

De Lisle College Curriculum

“Rooted and grounded in Love”.

A Level Chemistry



Intent – ‘Rooted and grounded in Love’

Intent – Rooted

Science is a body of knowledge that all students should have, so they have the power to understand the world they share and make informed decisions

Science (from the Latin word *scientia*, meaning "knowledge") is a set of ideas about the material world. The science curriculum at De Lisle aims to equip students with the knowledge and skills to apply the insights of science to the wonders of the universe.

Everything we know about the universe, from how plants reproduce to how the Universe itself came into existence, is the result of scientific research and experiment. Human progress throughout history has largely rested on advances in science. From our knowledge of gravity to the development of cutting-edge medicines, scientists have shaped our modern world for the better.

De Lisle students are surrounded by technology and the products of science every day. Government decisions that affect every aspect of our lives, both now and in the future, are based in scientific evidence. The solutions to problems facing our world, such as climate change, plastic pollution and antibiotic resistance, require the contributions of scientists. As De Lisle students grow up in an increasingly technologically and scientifically advanced world, they need to be scientifically literate to succeed.

Studying science is not just about accruing a series of facts: it is also a style of thinking. Science involves generating and testing ideas, gathering valid evidence – including by making observations, carrying out investigations and modelling, and communicating and debating with others – in order to develop scientific knowledge, understanding, and explanations. Scientific progress comes from logical, systematic work and from creative insight, built on a foundation of respect for evidence. By learning to use scientific method De Lisle students are taught how to think, learn, solve problems and make informed decisions. These skills are integral to every aspect of our students' education and life, supporting them in making an informed and positive contributions to society now and in the future.

In the Science Department we work to inform, enthuse and inspire our students.



Chemistry

Year 12

Curriculum Outline

Link to Catholic Social Teaching:

Through topics such as sustainability, green chemistry, and the environmental impact of chemical processes, students are encouraged to consider how scientific knowledge and innovation can be used responsibly to protect the Earth's resources. This reflects the principle of stewardship, which calls for care and respect for God's creation. Furthermore, understanding the ethical implications of chemistry in real-world contexts—such as pollution control, climate change, and resource management—supports the common good by promoting actions and policies that benefit all people, especially the most vulnerable. By integrating these values, the curriculum not only builds scientific understanding but also fosters a sense of moral responsibility in shaping a more just and sustainable world.

Advent 1	Atomic structure / Bonding / Acids and bases / Quantitative chemistry	Advent 2	Oxidation and redox / The periodic table / Rates of reaction
Description	Subatomic particles and electronic structure including orbitals Types of bonding and the bulk properties of matter. Intermolecular forces and the properties of water The reactions of acids and bases, titrations and oxidation states Calculating concentrations, moles, volumes and masses from physical data. Introduction to PAGs and working in a post-16 laboratory Practicals to determine molar mass, empirical formula and composition by mass.	Description	Assigning oxidation states Determining if a species has been oxidised/reduced and identifying redox reactions The arrangement of elements on the periodic table and the link between position and properties Periodic trends in the properties of elements Explaining why reactions occur and the factors that affect their rate Analysing chemical equilibria qualitatively and quantitatively using K_c

Lent 1	Enthalpy changes / Introduction to organic chemistry / Alkanes	Lent 2	Alkenes / Chemical analysis / Synthetic chemistry
Description	Endothermic and exothermic reactions The effects of catalysts Calculating enthalpy changes using bond enthalpies or Hess cycles when given enthalpy change data. Using IUPAC conventions to name and represent organic molecules Structural isomers. The properties and reactions of alkanes including radical substitution and combustion	Description	The properties and reactions of alkenes including; formation via elimination, hydration, hydrogenation and halogenation. Representing reactions of organic molecules with mechanisms and curly arrows. Qualitative techniques to identify ions Using IR spectroscopy and mass spectrometry to identify organic molecules. The equipment and techniques to make and purify organic compounds such as reflux, distillation, vacuum filtration, recrystallisation and separating funnels
Pentecost 1	Review of year to date	Pentecost 2	Introduction to benzene / D-block chemistry
Description	Reteach of topics informed by exam results and marking	Description	The structure and properties of benzene Electrophilic substitution mechanisms Definition of transition metals vs d-block metals Ligands and stereochemistry

Chemistry

Year 13



De Lisle College
A Catholic Voluntary Academy

Curriculum Outline

Link to Catholic Social Teaching:

The OCR A Chemistry curriculum for Year 13 deepens the connection to Catholic social teaching, particularly the principles of stewardship of creation and the common good. Advanced topics such as energy production, chemical synthesis, and the use of transition metals highlight the importance of responsible scientific advancement. Students explore the environmental and ethical considerations of industrial processes, including the development of sustainable fuels and the management of waste products, encouraging them to consider how chemistry can be used to safeguard the planet for future generations—an expression of stewardship. The curriculum also examines how chemical innovations can be applied to solve global challenges, such as providing clean water, improving healthcare through pharmaceutical chemistry, and addressing climate change. These applications promote the common good by supporting human dignity and improving quality of life, especially in underserved communities. In this way, the Year 13 chemistry curriculum helps students see their scientific learning as a tool for positive social and environmental impact.

Advent 1	Rates of reaction / Equilibria / Acids / Buffers	Advent 2	Enthalpy, entropy, Gibbs free energy / Redox / Electrochemistry
Description	Interpreting rates of reaction graphs, rate orders and half-lives. Writing rate equations and determining rate constants. Proposing mechanisms for reactions from rate of reaction data Determining K_c and K_p from reaction data and commenting on its magnitude Determining pH, K_a, pKa and concentrations for acids and bases. Identifying the temperature dependence of the pH of water Examining neutralisation reactions, the production of buffers and their role in biological systems to maintain healthy conditions Choosing appropriate indicators based on neutralisation curves	Description	Review of year 12 enthalpy topics. Using Born-Haber cycles to determine enthalpy changes including for lattice enthalpy and solvation enthalpy. Using entropy data to comment on reaction feasibility and determine the change in Gibbs free energy of a reaction. Determining the minimum temperature at which a reaction can occur. Writing balanced redox equations from half-cell equations Determining the voltage produced by cells formed from common chemical half cells and fuel cells Using half-cell equations to comment on the feasibility of reactions.

Lent 1	Amines and amides / Analysis / Carbonyl chemistry / NMR	Lent 2	Review of course
Description	Amines, their production and reactions including mechanisms and as part of biological systems including as amino acids. The reactions to produce and carried out by amides including to form polyamides. The chemistry of carboxylic acids, aldehydes and ketones including their formation and reactions including the formation of polymers. Identifying carbonyls using 2,4-DNPH and Tollen's reagent. Using chromatography to analyse reaction mixtures and the use of related techniques in industry and research. Using NMR, IR and mass spec data to determine the structure of organic molecules	Description	Reteach informed by marking including the sitting of in class mocks with feedback prior to exam leave.
Pentecost 1	COURSE COMPLETED	Pentecost 2	COURSE COMPLETED
Description	/	Description	/