



# CURRICULUM – MATHS

Intent, Curriculum Map & Age Related Expectations

## Abstract

Students are carefully provided with feedback on their learning to enable them to improve. They gain the knowledge leading onto the skills that are necessary to enable them to become successful lifelong learners.

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## Whole School INTENT

**Southchurch students embrace learning opportunities.**

## INTENT, IMPLEMENTATION & IMPACT

### Intent

- Students are problem solvers, building their confidence and love for learning mathematics. Develop their use of logical reasoning and problem solving to apply the mathematical skills needed in their chosen careers and all other aspects of the real world.

### Implementation

- Sequencing of the curriculum
- Adaptive teaching (to take into account of what the learners know and don't know)
- Extending opportunities for extracurricular

### Impact

- All students will achieve their potential with altered trajectories

# KS2 Links

## KS2 Maths National Curriculum

### Number – number and place value

- § read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
- § round any whole number to a required degree of accuracy
- § use negative numbers in context, and calculate intervals across zero
- § solve number and practical problems that involve all the above.

### Number – addition, subtraction, multiplication and division

- § multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- § divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- § divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- § perform mental calculations, including with mixed operations and large numbers
- § identify common factors, common multiples and prime numbers
- § use their knowledge of the order of operations to carry out calculations involving the four operations
- § solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- § solve problems involving addition, subtraction, multiplication and division
- § use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

### Number – fractions (including decimals and percentages)

- § use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- § compare and order fractions, including fractions  $> 1$
- § add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- § multiply simple pairs of proper fractions, writing the answer in its simplest form
- § divide proper fractions by whole numbers
- § associate a fraction with division and calculate decimal fraction equivalents for a simple fraction
- § identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
- § multiply one-digit numbers with up to two decimal places by whole numbers
- § use written division methods in cases where the answer has up to two decimal places
- § solve problems which require answers to be rounded to specified degrees of accuracy
- § recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

### Ratio and proportion - Proportion

- § solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts
- § solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
- § solve problems involving similar shapes where the scale factor is known or can be found
- § solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

### Ratio and Proportion - Measurement

- § solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
- § use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
- § convert between miles and kilometers
- § recognise that shapes with the same areas can have different perimeters and vice versa
- § recognise when it is possible to use formulae for area and volume of shapes
- § calculate the area of parallelograms and triangles
- § calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimeters (cm<sup>3</sup>) and cubic meters (m<sup>3</sup>), and extending to other units [for example, mm<sup>3</sup> and km<sup>3</sup>].

### Algebra – Introduction

- § use simple formulae
- § generate and describe linear number sequences
- § express missing number problems algebraically
- § find pairs of numbers that satisfy an equation with two unknowns
- § enumerate possibilities of combinations of two variables.

### Geometry – properties of shapes

- § draw 2-D shapes using given dimensions and angles
- § recognise, describe and build simple 3-D shapes, including making nets
- § compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- § illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
- § recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

### Geometry – position and direction

- § describe positions on the full coordinate grid (all four quadrants)
- § draw and translate simple shapes on the coordinate plane and reflect them in the axes.

### Statistics

- § interpret and construct pie charts and line graphs and use these to solve problems
- § calculate and interpret the mean as an average.

All the content above is according to the upper KS2 programme of study. The year 6 content is a continuation of year 5 and so on.

# CURRICULUM MAP

Our Year 7 scheme will begin with a baseline assessment to ensure we have the most up to date accurate information on current students' abilities, using the first 4 weeks to focus solely on number topics to allow us time to plug any gaps and support our non-secondary ready pupils, alongside giving opportunities to deepen the understanding to stretch and challenge.

Assessment KS3 - For Year 7 to 9 all students will be assessed every 3 weeks, this assessment will cover all content taught over the previous 3 weeks and not necessarily grouped by unit, we want to come away from the idea for students that mathematics is a series of units and instead one cohesive course will skills that intertwine and interlink, at the end of each term students will sit an end of term assessment covering knowledge across that term. All skills will be tracked using a QLA analysis with DIRT tasks given to support progress from written feedback. All assessments link directly to SPARX which in turn will support us in plugging each individual students' gaps using homework.

Assessment GCSE – For year 10 and 11 students will sit an end of unit assessment after covering a unit, these scores and skills will be tracked using a QLA analysis with DIRT time dedicated on feedback of these assessments for students to identify areas for improvement and be given time to practice these skills. We will also begin to introduce short form GCSE papers every 3 weeks akin to the KS3 style of assessment allowing us to help build retention. These will be linked with SPARX codes to support students' revision and ability to complete independent learning, emphasising the school's ambitions with students and their homework.

|                      | Autumn Term  |   |   |   |   |   |   |   |   |    |    |    |    |    | Spring Term   |    |    |    |    |    |    |    |    |    |    |    |    |    | Summer Term  |    |    |    |    |    |    |    |    |    |    |  |  |  |    |
|----------------------|--|---|---|---|---|---|---|---|---|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|----|----|----|----|--|--|--|----|
|                      | 1  | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15  | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29   | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 |  |  |  |    |
| <b>Y<br/>r<br/>7</b> | <b>FEEDFORWARD ASSESSMENT: Week 1 Baseline</b><br><u>Number sense and calculations</u><br>Number Sense<br>Adding and Subtracting<br>Multiplying<br>Dividing<br><b>FEEDFORWARD ASSESSMENT: Week 2 to 5</b><br>Calculating with Negative Numbers<br>Order of Operations<br><b>FEEDFORWARD ASSESSMENT: Week 6 to 9</b><br><u>Expressions and Equations</u><br>Expressions<br>Substitution<br>Solving Equations<br><u>Measures</u><br>Time<br>Measures<br><b>FEEDFORWARD ASSESSMENT: Week 11 to 14</b> |   |   |   |   |   |   |   |   |    |    |    |    |    | <b>FEEDFORWARD ASSESSMENT: END OF TERM TEST (Week 15)</b><br><u>2D Shapes</u><br>Lines and shape properties<br><u>Perimeter and Area</u><br>Perimeter<br>Area<br><b>FEEDFORWARD ASSESSMENT: Week 16 to 19</b><br><u>Coordinates</u><br>Coordinates and Shapes<br><u>Factors, Multiples and Primes</u><br>Factors and Multiples<br>Primes<br><b>FEEDFORWARD ASSESSMENT: Week 20 to 22</b><br><u>Fractions</u><br>Writing and comparing fractions<br>Adding and subtracting fractions<br><u>Brackets</u><br>Single Brackets<br><b>FEEDFORWARD ASSESSMENT: Week 23 to 26</b>                                       |    |    |    |    |    |    |    |    |    |    |    |    |    | <b>FEEDFORWARD ASSESSMENT: END OF TERM TEST (Week 27)</b><br><u>Angles</u><br>Angles<br>Finding unknown angles<br><u>Handling Data and Statistics</u><br>Averages and Range<br>Tables and Charts<br>Collecting and Presenting Data<br><b>FEEDFORWARD ASSESSMENT: Week 28 to 31</b><br><u>Proportion</u><br>Proportion word problems<br><b>END OF YEAR ASSESSMENT: Week 32 – 34 (assessment window)</b><br><u>Fractions, Decimals and Percentages</u><br>Multiplying and dividing fractions<br>Fractions of amounts<br>Fractions, decimals and percentages<br><u>Probability</u><br>Theoretical probability<br><b>FEEDFORWARD ASSESSMENT: Week 35 to 39</b><br><b>FEEDFORWARD ASSESSMENT: END OF TERM TEST (Week 40)</b>  |    |    |    |    |    |    |    |    |    |    |  |  |  | AP |
| <b>Y<br/>r<br/>8</b> | <u>Percentages</u><br>Percentages of amounts<br>Percentage Change<br><b>FEEDFORWARD ASSESSMENT: Week 1 to 3</b><br><u>Money</u><br>Calculating with Money<br><u>Indices</u><br>Index Laws<br><b>FEEDFORWARD ASSESSMENT: Week 4 to 6</b><br><u>Equations</u><br>Solving Equations<br><u>Sequences</u><br>Term-to-term rules<br>Position-to-term rules<br><b>FEEDFORWARD ASSESSMENT: Week 7 to 11</b><br><u>Ratio</u><br>Ratio<br>Scale Diagrams<br><b>FEEDFORWARD ASSESSMENT: Week 12 to 14</b>     |   |   |   |   |   |   |   |   |    |    |    |    |    | <b>FEEDFORWARD ASSESSMENT: END OF TERM TEST (Week 15)</b><br><u>Rounding</u><br>Significant Figures<br><u>Coordinates</u><br>Coordinates and Midpoints<br><u>Area</u><br>Area and Units<br><b>FEEDFORWARD ASSESSMENT: Week 16 to 18</b><br><u>Circles</u><br>Area and Circumference<br><u>Standard Form</u><br>Standard form and ordinary numbers<br><u>Venn Diagrams</u><br>Venn Diagrams<br>Factors, Multiples and primes<br><b>FEEDFORWARD ASSESSMENT: Week 19 to 23</b><br><u>3d Shapes</u><br>Nets<br><u>Surface area and Volume</u><br>Surface and Volume<br><b>FEEDFORWARD ASSESSMENT: Week 24 to 26</b> |    |    |    |    |    |    |    |    |    |    |    |    |    | <b>FEEDFORWARD ASSESSMENT: END OF TERM TEST (Week 27)</b><br><u>Linear Graphs</u><br>Plotting graphs and finding equations<br><u>Transformations</u><br>Transforming Shapes<br><u>Angles</u><br>Finding unknown angles<br><b>FEEDFORWARD ASSESSMENT: Week 28 to 31</b><br><u>Statistical Diagrams</u><br>Drawing and interpreting statistical diagrams<br><b>END OF YEAR ASSESSMENT: Week 32 – 34 (assessment window)</b><br><u>Inequalities</u><br>Linear Inequalities<br><u>Brackets</u><br>Double brackets<br><u>Algebraic Fractions</u><br>Fractions review<br>Algebraic Fractions<br><u>Recurring Decimals</u><br>Fractions and recurring decimals<br><b>FEEDFORWARD ASSESSMENT: Week 35 to 39</b><br><b>FEEDFORWARD ASSESSMENT: END OF TERM TEST (Week 40)</b> |    |    |    |    |    |    |    |    |    |    |  |  |  | AP |

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|-----------------------|---|--|--|--|---|--|
| Y<br>r<br>9           | <p><b>Fractions and Percentages</b><br/>Fractions, decimals and percentages review<br/>Percentage change.<br/><b>FEEDFORWARD ASSESSMENT: Week 1 to 3</b></p> <p><b>Probability</b><br/>Theoretical and experimental probability</p> <p><b>Standard Form</b><br/>Calculations with standard form</p> <p><b>Inequalities</b><br/>Linear Inequalities<br/><b>FEEDFORWARD ASSESSMENT: Week 4 to 6</b></p> <p><b>Quadratic Equations</b><br/>Factorising and solving quadratic equations</p> <p><b>Formulae</b><br/>Rearranging Formulae<br/><b>FEEDFORWARD ASSESSMENT: Week 7 to 11</b></p> <p><b>Constructions</b><br/>Constructing bisectors and perpendicular lines</p> <p><b>Circles</b><br/>Circles and Cylinders<br/><b>FEEDFORWARD ASSESSMENT: Week 12 to 14</b></p>   | <p><b>FEEDFORWARD ASSESSMENT: END OF TERM TEST (Week 15)</b></p> <p><b>Rounding</b><br/>Error Intervals</p> <p><b>3DShapes</b><br/>Representations of 3D shapes</p> <p><b>Pythagoras' Theorem</b><br/>Pythagoras' Theorem in 2D<br/><b>FEEDFORWARD ASSESSMENT: Week 16 to 19</b></p> <p><b>Ratio and Proportion</b><br/>Ratio<br/>Proportion word problems</p> <p><b>Linear Graphs</b><br/>Plotting graphs and finding equations<br/><b>FEEDFORWARD ASSESSMENT: Week 20 to 23</b></p> <p><b>Compound Measures</b><br/>Speed and rates</p> <p><b>Motion-time Graphs</b><br/>Distance-Time Graphs<br/><b>FEEDFORWARD ASSESSMENT: Week 24 to 26</b></p> | <p><b>FEEDFORWARD ASSESSMENT: END OF TERM TEST (Week 27)</b></p> <p><b>Quadratic Graphs</b><br/>Plotting and interpreting quadratic graphs</p> <p><b>Angles and Bearings</b><br/>Angles<br/>Bearings</p> <p><b>Transformations</b><br/>Transforming shapes<br/><b>FEEDFORWARD ASSESSMENT: Week 28 to 31</b></p> <p><b>Similarity and Congruence</b><br/>Similarity<br/>Congruence<br/><b>END OF YEAR ASSESSMENT: Week 32 – 34 (assessment window)</b></p> <p><b>Handling Data and Statistical Diagrams</b><br/>Collecting and presenting data<br/>Scatter Graphs<br/>Grouped Data</p> <p><b>Vectors</b><br/>Column Vectors<br/><b>FEEDFORWARD ASSESSMENT: Week 35 to 39</b></p> <p><b>FEEDFORWARD ASSESSMENT: END OF TERM TEST (Week 40)</b></p>   | AP   |   |  |
| Y<br>r<br>1<br>0<br>F | <p><b>Graphs</b><br/><i>N13 A7 A8 A9 A10 A12 A14 A17 R11 R14 G14</i><br/>Coordinates<br/>Linear Graphs<br/>Gradient<br/><math>Y=mx+c</math><br/>Real-life graphs<br/>Distance-time graphs<br/>More real-life graphs<br/><b>FEEDFORWARD ASSESSMENT: Topic Test</b></p> <p><b>Transformations</b><br/><i>R6 G1 G7 G24</i><br/>Translation<br/>Reflection<br/>Rotation<br/>Enlargement<br/>Describing Enlargements<br/>Combining Transformations<br/><b>FEEDFORWARD ASSESSMENT: Topic Test</b></p> <p><b>Ratio and Proportion</b><br/><i>N11 N13 R1 R4 R5 R6 R7 R8 R10 R11 R12 R14</i><br/>Writing Ratios<br/>Using Ratios 1<br/>Ratios and measures<br/>Using ratios 2<br/>Comparing using ratios<br/>Using poroportion<br/>Proportion and graphs<br/>Proportion problems<br/><b>FEEDFORWARD ASSESSMENT: Topic Test</b></p> <p><b>Right-Angled Triangles</b><br/><i>N7 N15 R12 G6 G11 G20 G21</i><br/>Pythagoras' theorem 1<br/>Pythagoras theorem 2<br/>The sine ratio 1<br/>The sine ratio 2<br/>The cosine ratio<br/>The tangent ratio<br/>Finding lengths and angles using trigonometry<br/><b>FEEDFORWARD ASSESSMENT: Topic Test</b></p> | <p><b>Revision and AP's</b></p> <p>These 3 weeks are dedicated to revising and preparing for AP1</p>   | <p><b>Probability</b><br/><i>N5 P1 P2 P3 P4 P5 P6 P7 P8</i><br/>Calculating probability two events<br/>Experimental probability<br/>Venn diagrams<br/>Tree diagrams<br/>More tree diagrams</p> <p><b>FEEDFORWARD ASSESSMENT: Topic Test</b></p> <p><b>Multiplicative Reasoning</b><br/><i>N13 R1 R7 R9 R10 R11 R13 R16 G14</i><br/>Percentages<br/>Growth and decay<br/>Compound measures<br/>Distance, speed and time<br/>Direct and inverse proportion</p> <p><b>FEEDFORWARD ASSESSMENT: Topic Test</b></p> <p><b>Constructions and Loci</b><br/><i>R2 R6 G1 G2 G4 G5 G6 G7 G12 G13 G15</i><br/>3D solids<br/>Plans and elevations<br/>Accurate drawings 1<br/>Scale drawings and Maps<br/>Accurate drawings 2<br/>Constructions<br/>Loci and regions<br/>Scale drawings and maps</p> <p><b>FEEDFORWARD ASSESSMENT: Topic Test</b></p> | <p><b>Constructions and Loci</b><br/><i>R2 R6 G1 G2 G4 G5 G6 G7 G12 G13 G15</i><br/>Bearings</p> <p><b>Quadratic Equations and Graphs</b><br/><i>N4 A1 A3 A4 A6 A8 A11 A12 A14 A18</i><br/>Expanding double brackets<br/>Factorising double brackets<br/>Solving quadratic equations algebraically<br/>Plotting quadratic graphs<br/>Using quadratic graphs</p> <p><b>FEEDFORWARD ASSESSMENT: Topic Test</b></p> | <p><b>Revision and AP's</b></p> <p>These 3 weeks are dedicated to revising and preparing for end of year assessment</p> | <p><b>DTT</b></p> <p>Analyse assessments and DIAGNOSE key areas for development then TEACH and formatively TEST ready for next year.</p> |
| Y<br>r<br>1<br>0<br>H | <p><b>Equations and Inequalities</b><br/><i>N1 N8 A3 A4 A5 A9 A11 A18 A19 A21 A22</i><br/>Solving quadratic equations 1<br/>Solving quadratic equations 2<br/>Completing the square<br/>Solving simple simultaneous equations<br/>More simultaneous equations<br/>Solving linear and quadratic simultaneous equations<br/>Solving linear inequalities</p>   | <p><b>Revision and AP's</b></p> <p>These 3 weeks are dedicated to revising and preparing for AP1</p>   | <p><b>More Trigonometry</b><br/><i>N16 A8 A12 A13 G20 G22 G23</i><br/>Accuracy<br/>Graphs of sine functions<br/>Graphs of cosine functions<br/>The tangent function<br/>Calculating areas and the sine rule<br/>The cosine rule and 2D trigonometric problems<br/>Solving problems in 3D</p>   | <p><b>Equations and Graphs</b><br/><i>N8 A4 A11 A12 A18 A19 A20 A21 A22</i><br/>Solving simultaneous equations graphically<br/>Representing inequalities graphically<br/>Graphs of quadratic functions<br/>Solving quadratic equations graphically<br/>Graphs of cubic functions</p>   | <p><b>Revision and AP's</b></p> <p>These 3 weeks are dedicated to revising and preparing for end of year assessment</p> | <p><b>DTT</b></p> <p>Analyse assessments and DIAGNOSE key areas for development then TEACH and formatively TEST ready for next year.</p> |

|                       |   |   |  |   |       |  |
|-----------------------|---|---|--|---|-------|--|
|                       | <p><b>FEEDFORWARD ASSESSMENT: Topic Test</b><br/> <u>Probability</u><br/> <i>N1 P1 P2 P3 P4 P5 P6 P7 P8 P9</i><br/>         Combined events<br/>         Mutually exclusive events<br/>         Experimental probability<br/>         Independant events and tree diagrams<br/>         Conditional probability<br/>         Venn diagrams and set notations<br/> <b>FEEDFORWARD ASSESSMENT: Topic Test</b><br/> <u>Multiplicative Reasoning</u><br/> <i>N12 N13 A2 A9 R1 R6 R9 R10 R11 R13 R14 R16</i><br/>         Growth and decay<br/>         Compound measures<br/>         More compound measures<br/>         Ratio and proportions<br/> <b>FEEDFORWARD ASSESSMENT: Topic Test</b><br/> <u>Similarity and Congruence</u><br/> <i>R6 R12 G5 G6 G7 G17 G19</i><br/>         Congruence<br/>         Geomretic proof and congruence<br/>         Similarity<br/>         More similariry<br/>         Similarity in 3D solids<br/> <b>FEEDFORWARD ASSESSMENT: Topic Test</b></p> |   | <p>Transforming trigonometric graphs 1<br/>         Transforming trigonometric graphs 2<br/> <b>FEEDFORWARD ASSESSMENT: Topic Test</b><br/> <u>Further Statistics</u><br/> <i>S1 S3 S4</i><br/>         Sampling<br/>         Cumulative frequency and box plots<br/>         Drawing histograms<br/>         Interpreting histograms<br/>         Comparing and describing populations<br/> <b>FEEDFORWARD ASSESSMENT: Topic Test</b></p> | <p><b>FEEDFORWARD ASSESSMENT: Topic Test</b><br/> <u>Circle Theorems</u><br/> <i>A16 G9 G10</i><br/>         Radii and chords<br/>         Tangents Angles in circles 1<br/>         Angles in circles 2<br/>         Applying circle theorems<br/> <b>FEEDFORWARD ASSESSMENT: Topic Test</b></p> |       |  |
| Y<br>r<br>1<br>1<br>F | <p><u>Perimeter, Area and Volume 2</u><br/> <i>N8 N14 N15 N16 G9 G14 G16 G17 G18</i><br/>         Circumference of a circle 1<br/>         Circumference of a circle 2<br/>         Area of a circle<br/>         Semicircles and sectors<br/>         Composite 2D shapes and cylinders<br/>         Pyramids and cones<br/>         Spheres and composite solids<br/> <b>FEEDFORWARD ASSESSMENT: Topic Test</b><br/> <u>Fractions, Indices and Standard Form</u><br/> <i>N2 N3 N6 N7 N8 N9</i><br/>         Multiplying and dividing fractions<br/>         Laws of indices<br/>         Writing large numbers in standard form<br/>         Writing small numbers in standard form<br/>         Calculating with standard form<br/> <b>FEEDFORWARD ASSESSMENT: Topic Test</b></p>  | <p><u>Congruence, Similarity and Vectors</u><br/> <i>R6 R12 G3 G5 G6 G7 G17 G19 G24 G25</i><br/>         Similarity and enlargement<br/>         More similariry<br/>         Using similariry<br/>         Congruence 1<br/>         Congruence 2<br/>         Vectors 1<br/>         Vectors 2<br/> <b>FEEDFORWARD ASSESSMENT: Topic Test</b><br/> <u>More Algebra</u><br/> <i>A2 A3 A5 A6 A12 A14 A17 A19 A21 R10 R13 R14 R16</i><br/>         Graphs of cubic and reciprocal functions<br/>         Non-linear graphs<br/>         Solving simultaneous equations graphically<br/>         Solving simultaneous algebraically<br/>         Rearranging formulae<br/>         Proof<br/> <b>FEEDFORWARD ASSESSMENT: Topic Test</b></p> | <p><b>DTT</b><br/>         Analyse assessments and <b>DIAGNOSE</b> key areas for development then <b>TEACH</b> and formatively <b>TEST</b> ready for next year.<br/> <b>Every 2 weeks - FEEDFORWARD ASSESSMENT: Past paper exam questions</b></p>  | <p><b>DTT</b><br/>         Analyse assessments and <b>DIAGNOSE</b> key areas for development then <b>TEACH</b> and formatively <b>TEST</b> ready for next year.</p>   | Exams |  |
|                       | Examination Rehearsal 1 - (November)  | Examination Rehearsal 2 - (March)   |  |   |       |  |
| Y<br>r<br>1<br>1<br>H | <p><u>More Algebra</u><br/> <i>N8 A4 A5 A6 A7 A18</i><br/>         Rearranging formulae<br/>         Algebraic fractions<br/>         Simplifying algebraic fractions<br/>         More algebraic fractions<br/>         Solving algebraic fractions equations<br/>         Functions<br/>         Proof<br/> <b>FEEDFORWARD ASSESSMENT: Topic Test</b><br/> <u>Vectors and Geometric Proof</u><br/> <i>G25</i><br/>         Vectors and vectors notation<br/>         Vector arithmetic<br/>         More vector arithmetic<br/>         Parallel vectors and collinear points<br/>         Solving geometric problems<br/> <b>FEEDFORWARD ASSESSMENT: Topic Test</b></p>  | <p><u>Proportion and Graphs</u><br/> <i>A7 A12 A13 A14 A15 R7 R10 R13 R14 R15 R16</i><br/>         Direct proportion<br/>         More direct propotion<br/>         Inverse propotion<br/>         Exponential functions<br/>         Non-linear graphs<br/>         Translating graphs of functions<br/>         Reflecting and stretching graphs of functions<br/> <b>FEEDFORWARD ASSESSMENT: Topic Test</b></p>   | <p><b>DTT</b><br/>         Analyse assessments and <b>DIAGNOSE</b> key areas for development then <b>TEACH</b> and formatively <b>TEST</b> ready for next year.<br/> <b>Every 2 weeks - FEEDFORWARD ASSESSMENT: Past paper exam questions</b></p>  | <p><b>DTT</b><br/>         Analyse assessments and <b>DIAGNOSE</b> key areas for development then <b>TEACH</b> and formatively <b>TEST</b> ready for next year.</p>   | Exams |  |
|                       | Examination Rehearsal 1 - (November)  | Examination Rehearsal 2 - (March)   |  |   |       |  |

# KS5 Links

## KS5 Maths Subject Criteria

### A-Level Maths Pearson Specification

The KS5 curriculum develops on from much on the higher content taught at KS4 higher tier and is split across Pure and Applied. Students would have finished year 11 having covered all the content required for this transition and this alongside our high-quality teaching for resilience and problem-solving students should also be prepared for the demands of the course.

In this section is an overview of AS mathematics and the skills needed across the first year and their GCSE spec reference. These skills would then develop into those needed for A2 mathematics

Prior Knowledge;

| Pure Mathematics  | Applied   |
|---|---|
| <p><b>Unit 1: Algebra and functions</b></p> <ul style="list-style-type: none"> <li>A4 Collecting like terms and factorising</li> <li>N8 Surds</li> <li>A19 Solving linear simultaneous equations</li> <li>A18 Solving quadratic equations (by factorising and completing the square)</li> <li>A22 Working with inequalities; Solving quadratic inequalities</li> <li>A12 Functional notation and shapes of standard graphs (e.g. parabola, cubic, reciprocal)</li> <li>N7 Rules of indices</li> </ul> | <p><b>Unit 1: Statistical sampling</b></p> <ul style="list-style-type: none"> <li>S1 Infer properties of populations or distributions from a sample, while knowing the limitations of sampling</li> <li>S5 Apply statistics to describe a population</li> </ul>   |
| <p><b>Unit 2: Coordinate geometry in the (x, y) plane</b></p> <ul style="list-style-type: none"> <li>A9 Equation of a line, parallel and perpendicular lines</li> <li>G20 Pythagoras</li> <li>A14 Conversion graphs</li> <li>R10 Calculating the proportionality constant k</li> <li>G10 Circle theorems</li> </ul>   | <p><b>Unit 2: Data presentation and interpretation</b></p> <ul style="list-style-type: none"> <li>S2 Interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data and know their appropriate use</li> <li>S3 Construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use</li> <li>S4 Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers), quartiles and inter-quartile range</li> <li>S6 Use and interpret scatter graphs of bivariate data; recognise correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends while knowing the dangers of so doing</li> </ul> |
| <p><b>Unit 3: Further algebra</b></p> <ul style="list-style-type: none"> <li>A4 Expanding brackets</li> <li>A2 Substitution</li> <li>A6 Proof</li> </ul>  | <p><b>Unit 3: Probability</b></p> <ul style="list-style-type: none"> <li>P1 Record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees</li> <li>P2 Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments</li> <li>P3 Relate relative expected frequencies to theoretical probability, using appropriate language and the 0-1 probability scale</li> <li>P4 Apply the property that the probabilities of an exhaustive set of outcomes sum to one; apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one</li> <li>P6 Enumerate sets and combinations of sets systematically, using tables, grids</li> <li>P7 Construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities</li> <li>P9 Tree diagrams and Venn diagrams</li> </ul>  |
| <p><b>Unit 4: Trigonometry</b></p> <ul style="list-style-type: none"> <li>G20 Pythagoras' Theorem and Trigonometry in right-angled triangles</li> <li>G22 The sine rule and the cosine rule</li> <li>G23 The area of a triangle</li> <li>G15 Bearings</li> </ul>  | <p><b>Unit 4: Statistical distributions</b></p> <ul style="list-style-type: none"> <li>N1 Order positive and negative integers, decimals and fractions; use the symbols =, ≠, &lt;, &gt;, ≤, and ≥</li> </ul>   |
| <p><b>Unit 5: Vectors (2D)</b></p> <ul style="list-style-type: none"> <li>G24 Vectors</li> </ul>  | <p><b>Unit 5: Statistical Hypothesis testing</b></p> <ul style="list-style-type: none"> <li>S1 Infer properties of populations or distributions from a sample, while knowing the limitations of sampling</li> <li>S5 Apply statistics to describe a population</li> </ul>   |
| <p><b>Unit 6: Differentiation</b></p> <ul style="list-style-type: none"> <li>N8 Fractions</li> <li>G16 Area of 2D shapes and volume and surface area of 3D shapes</li> <li>A5 Rearranging equations</li> </ul>  | <p><b>Unit 6: Quantities and units in mechanics</b></p> <ul style="list-style-type: none"> <li>R1 Change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts</li> <li>R11 Use compound units such as speed, rates of pay, unit pricing, density and pressure</li> <li>A14 Plot and interpret graphs (including reciprocal graphs and exponential graphs) and graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration</li> <li>A15 Calculate or estimate gradients of graphs and area under graphs (including quadratic and non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts</li> </ul>   |
| <p><b>Unit 7: Integration</b></p> <ul style="list-style-type: none"> <li>N8 Fractions</li> <li>G16 Area of 2D shapes and volume and surface area of 3D shapes</li> <li>A5 Rearranging equations</li> </ul>  | <p><b>Unit 7: Kinematics (constant acceleration)</b></p> <ul style="list-style-type: none"> <li>R1 Change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts</li> <li>R11 Use compound units such as speed, rates of pay, unit pricing, density and pressure</li> <li>A2 Substitute numerical values into formulae and expressions, including scientific formulae</li> <li>A5 Understand and use standard mathematical formulae; rearrange formulae to change the subject</li> </ul>   |



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|  | <ul style="list-style-type: none"> <li>• A14 Plot and interpret graphs (including reciprocal graphs and exponential graphs) and graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration</li> <li>• A15 Calculate or estimate gradients of graphs and area under graphs (including quadratic and non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts</li> <li>• A17 Solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation)</li> <li>• A18 Solve quadratic equations (including those that require rearrangement) algebraically by factorising, by completing the square and by using the quadratic formula</li> </ul> |
| <p>Unit 8: Exponentials and logarithms</p> <ul style="list-style-type: none"> <li>• R16 Compound interest</li> </ul> | <p>Unit 8: Forces &amp; Newton's laws</p> <ul style="list-style-type: none"> <li>• A19 Solve two simultaneous equations in two variables (linear/linear or linear/quadratic) algebraically; find approximate solutions using a graph</li> </ul>  |
|  | <p>Unit 9: Kinematics 2 (variable acceleration)</p> <ul style="list-style-type: none"> <li>• A11 Identify and interpret roots, intercepts, turning points of quadratic functions graphically; deduce roots algebraically and turning points by completing the square</li> <li>• A14 Plot and interpret graphs (including reciprocal graphs and exponential graphs) and graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration</li> <li>• A15 Calculate or estimate gradients of graphs and area under graphs (including quadratic and non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts</li> </ul>  |

# AGE RELATED EXPECTATIONS

## YEAR 7

|   | Topics / Units   | Number & Ratio  | Algebra & Graphs  | Geometry & Measure   | Probability & Statistics   |
|---|--|---|---|--|--|
| 4 | <p><b>EXPERT</b></p> <p>Across the skills acquired this year an expert child has developed a secure and deep understanding. They rarely make mistakes and can explain thinking and reasoning clearly with the use of correct mathematical language. They are also able to apply and transfer their learning and link it to new concepts without prompting.</p>   | <p>Students are acquiring knowledge around the following areas of number and ratio;</p> <ul style="list-style-type: none"> <li>Using number lines</li> <li>Integer place value</li> <li>Decimal place value</li> <li>Ordering negative numbers</li> <li>Rounding integers</li> <li>Rounding decimals</li> <li>Adding integers</li> <li>Adding decimals</li> <li>Subtracting integers</li> <li>Subtracting decimals</li> <li>Multiplying and dividing by 10, 100 and 1000</li> <li>Multiplying using place value</li> <li>Using a written method to multiply integers</li> <li>Using a written method to multiply decimals</li> <li>Dividing numbers into equal groups</li> <li>Using a written method to divide integers</li> <li>Dividing with remainder</li> <li>Using a written method to divide by integers to get a decimal answer</li> <li>Using a written method to divide by decimals</li> <li>Adding and subtracting with negative numbers</li> <li>Multiplying and dividing with negative numbers</li> <li>Calculating with roots and powers</li> <li>Using the correct order of operations</li> <li>Using the commutative laws</li> <li>Using the associative laws</li> <li>Finding the lowest common multiple</li> <li>Finding factors and using divisibility tests</li> <li>Finding the highest common factor</li> <li>Finding prime numbers</li> <li>Prime factor decomposition</li> <li>Finding fractions of shapes</li> </ul> | <p>Students are acquiring knowledge around the following areas of algebra and graphs;</p> <ul style="list-style-type: none"> <li>Algebraic notation</li> <li>Algebraic terminology</li> <li>Simplifying expressions containing a single variable</li> <li>Simplifying expressions containing multiple variables</li> <li>Simplifying expressions containing non-linear terms</li> <li>Substituting into expressions with one operation</li> <li>Substituting into expressions with multiple operations</li> <li>Substituting into algebraic formulae</li> <li>Substituting into real-life formulae</li> <li>Solving equations with one step</li> <li>Solving equations of the form <math>ax+b=c</math></li> <li>Solving equations of the form <math>x/a+b=c</math></li> <li>Reading and plotting coordinates</li> <li>Solving shape problems involving coordinates</li> <li>Using the distributive law</li> <li>Expanding single brackets</li> <li>Expanding single brackets and simplifying expressions</li> <li>Factorising into one bracket</li> </ul> | <p>Students are acquiring knowledge around the following areas of geometry and measure;</p> <ul style="list-style-type: none"> <li>Line properties</li> <li>Shape properties</li> <li>Symmetry</li> <li>Finding perimeters using grids</li> <li>Finding the perimeter of rectangles and simple shapes</li> <li>Finding the perimeter of compound shapes</li> <li>Finding areas using grids</li> <li>Finding the area of rectangles</li> <li>Finding the area of compound shapes</li> <li>Finding the area of triangles</li> <li>Finding the area of compound shapes containing triangles</li> <li>Types of angles</li> <li>Estimating angles</li> <li>Measuring angles</li> <li>Drawing angles</li> <li>Angles on a line and about a point</li> <li>Vertically opposite angles</li> <li>Angles in triangles</li> </ul> | <p>Students are acquiring knowledge around the following areas of probability and statistics;</p> <ul style="list-style-type: none"> <li>Calculating the median</li> <li>Finding the mode</li> <li>Calculating the mean</li> <li>Interpreting frequency tables and two-way tables</li> <li>Drawing and interpreting tally charts</li> <li>Drawing and interpreting pictograms</li> <li>Drawing bar charts</li> <li>Interpreting bar charts</li> <li>Collecting and recording data using tables</li> <li>Finding averages from frequency tables</li> <li>Choosing suitable averages and solving problems</li> <li>Using probability phrases</li> <li>Writing probabilities as fractions</li> <li>Writing probabilities as fractions, decimals and percentages</li> <li>Probabilities of mutually exclusive events</li> <li>Sample space diagrams</li> </ul> |
| 3 | <p><b>ADVANCED</b></p> <p>Across the skills acquired this year, an advanced child can work confidently and independently and complete most tasks without support, any mistakes made are used as key moments to make progress. An advanced student can link learning, sometimes with prompts, but can describe approaches and ideas often using correct terminology with the key concepts retained over time.</p> |   |   |  |  |

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|---|---|--|--|--|--|
|   |   | <ul style="list-style-type: none"> <li>• Constructing fractions</li> <li>• Finding equivalent fractions</li> <li>• Simplifying fractions</li> <li>• Ordering fractions</li> <li>• Converting between mixed numbers and improper fractions</li> </ul>   |  |  |  |
| 2 | <p><b>DEVELOPING</b></p> <p>Across the skills acquired this year a developing child can use clear modelling to support independent practise but is not confident and require reassurance often. A developing child may make mistakes which require teacher support on more than one occasion and require prompts to support link ideas. Knowledge is not always retained over time and students can sometimes explain thinking and reasoning.</p> | <ul style="list-style-type: none"> <li>• Adding and subtracting fractions</li> <li>• Adding and subtracting mixed numbers</li> <li>• Reciprocals</li> <li>• Multiplying fractions</li> <li>• Dividing fractions</li> <li>• Multiplying with mixed numbers</li> <li>• Dividing with mixed numbers</li> <li>• Fractions of amounts without a calculator</li> <li>• Fractions of amounts with a calculator</li> <li>• Converting between fractions and decimals</li> <li>• Converting between fractions, decimals and percentages</li> <li>• Ordering fractions, decimals and percentages</li> <li>• Writing numbers as percentages of other numbers</li> </ul> |  |  |  |
| 1 | <p><b>POTENTIAL</b></p> <p>Across the skills acquired this year a potential child further teacher support and modelling is required with tasks generally not completed independently or sustained once support is withdrawn. A potential child will require clear prompts to use retained knowledge to explain what concepts are being used when solving problems.</p>  | <ul style="list-style-type: none"> <li>• Converting units of time</li> <li>• Using clocks</li> <li>• Calculating with time</li> <li>• Using timetables</li> <li>• Using calendars</li> <li>• Estimating and measuring length, mass and capacity</li> <li>• Converting units of length, mass and capacity</li> <li>• Using appropriate units</li> <li>• Solving proportion problems</li> </ul>  |  |  |  |

## YEAR 8

|   | Topics / Units   | Number & Ratio   | Algebra & Graphs  | Geometry & Measure  | Probability & Statistics   |
|---|--|--|---|---|--|
| 4 | <p><b>EXPERT</b></p> <p>Across the skills acquired this year an expert child has developed a secure and deep understanding. They rarely make mistakes and can explain thinking and reasoning clearly with the use of correct mathematical language. They are also able to apply and transfer their learning and link it to new concepts without prompting.</p>   | <p>Students are acquiring knowledge around the following areas of number and ratio;</p> <ul style="list-style-type: none"> <li>Finding percentages of amounts without a calculator</li> <li>Finding percentages of amounts with a calculator</li> <li>Percentage change without a calculator</li> <li>Percentage change with a calculator</li> <li>Rounding integers using significant figures</li> <li>Rounding decimals using significant figures</li> <li>Estimating calculations</li> <li>Using standard form with positive indices</li> <li>Using standard form with negative indices</li> <li>Using recurring decimal notation</li> <li>Converting fractions to recurring decimals</li> <li>Value for money</li> <li>Writing and simplifying ratios</li> <li>Writing ratios in the form 1:n</li> <li>Converting between ratios, fractions and percentages</li> <li>Using equivalent ratios to find unknown amounts</li> <li>Sharing amounts in a given ratio</li> <li>Drawing and interpreting scale diagrams</li> </ul> | <p>Students are acquiring knowledge around the following areas of algebra and graphs;</p> <ul style="list-style-type: none"> <li>Index rules with positive indices</li> <li>Index rules with negative indices</li> <li>Simplifying expressions using index laws</li> <li>Simplifying algebraic fractions by cancelling common factors</li> <li>Solving equations of the form <math>(x+a)/b=c</math></li> <li>Solving linear equations involving brackets</li> <li>Solving equations with the unknown on both sides</li> <li>Solving equations with the unknown in the denominator</li> <li>Constructing and solving equations</li> <li>Term-to-term rules for numerical sequences</li> <li>Term-to-term rules for sequences of patterns</li> <li>Substituting into position-to-term rules</li> <li>Position-to-term rules for arithmetic sequences</li> <li>Position-to-term rules for sequences of patterns</li> <li>Calculating midpoints</li> <li>Mixed problems: Coordinates and midpoints</li> <li>Plotting horizontal, vertical and diagonal lines</li> <li>Plotting straight line graphs</li> <li>Finding equations of straight-line graphs</li> </ul> | <p>Students are acquiring knowledge around the following areas of geometry and measure;</p> <ul style="list-style-type: none"> <li>Finding the area of parallelograms</li> <li>Finding the area of trapeziums</li> <li>Converting units of area</li> <li>Identifying parts of circles</li> <li>Finding the circumference of circles</li> <li>Finding the area of circles</li> <li>Properties of 3D shapes</li> <li>Nets of 3D shapes</li> <li>Finding the surface area from a net</li> <li>Finding the surface area of cubes and cuboids</li> <li>Finding the surface area of prisms</li> <li>Finding the volume of cubes and cuboids</li> <li>Finding the volume of prisms</li> <li>Converting units of volume</li> <li>Translation</li> <li>Reflection</li> <li>Angles in quadrilaterals</li> <li>Combining angle facts</li> <li>Angles on parallel lines</li> <li>Using quadrilateral properties to find angles</li> <li>Angles in polygons</li> </ul> | <p>Students are acquiring knowledge around the following areas of probability and statistics;</p> <ul style="list-style-type: none"> <li>Venn diagrams</li> <li>Probabilities from Venn diagrams</li> <li>Finding the HCF and LCM using prime factor decomposition</li> <li>Drawing pie charts</li> <li>Interpreting pie charts</li> <li>Drawing line graphs</li> <li>Interpreting line graphs</li> <li>Drawing stem-and-leaf diagrams</li> <li>Interpreting stem-and-leaf diagrams</li> <li>Finding averages from diagrams</li> </ul> |
| 3 | <p><b>ADVANCED</b></p> <p>Across the skills acquired this year, an advanced child can work confidently and independently and complete most tasks without support, any mistakes made are used as key moments to make progress. An advanced student can link learning, sometimes with prompts, but can describe approaches and ideas often using correct terminology with the key concepts retained over time.</p> |  |   |   |  |

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| 2 | <p><b>DEVELOPING</b></p> <p>Across the skills acquired this year a developing child is able to use clear modelling to support independent practise but is not confident and require reassurance often. A developing child may make mistakes which require teacher support on more than one occasion and require prompts to support link ideas. Knowledge is not always retained over time and students can sometimes explain thinking and reasoning.</p> |  | <ul style="list-style-type: none"> <li>• Reading and drawing linear inequalities on number lines</li> <li>• Solving single inequalities</li> <li>• Expanding double brackets</li> <li>• Calculating with fractions</li> <li>• Calculating with mixed numbers</li> <li>• Simplifying algebraic fractions by factorising</li> <li>• Adding and subtracting algebraic fractions</li> </ul> |  |  |
| 1 | <p><b>POTENTIAL</b></p> <p>Across the skills acquired this year a potential child further teacher support and modelling is required with tasks generally not completed independently or sustained once support is withdrawn. A potential child will require clear prompts to use retained knowledge to explain what concepts are being used when solving problems.</p>   |  |   |  |  |

## YEAR 9

|   | Topics / Units   | Number & Ratio   | Algebra & Graphs   | Geometry & Measure   | Probability & Statistics   |
|---|--|--|--|--|--|
| 4 | <p><b>EXPERT</b></p> <p>Across the skills acquired this year an expert child has developed a secure and deep understanding. They rarely make mistakes and can explain thinking and reasoning clearly with the use of correct mathematical language. They are also able to apply and transfer their learning and link it to new concepts without prompting.</p>   | <p>Students are acquiring knowledge around the following areas of number and ratio;</p> <ul style="list-style-type: none"> <li>• Converting between fractions, decimals and percentages</li> <li>• Ordering fractions, decimals and percentages</li> <li>• Finding fractions of amounts without a calculator</li> <li>• Finding fractions of amounts with a calculator</li> <li>• Finding percentages of amounts without a calculator</li> <li>• Finding percentages of amounts with a calculator</li> <li>• Percentage change without a calculator</li> <li>• Percentage change with a calculator</li> <li>• Finding original values in percentage calculations</li> <li>• Finding the percentage an amount has been changed by</li> <li>• Simple interest calculations</li> <li>• Multiplying and dividing numbers in standard form</li> <li>• Adding and subtracting numbers in standard form</li> <li>• Standard form with a calculator</li> <li>• Finding error intervals</li> <li>• Truncating decimals</li> <li>• Finding error intervals for truncated numbers</li> <li>• Writing and simplifying ratios</li> <li>• Sharing amounts in a given ratio</li> <li>• Solving direct proportion word problems</li> </ul> | <p>Students are acquiring knowledge around the following areas of algebra and graphs;</p> <ul style="list-style-type: none"> <li>• Solving inequalities with the unknown on both sides</li> <li>• Solving double inequalities</li> <li>• Constructing and solving inequalities</li> <li>• Factorising quadratic equations of the form <math>x^2+bx+c</math></li> <li>• Factorising the difference of two squares</li> <li>• Factorising to solve quadratic equations of the form <math>x^2+bx+c=0</math></li> <li>• Changing the subjects of formulae with one step</li> <li>• Changing the subjects of formulae with two or more steps</li> <li>• Plotting straight line graphs</li> <li>• Finding equations of straight line graphs</li> <li>• Interpreting equations of straight line graphs</li> <li>• Plotting distance-time graphs</li> <li>• Interpreting distance-time graphs</li> <li>• Calculating speed from distance-time graphs</li> <li>• Plotting distance-time graphs using speeds</li> <li>• Plotting graphs of quadratic functions</li> <li>• Interpreting graphs of quadratic functions</li> <li>• Solving quadratic equations graphically</li> </ul> | <p>Students are acquiring knowledge around the following areas of geometry and measure;</p> <ul style="list-style-type: none"> <li>• Constructing bisectors of angles</li> <li>• Constructing perpendicular bisectors and lines</li> <li>• Finding the arc length of sectors</li> <li>• Finding the area of sectors</li> <li>• Finding the surface area of cylinders</li> <li>• Finding the volume of cylinders</li> <li>• Plans and elevations</li> <li>• Using Pythagoras' theorem in 2D</li> <li>• Combining angle facts</li> <li>• Angles on parallel lines</li> <li>• Using quadrilateral properties to find angles</li> <li>• Angles in polygons</li> <li>• Measuring and drawing bearings</li> <li>• Calculating bearings</li> <li>• Translation</li> <li>• Reflection</li> <li>• Rotation</li> <li>• Enlargement by a positive scale factor</li> <li>• Mixed transformations</li> <li>• Understanding similarity</li> <li>• Finding unknown sides in similar shapes</li> <li>• Understanding congruence</li> <li>• Congruent triangles</li> <li>• Constructing triangles</li> <li>• Understanding column vectors</li> <li>• Adding and subtracting column vectors</li> <li>• Multiplying column vectors by a scalar</li> </ul> | <p>Students are acquiring knowledge around the following areas of probability and statistics;</p> <ul style="list-style-type: none"> <li>• Expected results from repeated experiments</li> <li>• Calculating experimental probabilities</li> <li>• Frequency trees</li> <li>• Types of data</li> <li>• Presenting data and making conclusions</li> <li>• Comparing populations using diagrams</li> <li>• Choosing suitable averages and solving problems</li> <li>• Plotting scatter graphs</li> <li>• Interpreting scatter graphs</li> <li>• Using lines of best fit</li> <li>• Interpreting frequency tables with grouped data</li> <li>• Finding averages from grouped data</li> <li>• Drawing and interpreting frequency polygons</li> </ul> |
| 3 | <p><b>ADVANCED</b></p> <p>Across the skills acquired this year, an advanced child can work confidently and independently and complete most tasks without support, any mistakes made are used as key moments to make progress. An advanced student can link learning, sometimes with prompts, but can describe approaches and ideas often using correct terminology with the key concepts retained over time.</p> |  |  |  |  |

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|   |  |   |  | <ul style="list-style-type: none"> <li>Identifying parallel vectors</li> </ul> |  |
| 2 | <p><b>DEVELOPING</b></p> <p>Across the skills acquired this year a developing child is able to use clear modelling to support independent practise but is not confident and require reassurance often. A developing child may make mistakes which require teacher support on more than one occasion and require prompts to support link ideas. Knowledge is not always retained over time and students can sometimes explain thinking and reasoning.</p> | <ul style="list-style-type: none"> <li>Solving inverse proportion word problems</li> <li>Currency conversion</li> <li>Calculating with speed</li> <li>Calculating with rates</li> </ul> |  |  |  |
| 1 | <p><b>POTENTIAL</b></p> <p>Across the skills acquired this year a potential child further teacher support and modelling is required with tasks generally not completed independently or sustained once support is withdrawn. A potential child will require clear prompts to use retained knowledge to explain what concepts are being used when solving problems.</p>   |   |  |  |  |

# End of Course Expectations

## Pearson Maths Specification

| Edexcel Maths                     |   |
|-----------------------------------|---|
| <b>Aims and learning outcomes</b> | <p>The aims and objectives of the Pearson Edexcel Level 1/Level 2 GCSE (9–1) in Mathematics are to enable students to:</p> <ul style="list-style-type: none"><li>• develop fluent knowledge, skills and understanding of mathematical methods and concepts</li><li>• acquire, select and apply mathematical techniques to solve problems</li><li>• reason mathematically, make deductions and inferences, and draw conclusions</li><li>• comprehend, interpret and communicate mathematical information in a variety of forms appropriate to the information and context</li></ul>  |
| <b>Assessment objectives</b>      | <ul style="list-style-type: none"><li>• <b>AO1</b> - Use and apply standard techniques Students should be able to:<ul style="list-style-type: none"><li>○ accurately recall facts, terminology and definitions</li><li>○ use and interpret notation correctly</li><li>○ accurately carry out routine procedures or set tasks requiring multi-step solutions.</li></ul></li><li>• <b>AO2</b> - Reason, interpret and communicate mathematically Students should be able to:<ul style="list-style-type: none"><li>○ make deductions, inferences and draw conclusions from mathematical information</li><li>○ construct chains of reasoning to achieve a given result</li><li>○ interpret and communicate information accurately</li><li>○ present arguments and proofs</li><li>○ assess the validity of an argument and critically evaluate a given way of presenting information. Where problems require students to ‘use and apply standard techniques’ or to independently ‘solve problems’ a proportion of those marks should be attributed to the corresponding Assessment Objective.</li></ul></li><li>• <b>AO3</b> - Solve problems within mathematics and in other contexts Students should be able to:<ul style="list-style-type: none"><li>○ translate problems in mathematical or nonmathematical contexts into a process or a series of mathematical processes</li><li>○ make and use connections between different parts of mathematics</li><li>○ interpret results in the context of the given problem</li><li>○ evaluate methods used and results obtained</li><li>○ evaluate solutions to identify how they may have been affected by assumptions made. Where problems require students to ‘use and apply standard techniques’ or to ‘reason, interpret and communicate mathematically’ a proportion of those marks should be attributed to the corresponding Assessment Objective.</li></ul></li></ul> |



# DEPARTMENT FEEDBACK POLICY

## Formative Feedback

The department will provide continuous formative feedback to students every lesson and track progress each lesson using a holistic 1-4 age related expectation grade.

The department will set topic / unit summative assessments at the end of the topic / unit at set points throughout the year. These will be marked in green pen and improvements fed back to students. These marks will go towards the holistic 1-4 age related expectations formative assessment grade.

A formative assessment data drop will be completed once per half term.

## Assessment Feedback Frequency

KS3 will sit a Summative end of year assessment where the percentage achieved in the assessment will be reported to parents/carers as well as a holistic 1-4 formative assessment grade.

In KS4 Year 10 will sit two summative assessments during the year and the percentage mark of the first Assessment Point (AP1) will be reported and shared with parents/carers as well as a working at 1-9 grade. The second will be an end of year assessment mock style exam. Predictive 1-9 grades will then be calculated at the end of the year.

Year 11 will sit one examination rehearsal halfway through the year in preparation for their actual exams again providing a more accurate working at grade and prediction for end of year results.

## Planning for Feedback

- Feedback must be planned for using the **FEEDFORWARD ASSESSMENT** planning sheets
- This needs to be completed on a specific independent learning activity undertaken in the students' books which should happen every 6-10 lessons.
- Books should be checked at the same time for presentation with an acknowledgement to the student that you have seen their work.
- Feedback should be provided in the following lesson using DIRT (Dedicated Improvement and Reflection Time) activities.
- Red pen by the students should be used to highlight any work done during DIRT activities.

## Feedback Expectations

- **Verbal feedback** - Either one to one or as a class. Misconceptions can be addressed easily.
- **Live Feedback** - The teacher gives feedback as they circulate the room. This feedback is then acted on immediately.
- **Questioning** - The teacher uses a range of questioning techniques (cold call, no opt out, say it again better etc) or mini whiteboards to check understanding.
- **Modelling** - The teacher demonstrates what success looks like and scaffolds how to get there. This can be done verbally or in a written format.
- **Visualiser** - This can be used to do a "we write" model answer, to showcase good work or to address misconceptions.
- **Whole class feedback** - After reading all the books and making notes, the teacher gives feedback on strengths, areas for improvement and misconceptions. Time is given to act on improvements.
- **Written feedback** - Teachers use individual written feedback on a specific piece of work and give students time to act on it (DIRT). The time cost here should be carefully considered.

## Presentation in Books

- Books should be able to be used as **revision aids** by the students.
- Look for **common misconceptions** in all books; assessing the **quality** of the books; ensuring that **high expectations** for **presentation** are upheld and **SPAG** is addressed.
- Selective independent work will be checked using the **FEEDFORWARD ASSESSMENT** Planning sheet

# **NATIONAL CURRICULUM LINKS**

## **KS4 National Curriculum**

### **Purpose of study**

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

### **Aims**

- The national curriculum for mathematics aims to ensure that all pupils:
- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and nonroutine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

### **Computer Science National Curriculum Links**

#### **Computing National Curriculum**

All pupils must have the opportunity to study aspects of information technology and computer science at sufficient depth to allow them to progress to higher levels of study or to a professional career.

In maths students are taught, with the aid of scientific calculators where applicable, to:

- develop their capability of knowledge using computers, digital media and information technology using SPARX for homework and independent learning and research takes.
- develop and apply their analytic, problem-solving, and computational thinking skills where applicable in the use of spreadsheets to support calculations.

### **Religious Education National Curriculum Links**

#### **Agreed Syllabus for Religious Education**

#### **Religious Education in English Schools: Non-Statutory Guidance**

Within the Religious Education curriculum, we focus on developing an understanding of 'worldwide' views through discussion around religious, cultural and ethical design influences.

The demographic of our students influences how we develop our students' understanding and develop their own views of worldwide religious views to ensure that students have a balanced interpretation of different religions.

All pupils receive RE as part of a broad and balanced curriculum at school which promotes their spiritual, moral, social and cultural development.

In Maths we strive to ensure students are aware of the key mathematicians who have helped shape our subject and celebrate all the faiths and religions of these individuals. Students will take part in research tasks for famous mathematicians each month, which will be picked to ensure all students get the same experience.

# PERSONAL DEVELOPMENT CURRICULUM

## Aims

The mathematics curriculum is designed to support and promote the vision of Southchurch High School, “A community of Opportunity, Learning and Aspiration”. The curriculum recognises not only the importance of allowing students to flourish academically but also our wider role in preparing our students for their adult life beyond school. Our Personal Development programme is underpinned by five core pillars;

- **Equality and Diversity**
- **Cultural Capital**
- **Community and Wellbeing**
- **Careers and Employability**
- **Character Development.**

**Character Development:** All members of the school community (regardless of background or ability) understand, develop and demonstrate the values that underpin our student mission of a Community of Opportunity, Learning and Aspiration.

- **Community of Opportunity** – All students are supported and encouraged to perform in front of their peers and watched with mutual respect. Students are provided with various, collaborative group tasks each lesson in which all learners are supported to engage equally and freely share their ideas and opinions.
- **Learning** – All students have equal opportunity to access the curriculum. Students are taught and placed into mixed ability classes, ensuring all students are supported with adapted practice, where necessary, to ensure curriculum access. All students are invited to many enrichment opportunities including clubs, trips, visits and workshops.
- **Aspiration** – Students are encouraged to develop their love of design through careers talks, trips and external speakers. They take every opportunity within the lesson to learn and take control over their own personal development.

**Equality & Diversity:** The mathematics curriculum aims to develop an understanding through the design process of showing how people of different faiths, convictions, ability, gender, heritage and ethnicity can form a successful, cohesive and happy community that draws from the best in each of us.

- Students will celebrate a “mathematician of the month” and explore how people of different faiths, convictions, ability, gender, heritage and ethnicity and their discoveries have impacted the world we live in and the advancements over the history of human civilisation. We will take students on a chronological journey and complete a research and investigative activity around the month's mathematician.

**Wellbeing & Community** – The mathematics curriculum recognises the importance of our students knowing how to care for themselves both mentally and physically, whilst they also develop personal traits and virtues that will motivate and guide students with confidence and resilience, through the understanding of positive mindset and “learning from mistakes”.

**Cultural Capital** – The mathematics curriculum supports the school's vision in ensuring that all students gain the knowledge and cultural capital they need to succeed in life through a wealth of experiences both in and outside the taught curriculum.

- **Trips & Visits:**  
TBC

- **Extra-Curricular:**  
TBC

- **British Values:**

- **Individual Liberty:** In mathematics students are taught using a single approach, with clear teacher modelling being an important feature, how every lesson particularly at KS3, students are tasked with a “think about it” challenge which encourages problem solving where students can take an individual approach and are encouraged to showcase the skills they have acquired in any way to attempt the correct outcomes.

- **Mutual Respect:** Students are respectful when listening to the opinions and views of other students. In maths we ensure all children are aware that making mistakes are part of the learning journey and when mistakes are made in lessons, individually, during peer work or class discussions that identifying these misconceptions are key to success, we ensure that as staff we challenge students who do not respect this idea, further ensuring students feel safe to make mistakes and therefore learn in our classrooms.
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- **The Rule of Law:** The classroom rules enable all students to develop their skills in an environment where equipment and each other's feelings are respected. The classroom rules ensure students are all responsible for the learning environment. In mathematics we highlight the need to often follow universal mathematical rules, such as BIDMAS and the order of operations.
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- **Tolerance:** Students are tolerant of the opinions and creative ideas of each other. Students value the wide variety of cultures that we explore from all over the world and are tolerant of different faiths and beliefs in the styles we study. We showcase in mathematics that advancements across human history have been by people across every religion, faith, gender from every corner of the globe. We celebrate this each month by celebrating a new mathematician and the impact they have made.
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- **Democracy:** Students are all part of the learning experience and are listened to. Students assess each other's work and celebrate each other's successes. All students are granted autonomy and have the chance to make choices on developing their own creativity. In Math's we encourage discussions surrounding problem solving and "think about it tasks", we want students to collaborate with each other and in turn reach a consensus on which method/idea is best suited or which solution is correct. We also explore percentages which can be linked to local elections and how the voting system works as well as consider how representative data is by using sampling, we also think it is important for students to have these skills to be able to identify when statistics given could be misleading.
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**Careers & Employability** – The mathematics curriculum is designed to ensure students have a breadth of opportunities and experiences that our pupils can start to build their own future pathways on. Through the mathematics curriculum, our students are supported to develop the following skills;

- Communication
- Confidence
- Teamwork and Leadership
- Listening and Responding
- Critical thinking and problem solving
- Time management
- Research

## Events

TBC

## SMSC CURRICULUM LINKS

### **Spiritual development**

In our maths curriculum and lessons, we strive for students to develop their questioning and higher-level thinking about how the concepts they are learning link together and relate to world around them, using maths a tool to explore it! We are a subject full of specialists and try ensuring that the passion we have developed for our subject is evident to the students we teach, where we can showcase to them the beauty of mathematics be it sequences and patterns such as Fibonacci in nature, through to ensuring they can capably understand the vast amounts of data they will have access to in their lifetime and make informed decisions.

### **Moral development**

We want students to be aware that when working on solving problems in maths either in an abstract approach or real-life context every decision will have a consequence and students may have to evaluate their choices in order to get the correct solution. We also believe that students should develop sound data analysis skills to ensure they are fully equipped with the knowledge to know when data has been used to mislead and promote bias so they can make their own justified decisions. Within the classroom and the wider community, the pupils are expected to show respect to others and take responsibility for their own actions and of those around them, considering the consequences.

### **Social development**

In maths we value the importance of being able to share and discuss ideas, as well as working within a team are fundamental to making a successful mathematician. These skills are also life skills we wish to ensure we are giving the students an opportunity to develop each. Every lesson every student will have an opportunity to develop their oracy skills be it through class discussion, modelling, questioning as well as “think about it” tasks. By giving students, the chance to work with peers, students will be able to realise their own strengths, creating a sense of achievement that ultimately leads to enhanced confidence.

### **Cultural development**

Pupils across the time spent working with the mathematics curriculum will see how lots of different cultures have affected maths across its history and therefore the world we live in today. Mathematicians and their achievement will be celebrated through a research task every month allowing for students to make their own discoveries, dive into and explore other cultures. When we are introducing new topics/concepts these usually start with its origins, algebra and our number system originating in the middle east, Pythagoras in ancient Greece through to how architecture and patterns in mosaics differ from region to region when discovering tessellation and symmetry.

## Equality, Diversity and Inclusivity Links

### **Aims**

Within the different projects we look to ensure that there is a broad range emphasising equality, diversity and inclusivity. We ensure that all students work together within pairs, groups and teams to strengthen professional relationships within the classroom and promote an acceptance for all students and the wider world around them.