



# CURIOSITY

# COMPASSION

## Curriculum overview

# COURAGE



| Subject                   | Mathematics  | Year group | 10 |
|---------------------------|--|------------|----|
| 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>TC1 Algebraic manipulation - This concept involves recognising mathematical properties and relationships using symbolic representation</p> <p>TC2 Number sense - This concept involves understanding the number system and how they are used in a wide variety of mathematical ways</p> <p>TC3 Shape facts - This concept involves recognising the names and properties of geometry shapes and angles.</p> <p>TC4 Multiplicative reasoning - This concept involves using ratio and proportion and understanding of reciprocals in real world applications</p> <p>TC5 Representing and interpreting data - This concept involves interpreting, manipulating and presenting data in various ways.</p> <p>TC6 Calculator skills - This concept involves fluent application of mathematical operations on a scientific calculator</p> <p>TC7 Understanding and calculating risk - This concept involves knowing the rules of probability in the correct context</p>   |            |    |



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# COURAGE



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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# COURAGE



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 can you use algebra to model problems?

How can you use simultaneous equations to solve problems?

What happens to shapes when they are enlarged?

What is special about triangles?

How do you know what direction you are traveling in?

What are the properties of circles?

How is distance and direction described in maths?

How are ratios used to show comparisons?

How do you solve problems using percentages?

How can you model the probability of multiple events?

How can you collect, represent and interpret data?

How can you calculate without a calculator?

What different types of numbers are there and how are they related?

How do you manipulate powers?

How do you manipulate complex algebraic equations?

Content (Linked to TCs):

TC1 – Algebraic manipulation

- Understand the meaning of a solution
- Review - Form and solve one-step and two-step equations
- Review - Form and solve one-step and two-step inequalities

- TC3 - Shape Facts
- TC6 – Calculator Skills
- Review - Enlarge a shape by a positive integer scale factor
- Review - Enlarge a shape by a fractional scale factor
- H - Enlarge a shape by a negative scale factor
- Identify similar shapes

- TC2 – Number sense
- TC3 – Shape Facts
- Review - Use cardinal directions and related angles
- Review - Draw and interpret scale diagrams
- Understand and represent bearings
- Measure and read bearings
- Make scale drawings using bearings

- TC4 - Multiplicative reasoning
- TC6 – Calculator skills
- Review - Compare quantities using a ratio
- Review - Link ratios and fractions
- Review - Share in a ratio (given total or one part)
- Use ratios and fractions to make comparisons

- TC5 - Representing and interpreting data
- TC6 - Calculator skills
- TC7 - Understanding and calculating risk
- Understanding populations and samples
- H - Construct a stratified sample
- Primary and secondary data
- Construct and interpret frequency

- TC1 - Algebraic manipulation
- TC2 - Number sense
- Review - Mental/written methods of integer/decimal addition and subtraction
- Review - Mental/written methods of integer/decimal



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- Show solutions to inequalities on a number line
- Interpret representations on number lines as inequalities
- H - Represent solutions to inequalities using set notation
- Review - Draw straight line graphs
- Find solutions to equations using straight line graphs
- H - Represent solutions to single inequalities on a graph
- H - Represent solutions to multiple inequalities on a graph
- Review - Form and solve equations with unknowns on both sides
- Form and solve inequalities with unknowns on both sides
- Form and solve more complex equations and inequalities
- H - Solve quadratic equations by

- Review - Work out missing sides and angles in a pair given similar shapes
- Use parallel line rules to work out missing angles
- Establish a pair of triangles are similar
- H - Explore areas of similar shapes
- H - Explore volumes of similar shapes
- H - Solve mixed problems involving similar shapes
- Understand the difference between congruent triangles
- H - Prove a pair of triangles are congruent
- Explore ratio in similar right-angled triangles
- Work fluently with the hypotenuse, opposite and adjacent sides
- Use the tangent ratio to find missing side lengths
- Use the sine and cosine ratio to find missing side lengths
- Use sine, cosine and tangent to find missing angles

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- Calculate bearings using angles rules
- Solve bearings problems using Pythagoras and trigonometry
- H - Solve bearings problems using the sine and cosine rules
- Review - Recognise and label parts of circle
- Calculate fractional parts of a circle
- Calculate the length of an arc
- Calculate the area of a sector
- H - Circle Theorem: Angles at the centre & circumference
- H - Circle Theorem: Angles in a semicircle
- H - Circle Theorem: Angles in the same segment
- H - Circle Theorem: Angles in cyclic quadrilateral
- Understand and use the volume of a cylinder and cone
- Understand and use the volume of a sphere

- Review - Link ratios and graphs
- Solve problems with currency conversion
- Review - Link ratios and scales
- Use and interpret ratios of the form 1:n and n:1
- Solve 'best buy' problems
- Combine a set of ratios
- Link ratio and algebra
- H - Ratio in area problems
- H - Ratio in volume problems
- Mixed ratio problems
- Review - Convert and compare fractions, decimals and percentages
- Review - Work out percentages of amounts (with and without a calculator)
- Review - Increase and decrease by a given percentage
- Review - Express one number as a percentage of another
- Calculate simple and compound interest

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- tables and frequency polygons
- Review - Construct and interpret two-way tables
- Construct and interpret line and bar charts (including composite bar charts)
- Review - Construct and interpret pie charts
- Criticise charts and graphs
- H - Construct histograms
- H - Interpret histograms
- Review - Find and interpret averages from a list
- Review - Find and interpret averages from a table
- Review - Construct and interpret time series graphs
- Construct and interpret stem-and-leaf diagrams
- H - Construct and interpret cumulative frequency diagrams
- H - Use cumulative frequency diagrams to find measures

- multiplication and division
- Review - The four rules of fraction arithmetic
- Exact answers
- H - Rational and irrational numbers (convert recurring decimals here)
- H - Understand and use surds
- H - Calculate with surds
- Review - Rounding to decimal places and significant figures
- Review - Estimating answers to calculations
- Understand and use limits of accuracy
- H - Upper and lower bounds
- Use number sense
- Solve financial maths problems
- Break down and solve multi-step problems
- Review - Understand the difference between factors and multiples
- Review - Understand primes and express a number as a





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- factorisation (F to cover in Y11)
- H - Solve quadratic inequalities in one variable
- Understand that equations can have more than one solution
- Determine whether a given  $(x, y)$  is a solution to a pair of linear simultaneous equations
- Solve a pair of linear simultaneous equations by substituting a known variable
- Solve a pair of linear simultaneous equations by using graphs
- Solve a pair of linear simultaneous equations by subtracting equations
- Solve a pair of linear simultaneous equations by adding equations
- Review - Use a given equation to derive related factors
- Solve a pair of linear simultaneous equations by

- Review calculate sides in right-angled triangles using Pythagoras' Theorem
- Select the appropriate method to solve right-angled triangle problems
- Work with key angles in right-angled triangles
- H - Use trigonometry in 3-D shapes
- H - Use the formula  $\frac{1}{2}ab\sin C$  to find the area of a triangle
- H - Understand and use the sine rule to find missing lengths
- H - Understand and use the sine rule to find missing angles
- H - Understand and use the cosine rule to find missing lengths
- H - Understand and use the cosine rule to find missing angles
- H - Choosing and using the sine and cosine rules
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- Understand and use the surface area of a sphere
- Understand and use the surface area of a sphere
- Review - H - Solve area and volume problems involving similar shapes
- Understand and represent vectors
- Use and read vector notation
- Draw and understand vectors multiplied by a scale
- Draw and understand addition of vectors
- Draw and understand addition and subtraction of vectors
- H - Explore a vector journeys in shapes
- H - Explore a quadrilaterals using vectors
- H - Understand parallel vectors
- H - Explore collinear points using vectors
- H - Use vectors to construct geometric arguments and proofs

- Repeated percentage change
- Review - Find the original value after a percentage change
- Solve problems involving growth and decay
- H - Understand iterative processes
- Solve problems involving percentages, ratios and fractions
- Review - Know how to add, subtract and multiply fractions
- Review - Find probabilities using equally likely outcomes
- Review - Use the property that probabilities sum to 1
- Using experimental data to estimate probabilities
- Find probabilities from tables, Venn diagrams and frequency trees
- Review - Construct and interpret sample spaces for more than one event

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- H - Construct and interpret box plots
- Compare distributions using charts and measures
- H - Compare distributions using complex charts and measures
- Review - Construct and interpret scatter graphs
- Review - Draw and use a line of best fit
- Understand extrapolation

- product of its prime factors
- Review - Find the HCF and LCM of a set of numbers
- Describe and continue arithmetic and geometric sequences
- Explore other sequences
- H - Describe and continue sequences involving surds
- Review - Find the rule for the  $n$ th term of a linear sequence
- H - Find the rule for the  $n$ th term of quadratic sequence
- Review - Square and cube numbers
- Calculate higher powers and roots
- Review - Powers of ten and standard form
- Review - The addition and subtraction rules for indices
- Understand and use the power zero and negative indices
- Work with powers of powers





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|                 | <p>adjusting one equation</p> <ul style="list-style-type: none"> <li>• Solve a pair of linear simultaneous equations by adjusting both equations</li> <li>• Form a pair of linear simultaneous equations from given information</li> <li>• H - Determine whether a given (x, y) is a solution to both a linear and quadratic equation</li> <li>• H - Solve a pair of simultaneous equations (one linear, one quadratic) using graphs</li> <li>• H - Solve a pair of simultaneous equations (one linear, one quadratic) algebraically</li> <li>• H - Solve a pair of simultaneous equations involving a third unknown</li> <li>•</li> </ul> |  |  | <ul style="list-style-type: none"> <li>• Calculate probability with independent events</li> <li>• Use tree diagrams for independent events</li> <li>• User tree diagrams for dependent events</li> <li>• H - Construct and interpret conditional probabilities (Tree diagrams)</li> <li>• H - Construct and interpret conditional probabilities (Venn diagrams and two-way tables)</li> </ul> |  | <ul style="list-style-type: none"> <li>• H - Understand and use fractional indices</li> <li>• Review - Calculate with numbers in standard form</li> </ul> |
| Key vocabulary: | Inequalities, straight line graph, solve, equations, simultaneous equations  | .Congruent, similarity, enlarge, scale factor, parallel lines, hypotenuse. | Angles, bearings, scale diagram, Pythagoras, trigonometry, cyclic quadrilateral, circumference, area, segment. | Ratio, scale, simplify, convert, simple interest, compound interest, percentage change, probability, venn   | Population, sample, two-way tables, bar chart, line chart, pie chart, two-way table, histogram, stem and leaf diagram. | Sequences, indices, surds, bounds, rational, irrational.  |



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|   |  |   |   | diagram, frequency trees.   |   |  |
| Assessment:                                 | Topic Assessments  | Topic Assessments   | Topic Assessments<br>Summative Assessment 1 (Date)  | Topic Assessments   | Topic Assessments   | Topic Assessments<br>Summative Assessment 2  |
| Key/Historical misconceptions in this unit: | <ul style="list-style-type: none"> <li>Rearranging a quadratic, dividing through by x to get a single solution</li> <li><math>(x+y)^2 = x^2+y^2</math></li> <li>Incorrect use of inequality symbols /word confusion</li> <li>Not recognising <math>x &lt; 3</math> is equivalent to <math>3 &gt; x</math></li> <li>Dividing/multiplying an inequality by a negative reverses the sign</li> </ul>   | <ul style="list-style-type: none"> <li>Not recognising area scale factor and volume scale factor as powers of linear scale factor</li> <li>Use of negative scale factors</li> <li>Similar shapes have the same angles, regardless of linear scale factor</li> </ul> | <ul style="list-style-type: none"> <li>Bearings must be 3 digits and always from North</li> <li>Failure to recognise rules of parallel lines can be applied to bearings</li> <li>Reverse interpretation of column vectors (and even coordinates)</li> </ul> | <ul style="list-style-type: none"> <li>Reverse percentage: Use of the original percentage to get back to starting amount</li> <li>Probabilities <math>&gt;1</math></li> <li>Use of ratios for probabilities</li> <li>Knowing when to add and when to multiply probabilities</li> <li>Compound Vs simple interest</li> <li>Percentage change using original value</li> </ul> | <ul style="list-style-type: none"> <li>A histogram is not a bar chart! No spaces between bars, area is frequency</li> <li>Mean Vs median Vs 'average'</li> <li>LoBF must go through origin</li> <li>Plotting cumulative frequency for grouped continuous data against start of the group</li> </ul> | <ul style="list-style-type: none"> <li>Not knowing their square numbers making it difficult to simplify surds</li> <li><math>2^3 \neq 2 \times 3</math> and <math>2^{-3} \neq -8</math></li> <li>Recognise fractional indices are roots</li> </ul> |
| Sequencing:                                 | <p>We have chosen to sequence the year 10 curriculum like this because builds on and extends their previous knowledge and understanding. Students are now working towards higher or foundation pathways. Students are now regularly completing past exam questions to begin to prepare them for the end of their GCSE.</p> <p>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 begin looking at sequences with surds and quadratic sequences in the summer term. In year 11 students consolidate and extend this knowledge to ensure they are fully prepared for their exams.</p> |   |   |   |   |  |



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## COMPASSION

## COURAGE



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|---------------------------|---|
| Values                    | <p>This scheme of work promotes the school values of Compassion, Curiosity and Courage by:</p> <p>Compassion - Students show compassion through a culture of being non-judgmental when questions are answered incorrectly.</p> <p>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.</p> <p>Courage - Students are encouraged to show courage through attempting questions</p>   |
| National Curriculum plus: | <p>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.</p> <p>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:</p> <ul style="list-style-type: none"><li>• Rationalisation of surds using difference of 2 squares</li><li>• Domains and ranges of functions</li><li>• Expanding triple brackets</li><li>• Binomial expansion</li><li>• Factor theorem</li><li>• Advanced algebraic fractions</li><li>• Sketching functions and interpreting graphs</li><li>• Transformations of functions</li><li>• Trig identities</li><li>• Algebraic proof</li><li>• Limiting values of sequences and expressions</li><li>• Equations of circles not centred on the origin</li><li>• Differentiation</li><li>• Matrices</li><li>• Matrix transformations</li><li>• Geometric proof</li></ul> |