CURIOSITY COMPASSION COURAGE

Curriculum overview

Subject	Chemistry	Year group	12
Vision statement:	At Landau Forte our curriculum exists to ensure all students regardless of background and ability have the opportunity to unlock their potential. We are committed to students being challenged from their previous key stage learning experiences. Our broad and balanced curriculum is ambitious, coherently planned and sequenced, and will provide the platform for preparing students with the foundations for examination success. Our Curriculum Intent has been informed by a wide variety of researchers and is steeped in evidence based research. Christine Counsell summarises the aspiration of our curriculum to empower all learners creating a pathway to success in university, their career and life: *'A curriculum exists to change the pupil, to give the pupil new power. One acid test for a curriculum is whether it enables even lower attaining or disadvantaged pupils to clamber into the discourse and practices of educated people, so that they gain powers of the powerful.'* As well as excellent academic success we aim to ensure our students leave us as polite and well-rounded young adults. Our new core values of Compassion, Courage and Curiosity are currently being embedded throughout our curriculum offer to ensure we continue to meet our social, emotional, spiritual and moral obligations.		
Curriculum intent:	*Must include school values (3Cs) In line with the Academy's vision to enhance students' understanding of the world by ensuring an educational journey guided with care and compassion the Science department at Landau Forte Academy QEMS aim to deliver a curriculum that not only develops students' knowledge and understanding of the subject but inspires them to succeed far beyond their education at the academy.* *The science curriculum aims to be;* ○ *Aspirational* ○ *Ambitious* ○ *Coherent both in planning and sequence* ○ *Adapted successfully to suit all needs and abilities* ○ *Broad - covering not only aspects of the subject but how this can be taken into the outside world* *In delivering the knowledge based curriculum students will be able to not only achieve the best they can academically but also link theory to reason, understand why they learn about specific concepts, grasp how this fits into the world of careers and ultimately develop the skills and reasoning needed to become well rounded individuals. The curriculum aims to give students a range of opportunities within the classroom and beyond allowing them to become confident and articulate in their scientific ideas. Consistently high expectations of both students and teaching staff ensures that every individual in Science has access to the highest quality of teaching and learning possible and working with key stakeholders ensures that our students have every opportunity to achieve.* *In summary the Science curriculum is developed and tailored for each specific year group taking into account the demographic of our students. The intention of which is to allow students to think deeper and use knowledge based skills within their learning both in science and throughout their lives*		

CURIOSITY **COMPASSION** **COURAGE**

Threshold Concepts (TCs):	*Atomic structure* *Amounts of substance* *Bonding* *Energetics* *Kinetics* *Equilibria and redox reactions* *Organic chemistry* *Alkanes* *Alkenes and alcohols* *Organic analysis* *Periodicity* *Group 2 and group 7* *Thermodynamics*
KS4 specification summary:	The KS4 science curriculum ensure students have the knowledge to enable them to develop curiosity about the natural world, insight into working scientifically, and appreciation of the relevance of science to their everyday lives. This allows students to not only develop scientific knowledge and conceptual understanding through the specific disciplines of biology but also develop understanding of the nature, processes and methods of science, through different types of scientific enquiry that help them to answer scientific questions about the world around them. *The topics you will study in Yr. 12 Chemistry links to the following topics you would have studied at GCSE, Atomic structure, the periodic table, ionic bonding, and covalent bonding.* Students at KS4 study AQA GCSE Combined Science: Trilogy, which not only covers many aspects of Biology, Chemistry and Physics but also is engaging and relevant to all types of students. In teaching this KS4 specification we've ensured that: • The biology, chemistry and physics content is presented clearly, in a logical teaching order. We have also signposted opportunities for skills development throughout the specification. • The subject content and required practical's are spread across all three disciplines. • The science qualifications provide opportunities for progression. Combined Science: Trilogy gives students the option to progress to A-levels in science or other subjects
Learner skills:	Critical thinking Organisation Collaboration Adaptability Oracy Self-quizzing





CURIOSITY COMPASSION COURAGE

	Term 1 Aug-Oct	Term 2 Nov-Dec	Term 3 Jan-Feb	Term 4 Mar-Apr	Term 5 Apr-May	Term 6 Jun-Jul
The Big Question	What are the properties and reactions of organic and inorganic molecules and what qualitative and quantitative techniques can be used to study these molecules?					
Big picture questions:	What is inside an atom?	How do we measure reaction rates?	What are alkanes and halogenoalkanes?	What are alkenes and alcohols? How do we know the structure of organic molecules?	Trends and properties of group 2 and group 7.	What energy changes occur in reactions?
Content (Linked to TCs):	Unit 1 Section 1: Atomic structure • The atom • Atomic models • Relative mass • The mass spectrometer • Using mass spectra • Electronic structure • Ionisation energies Section 2: amounts of substance • The mole • Gases and the mole • Chemical equations	Unit 1 Section 4: Energetics • Enthalpy • Bond enthalpies • Measuring enthalpy changes • Hess's law Section 5: Kinetics • Reaction rates • Catalysts • Measuring reaction rates Section 6: Equilibria and Redox Reactions • Reversible reactions • Industrial processes	Unit 3 Section 1: Introduction to organic chemistry • Formulas • Functional groups • Nomenclature • Mechanisms • Isomers • E/Z isomers Section 2: Alkanes and Halogenoalkanes • Alkanes and petroleum • Alkanes as fuels • Synthesis of chloroalkanes • Halogenoalkanes	Unit 3 Section 3: Alkenes and Alcohols • Alkenes • Reactions of alkenes • Addition polymers • Alcohols • Dehydrating alcohols • Ethanol production • Oxidising alcohols Section 4: Organic Analysis • Tests for functional groups • Mass spectrometry	Unit 2 Section 2: Group 2 and Group 7 Elements • Group 2 – The Alkaline Earth metals • Group 2 compounds • Group 7 – The Halogens • Halide Ions • Tests for Ions Review of AS content	Progression PPE reteach Unit 1 Section 7: Thermodynamics • Enthalpy Changes • Born-Haber cycles • Enthalpies of Solution • Entropy • Free-energy change

	• Equations and calculations • Titrations • Formula • Chemical yield • Atom economy Section 3: Bonding • Ionic bonding • Covalent bonding • Charge clouds • Shapes of molecules • Polarisation • Intermolecular forces • Metallic bonding • Properties of metals	• The equilibrium constant • Factors affecting the equilibrium constant • Redox reactions • Redox equations	• Nucleophilic substitution • Elimination reactions	• Infrared spectroscopy Unit 2 Section 1: Periodicity • The Periodic Table • Periodicity		
Key vocabulary:	Mole, Avogadro's constant, relative molecular mass, ionisation, mass spectra, ion, intermolecular force, polar, lattice, tetrahedral.	Endothermic, exothermic, enthalpy, oxidation, reduction, rate constant.	Periodicity, trend, period, group, solubility, ionisation energy, displacement, halide, nomenclature, isomerism, functional group. Displayed formula, structural formula.	Alkane, fuel, synthesis, nucleophile, elimination, free radical, alkene, polymer, monomer, oxidation.	Key vocabulary as per in terms 1 to term 4.	Exothermic, endothermic, enthalpy change of hydration, lattice enthalpy of dissociation, entropy, feasible,
Assessment:	Retrieval tasks every lesson Key learning task at end of topic	Retrieval tasks every lesson Key learning task at end of topic	Retrieval tasks every lesson Key learning task at end of topic	Retrieval tasks every lesson Key learning task at end of topic	Retrieval tasks every lesson Key learning task at end of topic	AS Chemistry paper 1 and 2.

CURIOSITY COMPASSION COURAGE

Key/Historical misconceptions in this unit:	H bond is a covalent bond. The space between orbitals is made up air.	Endothermic and exothermic mixed up Positive or negative numbers for exothermic or endothermic	Displayed formula and structural formula is the same Mix up different types of isomerism	Test results Elimination and nucleophilic substitution with halogenoalkane dependant on solvent		Reaction profiles of exo and endothermic reactions Difference between enthalpy and entropy
Sequencing:	In Year 12 Chemistry the topics are taught in the following sections Physical Chemistry, Inorganic Chemistry and Organic Chemistry. By grouping all the e.g. organic chemistry topics together then it is hoped that students can make links between each e.g. organic chemistry subtopic more easily. Structure of the atom is essential for understanding all Chemistry and links to the following topics bonding, Periodicity, Group 2 and group 7 elements, alkanes and halogenalkanes, alkenes. The amount of substance topic provides students with the knowledge of some of the key calculations (e.g. mole calculations) which the students need to use throughout the course (e.g. in the Energetics topic). The next topic is bonding which links to atomic structure and the subsequent topic on energetics where the students study bond enthalpies. The last two topics in Physical Chemistry are kinetics and Equilibria and Redox reactions which link together as kinetics explores how the rate of the reaction can measured while equilibria looks at what can affect the position of a reaction equilibria. The inorganics chemistry topics are grouped together and link to the topics on atomic structure. Students then study organic chemistry which begins with an introduction to organic chemistry and develops knowledge in key aspects of organics chemistry (e.g. the different functional groups, organic mechanisms). This provides the foundation of knowledge required to study organic chemistry in year 13.					