwood Park School



KS4 Chemistry

The AQA GCSE Chemistry course is studied at RPS, as it links seamlessly with our lower school provision, which is based upon AQA's KS3 course. Having all 3 separate science disciplines following the AQA course, allows for students to develop transferable skills and common exam technique across the scientific disciplines, whilst ensuring a full and wide coverage of science topics.

The real-world application of new break throughs in science such as the use of nanotechnology, fuel cells and the use and recycling of resources in a way that protects our planet, aims to spark in our students a passion for green chemistry and for improving the current trajectory humans have put our planet on. This focus gives our RPS students valuable insight to the potential careers and cultural applications of the scientific ideas discussed in lessons. The underpinning goal of this is for students to develop their science capital, especially in terms of how they can pursue their scientific journey beyond RPS.

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 ASPIRE skills. The learning habits included in the "Learning to Understand" quadrant of the ASPIRE board in particular strike a chord with the core values of Chemistry - our students are constantly being given opportunities to solve problems and develop resilience, whilst consolidating their logical thinking and resourcefulness in many different contexts.

In Chemistry, the curriculum is taught in the same order as the AQA course specification, as the natural progression and challenge of the topics develops alongside the students' developing knowledge and confidence. Some of the challenging topics, such as structure and bonding and quantitative chemistry are introduced relatively early on in the course, therefore allowing more opportunities for exam practice on these topics, as they will feature in both their Year 10 and Year 11 mock examinations. Titrations is also brought forward from 4.2.5 into chapter 3, when concentration calculations are taught, enhancing the students' ability to form logical sequences of ideas and make cross-topic links. Titrations are then revisited in chapter 4, providing an additional opportunity to build resilience in their titration calculation skills. The aim of this is for students to feel more confident in these common pitfall areas, having had more in-class practice and more opportunity for them to challenge themselves under the pressure of assessments and mock examinations.

The AQA specification is practical-focused and embraces all the practical skills necessary to help our young scientists develop their manual dexterity, problem-solving skills and provides visual representation of the theory they are learning about. This helps all styles of learner to mature and deepen their knowledge of science, whilst equipping students with the skills required to progress onto their A-level studies and science-based degrees beyond.

Our modern and well-resourced laboratories allow students to apply their theoretical understanding to practical scenarios. The use of demonstration and hands-on experiments allow 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.

Year / term	Unit of work	Assessment
Year 10 Autumn Term	<p><u>Continue C1. Atomic structure and periodic table from Year 9:-</u></p> <ul style="list-style-type: none"> • 1.1.1-1.1.7 atomic structure recap – atoms, sub-atomic particles, history of the atom, separating mixtures, electronic structure • 1.2.1 – 1.2.6 – periodic table history, layout, metals vs. non-metals, groups 1, 0, 7 • 1.3.1 – 1.3.2 transition metal <p><u>C2. Structure and bonding:-</u></p> <ul style="list-style-type: none"> • 2.1.1 – 2.2.5 ionic bonding and properties, covalent bonding, metallic bonding, • 2.2.1 – 2.2.8 states of matter, properties of ionic, simple molecular, giant covalent substances (eg. diamond, graphite), alloys • 2.3.3 – 2.4.2 graphene, fullerenes, nanoparticles <p><u>C3. Quantitative chemistry:-</u></p> <ul style="list-style-type: none"> • 3.1.1 – 3.1.3 – balanced equations, conservation of mass, Mr • 3.2.1 – 3.2.4 & 3.3.1 – 3.3.2 mole calculations, Avogadro's number, reacting masses, limiting reactants 	<p><u>C1. Atomic structure and periodic table assessment</u></p> <p><u>C2. Structure and bonding assessment</u></p>
Super Curricular	Read Stephen Hawking's "Brief answers to the big questions"	

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Year 10 Spring Term	<u>C3. Quantitative chemistry cont.:-</u> <ul style="list-style-type: none"> • % yield, atom economy • 3.2.5 – 3.3.4 & 4.2.5 concentration, titrations • 3.5 gas volumes • 4.2.5 titrations and calculations <u>C4a. Chemical changes:-</u> <ul style="list-style-type: none"> • 4.1.1 – 4.1.4 Reactivity series, redox, extracting metals • 4.2.1 – 4.2.6 reactions of acids, soluble salts, pH and neutralisation, strong and weak acids • 4.2.5 titrations recap <u>Revision period for Year 10 examinations</u>	<u>C3. Quantitative chemistry assessment (excl. titrations)</u> <i>Required practical # 2 – neutralisation</i> <u>Year 10 examinations (C1 – C3 (excl. titrations) , C9)</u>
Super Curricular	Plan and deliver a KS3 Science club session	

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Year 10 Summer Term	<u>C4b. Electrolysis:-</u> <ul style="list-style-type: none"> • 4.3.1 – 4.3.5 • Molten electrolysis, aqueous electrolysis, half equations, extracting metals <u>C5. Energy changes:-</u> <ul style="list-style-type: none"> • 5.1.1 – 5.1.3 energy changes, exothermic and endothermic reactions, reaction profiles • 5.2.1 – 5.2.2 chemical cells, fuel cells 	<u>C4a. Chemical Changes assessment</u> <i>Required practical #1 – making salts</i> <i>Required practical #3 – aqueous electrolysis</i> <u>C4b Electrolysis & C5. Energy changes assessment</u>
Super Curricular	Watch some videos made by the University of Nottingham's YouTube channel Periodic Videos about rare elements not discussed in school. They do cool experiments with cheeseburgers, alcohol shots, and look at a party trick called Pythagoras' cup. https://www.youtube.com/user/periodicvideos	

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Year 11 Autumn Term	<p><u>C6a. Rates of reaction:-</u></p> <ul style="list-style-type: none"> 6.1.1 – 6.1.4 rates of reaction, effect of surface area, concentration, temperature, pressure, calculating rate from a graph, catalysis <p><u>Revision period for mock examinations</u></p> <p><u>Cont C6b. Dynamic equilibrium:-</u></p> <ul style="list-style-type: none"> 6.2.1 – 6.2.7 reversible reactions, dynamic equilibrium, Le Chatelier's principle <p><u>C7. Crude oil & fuels:-</u></p> <ul style="list-style-type: none"> 7.1.1 – 7.1.4 – crude oil, alkanes, fractional distillation, properties of hydrocarbons, cracking 	<p><u>Into Year 11 bridging assessment</u></p> <p><i>Required practical #4 – energy changes</i></p> <p><i>Required practical #5 – rate of reaction</i></p> <p><u>Year 11 mock examinations (C1 – C6a.)</u></p> <p><u>C6. Equilibria (equilibria only) assessment</u></p>
Super Curricular	Read Kathryn Harkup's "The secret lives of the elements"	

CHRISTMAS HOLIDAY SELF STUDY WORK - C10. USING OUR RESOURCES

- 10.1.1 – 10.2.1 sustainability, potable water, waste water, life cycle assessments

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Year 11 Spring Term	<p><u>Cont C7. Crude oil & fuels cont.:-</u></p> <ul style="list-style-type: none"> • 7.2.1 – 7.2.2 alkenes, reactions of alkenes • 7.2.3 – 7.2.4 alcohols, carboxylic acids • 7.3.1 – 7.3.4 polymers – addition, condensation, amino acids, DNA <p><u>C8. Chemical analysis:-</u></p> <ul style="list-style-type: none"> • 8.1.1 – 8.3.7 purity, formulations, chromatography, gas tests, ion tests, flame tests, instrumental methods, flame emission spectroscopy <p><u>Year 11 mock examinations round 2 (core subjects)</u></p> <p><u>C9. Earth and atmosphere (taught in year 9)</u></p> <ul style="list-style-type: none"> • 9.1.1 - 9.1.4 Changes in the atmosphere over time • 9.2.1 - 9.2.4 Greenhouse gases and global warming • 9.3.1 - 9.3.2 Pollutants 	<p><u>C7.Organic Chemistry assessment</u></p> <p><i>Required practical #6 – Chromatography</i></p> <p><i>Required practical #7 – testing for ions</i></p> <p><u>C8. Chemical analysis & C9. Earth and atmosphere assessment</u></p> <p><u>Year 11 mocks round 2 - C6, 7, 8 & 10</u></p>
Super Curricular	<p>What is the Government's plan to decrease our dependence on fossil fuels? Read the 2021 Progress Report to Government by the Climate Change Committee. Pick one of the report's key recommendations and research what needs to be done to our renewable energy provision in order to meet this target. https://www.theccc.org.uk/publication/2021-progress-report-to-parliament/</p>	

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Year 11 Summer Term	<u>Cont C10. Using our resources:-</u> <ul style="list-style-type: none"> 10.3.1 – 10.2.1 corrosion, alloys, ceramics and composites 10.4.1 – 10.4.2 Haber process, NPK fertilisers <u>Revision for final GCSE examinations</u>	<i>Required practical #8 – water purification</i> <u>In-class trial exam papers</u>
Super Curricular	Find out where the food you eat comes from. How many food miles does your average meal have? What impact does this have on our planet?	