Queen Elizabeth's Girls' School

Founded in 1888

Educating Women of the Future

Chemistry Key Stage 5 Curriculum

	Topic/Big Question	Focus
Year 12	Atoms, ions and compounds	Students will learn about atomic structure, calculating relative mass and writing chemical formulas.
	Electronic configuration and bonding	Students will learn about bonding, how to represent compounds and molecules using dot and cross diagrams.
	Amount of substance	Students will learn about chemical calculations, in particular calculating moles, volumes and reacting quantities.
	Shapes of molecules and intermolecular forces.	Students will learn about electronegativity, polarity and how to determine the shapes of molecules and ions.
	Acids and redox	Students will learn about acids, bases and neutralisation. How to carry out titrations and analyse the results and how to work out oxidation numbers.
	Periodicity	Students will learn about the periodic table and trends associated with it, they will also learn about ionisation energies.
	Enthalpy	Students will learn about enthalpy changes and how to measure them, they will learn Hess' law and use it to determine enthalpy changes which cannot be measured experimentally.
	Reactivity Trends	Students will learn more detail about groups 2 and 7 and qualitative tests for ions.
	Rates of reaction and equilibria	Students will learn about factors which affect rate of reaction and equilibrium, including the Boltzmann distribution and Le Chatelier's principle.
	Organic Chemistry	Students will learn the basics of organic chemistry followed by further detail about alkanes, alkenes, alcohols and halogenoalkanes. This will include information on structure, bonding and reaction mechanisms (electrophilic addition, nucleophilic substitution, radical substitution.)
	Synthesis	Students will learn practical techniques in chemical synthesis to include distillation, reflux, use of a separating funnel and drying agents. They will also look at synthetic routes with the aim of planning multistep reactions.
	Analysis	Students will look at the use of mass spectrometry, elemental analysis and infrared spectroscopy to identify unknown products.
	Aromatic chemistry	Students will learn about the chemistry of benzene to include work done by Kekule and electrophilic substitution reactions, they will learn further detail of the chemistry of phenol and use of directing groups.

	Carboxylic acids	Students will learn about the structure and reactions of carbonyl groups and their derivatives, including aldehydes, ketones and acid anhydrides.

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Year 13	Rates of Reaction	Students will look at orders of reaction and determination of rate from graphical data. They will also look at calculating rate constants, the Arrhenius equation and the rate determining step.
	Enthalpy	Students will look at enthalpy changes in more detail and learn how to use Born-Haber cycles to determine lattice enthalpy.
	Entropy	Students will look a Gibbs' Free energy and how entropy changes in chemical reactions.
	Equilibria	Students will look at calculating the equilibrium constants *K*c and *K*p and how to control the position of equilibrium.
	Redox and Electrode potentials	Students will look at redox reactions and use redox titrations to calculate % mass and composition. They will then go on to study electrode potentials and fuel cells.
	Acids, bases and Buffers	Students will explore the definition of an acid, learn how to convert between pH and concentration of hydrogen, calculate Ka and pKa, pOH and pH of buffer systems from data.
	Transition elements	Students will learn about d block elements, complex ions and ligand substitution. They will look at how to identify metal ions.
	Amines	Students will learn about the chemistry of amines, including synthesis, reactions and condensation polymers.
	Synthesis Routes	Students will learn about how carbon-carbon bonds are formed and further practical techniques including re-crystallisation and melting point determination. They will summarise their work on organic chemistry looking at how the different functional groups link and may be reacted.
	Chromatography and spectroscopy	Students will learn how further analytical techniques may be used to identify the structure of compounds.