



# CURIOSITY

# COMPASSION

# COURAGE



## Curriculum overview

Subject	Mathematics	Year group	9
Vision statement:	<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>		
Curriculum intent:	<p>All students acquire the mathematical life skills necessary for the world of work, no matter what their starting point is, catering for all abilities and backgrounds. We have a strong belief that all students can achieve in Maths.</p> <p>Students will be taught to have a firm understanding of number bonds and be confident in using non-calculator strategies for solving problems.</p> <p>Students will be stretched and challenged through problem solving tasks to develop resilience.</p> <p>Students are encouraged to show courage through attempting questions in environment where other students show compassion through a culture of being non-judgmental when questions are answered incorrectly. Students are also encouraged to show curiosity through asking questions and taking a genuine interest in the real life applications of the Maths that they are learning.</p> <p>This will be achieved by staff working together in planning lessons that allow ALL students to achieve/ exceed their potential through:</p> <ul style="list-style-type: none"> <li>Common lesson planning formats; Expert knowledge of the subject; Differentiated material;</li> <li>Regular use of AfL to assess progress in a lesson; Regular use of formal marking and feedback;</li> <li>Regular summative assessments to ensure appropriate progress and intervention.</li> </ul>		
Threshold Concepts (TCs):	<p><b>TC1 Algebraic manipulation</b> - This concept involves recognising mathematical properties and relationships using symbolic representation</p> <p><b>TC2 Number sense</b> - This concept involves understanding the number system and how they are used in a wide variety of mathematical ways</p> <p><b>TC3 Shape facts</b> - This concept involves recognising the names and properties of geometry shapes and angles.</p> <p><b>TC4 Multiplicative reasoning</b> - This concept involves using ratio and proportion and understanding of reciprocals in real world applications</p> <p><b>TC5 Representing and interpreting data</b> - This concept involves interpreting, manipulating and presenting data in various ways.</p> <p><b>TC6 Calculator skills</b> - This concept involves fluent application of mathematical operations on a scientific calculator</p> <p><b>TC7 Understanding and calculating risk</b> - This concept involves knowing the rules of probability in the correct context</p>		



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KS2 National Curriculum summary:

The curriculum ensures that all pupils around England get the essential knowledge they need to become educated citizens. So, it doesn't matter which school or area children are studying at - they will develop the same fundamental maths skills. Included in this frame of work are curriculum aims, which pupils need to meet at the end of each school year. Children who want to expand their knowledge even further will get the opportunity to do so. But essentially, they will all start from basics by learning about the key topic areas covered in the national curriculum for KS2 maths.

The eight main maths areas, which are included in the national curriculum for maths throughout KS2 are:

- Number - Number and Place Value
- Number - Addition and Subtraction
- Number - Multiplication and Division
- Number - Fractions
- Measurement
- Geometry - Properties of Shape
- Geometry - Position and Direction (not included in year 3)
- Statistics

As pupils get to year 6, they would have developed a deep understanding of these maths concepts. That's why two additional topic areas are introduced to the curriculum, which are:

- Ratio and Proportion
- Year 6 Algebra

Learner skills:

Critical thinking

Organisation

Collaboration

Adaptability

Oracy

Self-quizzing

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CRITICAL THINKING



ORGANISATION



COLLABORATION



ADAPTABILITY



ORACY



SELF QUIZZING

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

Big picture questions:

How do I use algebra to represent and solve problems?

Why are shapes important?

What is tax and how is it calculated?

Who was Pythagoras and what did he do?

What is scale and why is it important?

What is the probability it will happen?

Content (Linked to TCs):

TC1 Algebraic manipulation

- R - Lines, parallel to the axes,  $y = x$  and  $y = -x$
- Using table of values
- Compare gradients
- Compare intercepts
- Understand and use  $y = mx + c$
- Write an equation in the form  $y = mx + c$
- Find the equation of a line from a graph
- Interpret gradient and intercepts of real-life graphs
- Model real-life graphs involving inverse proportion
- Explore perpendicular lines

TC3 Shape facts

- Know names of 2-D and 3-D shapes
- Recognise prisms
- Accurate nets of cuboids and other 3-D shapes
- sketch and recognise nets of cuboids and other 3-D shapes
- plans and elevations
- R - Find area of 2-D shapes
- Surface area of cubes and cuboids
- surface area of triangular prisms
- surface area of a cylinder
- volume of cubes and cuboids
- Volume of other 3-D shapes - prisms and cylinders

TC2 Number sense  
TC6 Calculator skills

- Integers, real and rational numbers
- Understand and use surds
- R - Work with directed number
- Solve problems with integers
- Solve problems with decimals
- R - HCF and LCM
- R - Adding and subtracting fractions
- R - Multiplying and dividing fractions
- Solving problems with fractions
- R - Numbers in standard form
- R - Use the equivalence of

TC3 Shape facts

- R - Angles in parallel lines
- Solving angles problems (using chains of reasoning)
- Angles problems with algebra
- Conjectures with angles
- Conjectures with shapes
- Link constructions and geometrical reasoning
- Identify the order of rotational symmetry of a shape
- Compare and contrast rotational symmetry with line symmetry

TC3 Shape facts  
TC4 Multiplicative reasoning  
TC6 Calculator skills

- Recognise enlargement and similarity
- Enlarge a shape by a positive integer scale factor
- Enlarge a shape by a positive integer scale factor from a point
- Enlarge a shape by a positive fractional scale factor
- Enlarge a shape by a negative scale factor
- Work out missing sides and angles in a pair of given similar shapes

TC1 Algebraic manipulation  
TC7 Understanding and calculating risk

- R - Single event probability
- Relative frequency - include convergence
- Expected outcomes
- Independent events
- Use tree diagrams
- Use tree diagrams to solve 'without replacement' problems
- Use tree diagrams to work out probabilities
- Draw and interpret quadratic graphs
- Interpret graphs, including reciprocal and piece-wise



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<ul style="list-style-type: none"> <li>• R - Solve one and two-step equations and inequalities</li> <li>• R - Solve one and two-step equations and inequalities with brackets</li> <li>• Inequalities with negative numbers</li> <li>• Solve equations with unknowns on both sides</li> <li>• Solve inequalities with unknowns on both sides</li> <li>• Solving equations and inequalities in context</li> <li>• Substituting into formulae and equations</li> <li>• Rearranging formulae (one-step)</li> <li>• Rearranging formulae (two-step)</li> <li>• Rearrange complex formulae including brackets and squares</li> <li>• R - Factors, multiples and primes</li> <li>• True or false</li> <li>• Always, sometimes, never true</li> <li>• Show that</li> <li>• Conjectures about number</li> </ul>	<ul style="list-style-type: none"> <li>• Explore volumes of cone, pyramids and spheres</li> <li>• R - draw and measure angles</li> <li>• R - construct and interpret scale drawings</li> <li>• Locus of distance from a point</li> <li>• Locus of distance from a straight line/shape</li> <li>• Locus of points equidistant from two points</li> <li>• construct a perpendicular bisector</li> <li>• Construct a perpendicular from a point</li> <li>• Construct a perpendicular to a point</li> <li>• Locus of distance from two lines</li> <li>• Construct an angle bisector</li> <li>• R - Construct triangles from given information</li> <li>• Identify congruent figures</li> <li>• Explore congruent triangles</li> <li>• Identify congruent triangles</li> </ul>	<p>fractions, decimals and percentages</p> <ul style="list-style-type: none"> <li>• R - Calculate percentage increase and decrease</li> <li>• R - Express a change as a percentage</li> <li>• Solve 'reverse' percentage problems</li> <li>• Recognise and solve percentage problems (non-calc)</li> <li>• R - Recognise and solve percentage problems (calc)</li> <li>• Solve problems with repeated percentage change</li> <li>• Solve problems with bills and bank statements</li> <li>• Calculate simple interest</li> <li>• Calculate compound interest</li> <li>• Solve problems with VAT</li> <li>• Calculate wages and taxes</li> <li>• Solve problems with exchange rates</li> <li>• Solve unit pricing problems</li> </ul>	<ul style="list-style-type: none"> <li>• Rotate a shape about a point on a shape</li> <li>• Rotate a shape about a point not on a shape</li> <li>• Translate points and shapes by a given vector</li> <li>• Compare rotation and reflection of shapes</li> <li>• Find the result of a series of transformations</li> <li>• R - Squares and square roots</li> <li>• Identify the hypotenuse of a right-angled triangle</li> <li>• Determine whether a triangle is right angled</li> <li>• Calculate the hypotenuse of a right-angled triangle</li> <li>• Calculate missing sides in right-angled triangles</li> <li>• Use Pythagoras' theorem on coordinate axes</li> <li>• Explore proofs of Pythagoras' theorem</li> <li>• Use Pythagoras' theorem in 3-D shapes</li> </ul>	<ul style="list-style-type: none"> <li>• Solve problems with similar triangles</li> <li>• Explore ratios in right-angled triangles</li> <li>• R - Solve problems with direct proportion</li> <li>• R - Direct proportion and conversion graphs</li> <li>• Solve problems with inverse proportion</li> <li>• Graphs of inverse relationships</li> <li>• R - Solve ratio problems given the whole or part</li> <li>• Solve 'best-buy' problems</li> <li>• Solve problems ratio and algebra</li> <li>• Solve speed, distance and time problems without a calculator</li> <li>• Solve speed, distance and time problems with a calculator</li> <li>• Use distance/time graphs</li> <li>• Solve problems with density, mass and volume</li> <li>• Solve flow problems and their graphs</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate graphs of simultaneous equations</li> <li>• Represent inequalities</li> </ul>
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	<ul style="list-style-type: none"> <li>Expand a pair of binomials</li> <li>Conjectures with algebra</li> <li>Explore the 100 grid</li> </ul>				<ul style="list-style-type: none"> <li>Rates of change and their units</li> <li>Convert compound units</li> </ul>	
Key vocabulary:	Gradient, intercept, equation, graph, proportion, perpendicular, solve, conjecture, expand, binomial.	Plans, elevations, 3-D shapes, cube, cuboid, prism, cylinder, cone, sphere, pyramid, locus, equidistant, construct, congruent.	Integer, decimal, standard form, simple interest, compound interest.	Parallel, constructions, rotational symmetry, line symmetry.	Enlargement, similarity, scale factor, ratio, speed, distance, time.	Relative frequency, independent, dependent, tree diagram, simultaneous equations
Assessment:	Topic Assessments	Topic Assessments	Topic Assessments  Summative Assessment 1 (Date)	Topic Assessments	Topic Assessments	Topic Assessments  Summative Assessment 2
Key/Historical misconceptions in this unit:	<ul style="list-style-type: none"> <li>Calculating gradient as change in x over change in y</li> <li><math>y_1 - y_2 / x_2 - x_1 = m</math></li> <li>Solve 2-step by inverse operation of coefficient of the variable without adjusting constant</li> <li>Confuse gradient and intercept</li> <li>Confuse <math>y=c</math> with <math>x=c</math></li> <li>Expanding a bracket using a negative coefficient but not changing the signs</li> </ul>	<ul style="list-style-type: none"> <li>Cuboids and cubes</li> </ul>	<ul style="list-style-type: none"> <li>Adding denominators; failing to obtain common denominator before adding/subtracting</li> <li>Multiply both numerator and denominator by a scalar</li> <li>Reverse percentage: Use of the original percentage to get back to starting amount</li> <li>Compound Vs simple interest</li> <li>Percentage change using original value</li> </ul>	<ul style="list-style-type: none"> <li>Failure to use correct CoR</li> <li>Forgetting to square root when using Pythagoras theorem</li> <li><math>a^2 = h^2 + b^2</math></li> </ul>	<ul style="list-style-type: none"> <li>Similar shapes have the same angles, regardless of linear scale factor</li> <li>Gradient of distance time = speed</li> </ul>	<ul style="list-style-type: none"> <li>Probabilities &gt;1</li> <li>Use of ratios for probabilities</li> <li>Knowing when to add and when to multiply probabilities</li> </ul>



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- Not correctly understanding mixed numbers
- Confuse factors for multiples

### Sequencing:

We have chosen to sequence the year 9 curriculum like this because builds on their previous knowledge and begin to put in place the foundations to build upon in future years. Students begin to work towards higher or foundation pathways.

For example - In year 7 they started with sequences which consolidated work previously done in primary school and formalised their understanding (Recognise linear and non-linear sequences) which was then extended by using algebraic notation (Generate sequences from an algebraic rule) in the following block. Algebra and sequences are revisited in year 8 during the spring term (Revise and extend Y7 coverage to include more complex rules) to further extend and embed understanding. This then moves towards working with conjectures in year 9 (Testing conjectures about sequences) and finding the nth term of a linear sequence. In year 10 students will revise and extend KS3 content, whilst higher students will begin looking at sequences with surds and quadratic sequences in the summer term.

### Values

**This scheme of work promotes the school values of Compassion, Curiosity and Courage by:**

Compassion - Students show compassion through a culture of being non-judgmental when questions are answered incorrectly.

Curiosity - Students are encouraged to show curiosity through asking questions and taking a genuine interest in the real life applications of the Maths that they are learning.

Courage - Students are encouraged to show courage through attempting questions

### National Curriculum plus:

In addition to teaching the statutory elements of the national curriculum, we also include opportunities to extend their learning beyond the classroom. For example practical examples and going further than the curriculum in terms of what they are expected to know from a financial literacy perspective.

Preparation of students to take Level 2 further maths in support of achieving additional qualifications, higher grades in their normal GCSE maths and in preparation for A-level maths:

- Rationalisation of surds using difference of 2 squares
- Domains and ranges of functions
- Expanding triple brackets
- Binomial expansion
- Factor theorem
- Advanced algebraic fractions
- Sketching functions and interpreting graphs
- Transformations of functions



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- Trig identities
- Algebraic proof
- Limiting values of sequences and expressions
- Equations of circles not centred on the origin
- Differentiation
- Matrices
- Matrix transformations
- Geometric proof