



CURIOSITY

COMPASSION

COURAGE



## Curriculum overview

Subject	Science	Year group	10
<p><b>Vision statement:</b></p>	<p>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.</p> <p>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:</p> <p><i>'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.'</i></p> <p>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.</p>		
<p><b>Curriculum intent:</b></p>	<p>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.</p> <p>The science curriculum aims to be;</p> <ul style="list-style-type: none"> <li>○ Aspirational</li> <li>○ Ambitious</li> <li>○ Coherent both in planning and sequence</li> <li>○ Adapted successfully to suit all needs and abilities</li> <li>○ Broad - covering not only aspects of the subject but how this can be taken into the outside world</li> </ul> <p>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.</p> <p>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.</p>		



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<p><b>Threshold Concepts (TCs):</b></p>	<p><i>Biology</i></p> <ol style="list-style-type: none"><li>1. Cell biology</li><li>2. Organisation</li><li>3. Infection and response</li><li>4. Bioenergetics</li><li>5. Homeostasis and response</li><li>6. Inheritance, variation and evolution</li><li>7. Ecology</li></ol> <p><i>Chemistry</i></p> <ol style="list-style-type: none"><li>1. Atomic structure and periodic table</li><li>2. Bonding, structure and properties of matter</li><li>3. Quantitative chemistry</li><li>4. Chemical changes</li><li>5. Energy changes</li><li>6. Rate and extent of chemical change</li><li>7. Organic chemistry</li><li>8. Chemical analysis</li><li>9. Chemistry of the atmosphere</li><li>10. Using resources</li></ol> <p><i>Physics</i></p> <ol style="list-style-type: none"><li>1. Energy</li><li>2. Electricity</li><li>3. Particle model of matter</li><li>4. Atomic structure</li><li>5. Forces</li><li>6. Waves</li><li>7. Magnetism and electromagnetism</li><li>8. Space</li></ol>
<p><b>KS2 National Curriculum summary:</b></p>	<p>The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.</p>



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Pupils should read, spell and pronounce scientific vocabulary correctly.

### Working scientifically

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments

### Topics covered:

Animals Including Humans, Everyday Materials (Properties and Changes of Materials), Living Things and their Habitats, Light, Forces and Magnets, Electricity, Earth and Space, Evolution.

### Learner skills:

Critical thinking



CRITICAL THINKING

Organisation



ORGANISATION

Collaboration



COLLABORATION

Adaptability



ADAPTABILITY

Oracy



ORACY

Self-quizzing



SELF QUIZZING

Term 6 Jun-Jul

### The Big Question

How can Science be used to solve the problems of the future?



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<b>Big picture questions:</b>	<b>How do we get from oil to useful fuels? What causes diseases?</b>
<b>Content (Linked to TCs):</b>	<p><b><u>Complete CC16-17 Fuels and atmospheric science</u></b> Hydrocarbons Fractional distillation Alkanes Combustion Fuels and pollution Cracking Early atmosphere Today's atmosphere Climate change</p> <p><b><u>End of year PPE – Chemistry Paper 2 and Physics paper 1 (combined science)</u></b></p> <p><b><u>CB5 Health, disease and the development of medicine</u></b> Health and disease Non-communicable diseases Cardiovascular disease Pathogens Spreading Pathogens Physical and chemical barriers The immune system Antibiotics</p> <p><b><u>Separate Biology</u></b> SB5 Health, Disease and the development of medicine Health and disease Non-communicable diseases Cardiovascular disease Pathogens Spreading Pathogens Physical and chemical barriers The immune system Antibiotics</p> <p><b><u>Separate Chemistry</u></b> SC25-26 Qualitative Analysis: Tests for Ions, Bulk and Surface Properties of Matter Including Nanoparticles</p>



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	<p>Flame tests and photometry          Tests for positive ions          Tests for negative ions          Choosing materials          Composite materials          Nanoparticles</p> <p><b><u>Separate Physics</u></b>          Complete SP6 Radioactivity</p> <p>SP7 Astronomy          The solar system          Gravity and orbits          Life cycles of stars          Red-shift          Origin of the Universe</p>		
<p><b>Vocabulary Instruction:</b></p>	<p><b><u>Biology:</u></b>          Infection          Viral          Bacterial          Fungal          Protist          Immunity          Vaccines          Antibiotics          Monoclonal</p>	<p><b><u>Chemistry:</u></b>          Fuel          Alkane          Alkene          Cracking          Fractional distillation</p>	<p><b><u>Physics:</u></b>          Satellite          Orbit          Nebula          Supernova          Protostar          Red shift          Cosmic Microwave Background Radiation</p>
<p><b>Assessment:</b></p>	<p><b>End of topic test for all topics</b>  <b>Summative Assessment 2</b></p>		
<p><b>Key/Historical misconceptions in this unit:</b></p>	<p><b>Biology</b>  <b>Misconception:</b> Vaccines contain the live disease.</p>	<p><b>Misconception:</b> Crude oil can be used as a fuel (not separated into its fractions)</p>	<p><b>Misconception:</b> There is only one type of star</p>



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<b>Sequencing:</b>	We have chosen this way to sequence the year 10 curriculum based on several factors. The specification has provided us with a route through that we felt strongly we wanted to follow. This sequence is based on building up the fundamental concepts taught in KS3 (year 7-9) to extend the students to GCSE and allows opportunities for retrieval, interleaving and spaced practice. The retrieval is a regular element in all lessons and focuses not just on last lesson but on last week, last month and last year. The interleaving and spaced practice is embed in the covering of concepts in a spiral motion, moving from Biology to Chemistry to Physics. The common aspects of the sciences are not taught in one block but are spaced out over the two years to maximise student learning and retrieval.
<b>Values</b>	<b>This scheme of work promotes the school values of Compassion, Curiosity and Courage by:</b> <b>Compassion – Acceptance of differing scientific models. Support of peers during feedback process'</b>  <b>Curiosity – Asking scientific questions</b>  <b>Courage – Review of prior learning and acting on feedback to bridge gaps within knowledge</b>
<b>National Curriculum plus:</b>	At GCSE, currently we offer the Edexcel specification which covers the National Curriculum in its entirety. We do, however, offer additional experiences such as a visit from Severn Trent to share their part in the cleaning of potable water as well as support provided through the wider school with reference to science careers.