IBH 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 IB Standard Chemistry course provides stimulating opportunities to appreciate the study and creativity associated with chemistry within a global context.
The course aims for all students to: ·

- Acquire, apply and use knowledge, methods and techniques that characterise chemistry
- Develop an ability to analyse, evaluate and synthesise chemistry information
- Develop a critical awareness of the need for, and the value of, effective collaboration and communication during scientific activities
- Appreciate the possibilities and limitations of chemistry while becoming critically aware, as global citizens, of the ethical implications of using chemistry
- Develop and understanding of the relationships between scientific disciplines and their influence on other areas of knowledge
- Promote students' interest in and enthusiasm for the subject.

"In the fields of observation chance favours only the prepared mind" Louis Pasteur

Students will learn: - Autumn Term – Term 1

Individual research investigation. AHL Equilibrium. Proton transfer reactions. Electron transfer reactions.

Spring term – Term

Organic chemistry

What does excellence look like?

- Carrying out practical processes logically, precisely, and accurately.
- Linking ideas together to answer questions logically and sequenced.
- Linking ideas to the IB Core including Theory of Knowledge and IB Approaches to Learning
- Linking big ideas to answer real life Chemistry problems. For example, use of buffers in biological systems and commercial formulations; prediction of pH of salt solutions; link to acidity of hydrated transition metal ions. Application of unfamiliar redox reactions to titration calculations. Deduction of feasibility of reaction using cell potential.
- Proficient use of experimental, technological and mathematical Tools for IB Chemistry.
- High standard of IA design, implementation, analysis and evaluation.

Knowledge, understanding & Skills

Term 1: Knowledge, understanding, application, analysis, and evaluation of: Scientific method, enquiry cycle, research and referencing skills, use of pilot study, formulating a hypothesis, risk assessment, design. Data collection, analysis and evaluation. Calculations involving K, Q and links to ΔG. Theories of acids and base, Bronsted-Lowry and Lewis acids and bases, conjugate pairs; properties of acids and bases; strong and weak acids and bases. pH scale, calculations to solve problems involving pH, pOH, Ka, pKa, Kb, pKb, Kw. Indicators and pH curves, buffer solutions. Oxidation and reduction processes; variable oxidation numbers. Electrochemical cells: voltaic (galvanic) cells; electrolytic cells; explanation in terms of ion flow and electron transfer; voltaic cell diagram convention. Cell potential, standard hydrogen electrode; application and interpretation of $\Delta G^{\ominus} = nFE^{\ominus}$; electrolysis of aqueous solutions with inert electrodes and copper electrodes, explanation of competing reactions; electroplating.

Term 2: Knowledge, understanding, application, analysis, and evaluation of: Homolytic and heterolytic fission, radical substitution of alkanes by electron sharing; nucleophilic substitution and electrophilic addition by electron-pair sharing; oxidation and reduction of organic compounds. Mechanism: Comparison of S_N1 and S_N2; links to energy profile; kinetics; Lewis acids and bases; coordination bonds in TM complex ions; stereochemistry.

How will we assess impact?

- Peer, self and teacher assessment in lessons
- Previous lesson recap quiz
- Teacher questioning
- Practical skills
- Landmark tasks
- End of Topic tests
- Internal assessment (I.A.)

How can you enhance your learning at home?

- Chemguide
- Isaac chemistry
- Inthinking chemistry
- Royal Society of Chemistry

Suggested homework tasks

- Learn definitions of key terms.
- Group and independent research projects
- Past examination questions practice

Practical activity preparation, simulations, and follow-up.

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 IBS 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.

Nature of Science is learned using global issues from modern science and science history.