A Level Chemistry – U6

Curriculum Intent

Chemistry is the study of matter, its properties, how and why substances combine or separate to form other substances, and how substances interact with energy. The A level Chemistry course provides an interesting and challenging experience to link key chemical ideas and understand how they relate to each other. The course aims for all students to: ·

- develop essential knowledge, understanding and application of different areas of the subject and how they relate to each other
- understand how society makes decisions about scientific issues and how Chemistry contributes to the success of the economy and society
- develop competence and confidence in a variety of practical, mathematical, and problem-solving skills
- develop and demonstrate a deep appreciation of the skills, knowledge and understanding of scientific methods promote students' interest in and enthusiasm for the subject, including an interest in further study and careers associated with the subject.

"A fact acquires its true and full value only through the idea which is developed from it"
Justus Von Liebig

Students will learn: -

Autumn Term: Module 5.1.2-3 Equilibrium & pH 5.2.1-2 energy, Module 6.2 Nitrogen compounds, polymers, synthesis,6.3 analysis

Equilibrium. Acids and bases. Enthalpy, entropy, and free energy. Amines, amino acids, and polymers. Chromatography and spectroscopy.

Spring term – Module 5.2.3 Redox, 5.3 Transition elements – Term 2

Redox and electrode potential. Transition elements.

Summer term Module 5.2.3 Redox, 5.3 Transition elements – Term 3

Unified Chemistry. Practical skills assessed in written examinations.

What does excellence look like?

- Carrying out practical processes logically, precisely, and accurately.
- Linking ideas together to answer questions logically and sequenced.
- Linking big ideas to answer real life Chemistry problems. For example. Unstructured calculations in unfamiliar contexts. Extend your learning to pOH. Conduct a thought experiment to explore the relationship between Gibbs free energy change and equilibrium constant. Devising a multistep synthesis of a painkiller. Unstructured identification of an unknown organic compound by the combined application of quantitative, analytical and reaction chemistry, in an unfamiliar context. Conduct a thought experiment to explore the relationship between Gibbs free energy change and standard electrode potentials.

Knowledge, understanding & Skills

Term 1:

Knowledge, understanding and application of: Equilibrium constant K_c part 2, equilibrium constant K_p, controlling the position of equilibrium. Bronsted-Lowry acids and bases, pH scale, strong acids, acid dissociation constant K_a, pH of weak acids, pH and strong bases. Buffer solutions, buffer solutions in the body, neutralisation, pH curves, indicators. Lattice enthalpy, Born-Haber cycles, enthalpy changes in solution, factors affecting lattice enthalpy and hydration, entropy, free energy, feasibility prediction. Amines: preparation, as bases, reactions; amino acids, amides; chirality; condensation polymers. Carbon-carbon bond formation, multi-stage pathways, further practical techniques. Thin layer chromatography, gas chromatography, qualitative analysis of functional groups, carbon-13 NMR spectroscopy, proton NMR spectroscopy, combined techniques.

Term 2:

Redox reactions, equations and half equations, interpretation and prediction using oxidation number; manganate (VII) redox titration, iodine/thiosulfate redox titration. Electrode potentials, predictions from electrode potentials, storage, and fuel cells. d-block elements, the formation and shapes of complex ions, stereoisomerism in complex ions, ligand substitution and precipitation, redox and quantitative analysis.

Term 3:

Whole specification: synoptic links, unfamiliar contexts. Application and analysis of secondary data; synthesis design; selection of appropriate purification technique. Examination paper practice. Transition to university for students intending to study chemistry-related degree courses

What does excellence look like?

Justify the use of sulfuric acid rather than hydrochloric acid in manganate(VII) titrations. Classify named hexaaqua complexes as acidic or amphoteric and explain how oxidation state affects acidity. Unstructured identification of an unknown inorganic compound by the combined application of quantitative, analytical and reaction chemistry, in an unfamiliar context. Application of mechanism principles to unfamiliar reactions. Proposing a multi-step synthetic method to produce a required mass of pure product. Unstructured identification of an unknown compound by the combined application of quantitative, analytical and reaction chemistry, in an unfamiliar context.

How can you enhance your learning at home?

- Kerboodle
- Chemguide
- Isaac chemistry
- Knockhardy
- Royal Society of Chemistry
- Physicsandmathstutor

Suggested homework tasks

- Learn definitions of key terms.
- Group and independent research projects
- Past examination questions practice
- Practical activity preparation, simulations, and follow-up.

How will we assess impact?

- Peer, self and teacher assessment in lessons
- Previous lesson recap quiz
- Teacher questioning
- Landmark tasks
- End of Topic tests

International Opportunities

Visits Programme

- **Community lectures on International themes**
- **International day across the school**
- **Primary research using student cultural diversity**

Within the curriculum

The Chemistry A Level curriculum is designed to deepen understanding and appreciation of how our International society makes decisions about world scientific issues. Students can compete in the International Chemistry Olympiad.

Students are encouraged to research each theme beyond lessons and set work to ensure that they can draw on a worldwide knowledge of the skills, techniques and theoretical understanding required for the further study of Chemical Sciences at an International level.