

# Year 9 Learning map



|               |                                  |  |                     |   |                              |                    |
|---------------|----------------------------------|--|---------------------|---|------------------------------|--------------------|
| <b>Autumn</b> | <b>Reasoning with Algebra</b>    |  |                     | <b>Constructing in 2 and 3 Dimensions</b> |                              |                    |
|               | Straight line graphs             | Forming and solving equations          | Testing conjectures | Three dimensional shapes                  | Constructions and congruency |                    |
| <b>Spring</b> | <b>Reasoning with Number</b>     |  |                     | <b>Reasoning with Geometry</b>            |                              |                    |
|               | Numbers                          | Using percentages                      | Maths and money     | Deduction                                 | Rotation and translation     | Pythagoras theorem |
| <b>Summer</b> | <b>Reasoning with Proportion</b> |  |                     | <b>Representations and Revision</b>       |                              |                    |
|               | Enlargement and similarity       | Solving ration and proportion problems | Rates               | Probability                               | Algebraic representation     | Revision           |

\*Bold are the prerequisite skills previously covered within curriculum

# Year 9 Autumn Learning map

## Reasoning with Algebra



| Straight Line Graphs  | Forming and Solving Equations  | Testing Conjectures   |
|---|--|---|
| <ul style="list-style-type: none"> <li>• Lines parallel to the axis, <math>y = x</math> and <math>y = -x</math></li> <li>• Using tables of values</li> <li>• Compare gradients and intercepts</li> <li>• Understand and use <math>y = mx+c</math></li> <li>• Find the equation of a line from a graph</li> <li>• Interpret gradient and intercepts of real-life graphs</li> </ul> | <ul style="list-style-type: none"> <li>• Solve one and two-step equations and inequalities</li> <li>• Solve one and two-step equations and inequalities with brackets</li> <li>• Inequalities with negative numbers</li> <li>• Solve equations and inequalities with unknowns on both sides</li> <li>• Solving equations and inequalities in context</li> <li>• Substituting into formulae and equations</li> <li>• Rearranging one and two step formulae</li> </ul> | <ul style="list-style-type: none"> <li>• Factors, Multiples and Primes</li> <li>• True or false</li> <li>• Always, sometimes, never true?</li> <li>• Show that</li> <li>• Conjectures about number</li> <li>• Expand a pair of binomials</li> <li>• Conjectures with algebra</li> <li>• Explore the 100 grid</li> </ul> |
| <ul style="list-style-type: none"> <li>• Write an equation in the form <math>y = mx+c</math></li> <li>• Model real-life graphs involving inverse proportion</li> <li>• Explore perpendicular lines</li> </ul>   | <ul style="list-style-type: none"> <li>• Rearrange complex formulae including brackets and squares</li> </ul>  |   |

# Year 9 Autumn Learning map

## Constructing in 2 and 3 Dimensions



| Three-Dimensional Shapes   | Constructions and Congruency   |
|--|--|
| <ul style="list-style-type: none"> <li>• Know names of 2D and 3D shapes</li> <li>• Recognise prisms</li> <li>• Accurate nets of cuboids and other 3D shapes</li> <li>• Sketch and recognise nets of cuboids and other 3D shapes</li> <li>• Plans and elevations</li> <li>• <b>Find area of 2D shapes</b></li> <li>• Surface area of cubes and cuboids</li> <li>• Surface area of triangular prisms</li> <li>• Surface area of a cylinder</li> <li>• Volume of cubes and cuboids</li> <li>• Volume of other 3D shapes – prisms and cylinders</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Draw and measure angles</b></li> <li>• <b>Construct and interpret scale drawings</b></li> <li>• Locus of distance from a point, from a straight line/shape, equidistant from two points, from two lines</li> <li>• Construct a perpendicular bisector, perpendicular from a point, perpendicular to a point, an angle bisector</li> <li>• Construct triangles from given information</li> <li>• Identify congruent figures</li> <li>• Explore congruent triangles</li> <li>• Identify congruent triangles</li> </ul> |
| <ul style="list-style-type: none"> <li>• Explore volumes of cones, pyramids and spheres</li> </ul>   |  |

# Year 9 Spring Learning map

## Reasoning with Number



| Numbers  | Using Percentages  | Maths and Money  |
|--|--|--|
| <ul style="list-style-type: none"> <li>• Integers, real and rational numbers</li> <li>• <b>Work with directed number</b></li> <li>• Solve problems with integers and decimals</li> <li>• <b>HCF and LCM</b></li> <li>• <b>Adding and subtracting fractions</b></li> <li>• <b>Multiplying and dividing fractions</b></li> <li>• Solving problems with fractions</li> <li>• <b>Numbers in standard form</b></li> </ul> | <ul style="list-style-type: none"> <li>• Use the equivalence of fractions, decimals and percentages</li> <li>• Calculate percentage increase and decrease</li> <li>• Express a change as a percentage</li> <li>• Solve 'reverse' percentage problems</li> <li>• Recognise and solve percentage problems (calculator and non-calculator)</li> </ul> | <ul style="list-style-type: none"> <li>• Solve problems with bills and bank statements</li> <li>• Calculate simple interest</li> <li>• Calculate compound interest</li> <li>• Solve problems with Value Added Tax (VAT)</li> <li>• Calculate wages and taxes</li> <li>• Solve problems with exchange rates</li> <li>• Solve unit pricing problems</li> </ul> |
| <ul style="list-style-type: none"> <li>• Understand and use surds</li> </ul>   | <ul style="list-style-type: none"> <li>• Solve problems with repeated percentage change</li> </ul>   |  |

# Year 9 Spring Learning map

## Reasoning with Geometry



| Deduction  | Rotation and Translation  | Pythagoras' Theorem   |
|--|---|---|
| <ul style="list-style-type: none"> <li>• <b>Angles in parallel lines</b></li> <li>• Solving angles problems (using chains of reasoning)</li> <li>• Angles problems with algebra</li> <li>• Conjectures with angles</li> <li>• Conjectures with shapes</li> </ul> | <ul style="list-style-type: none"> <li>• Identify the order of rotational symmetry of a shape</li> <li>• Compare and contrast rotational symmetry with line symmetry</li> <li>• Rotate a shape about a point on a shape and about a point not on a shape</li> <li>• Translate points and shapes by a given vector</li> <li>• Compare rotation and reflection of shapes</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Squares and square roots</b></li> <li>• Identify the hypotenuse of a right-angled triangle</li> <li>• Determine whether a triangle is right-angled</li> <li>• Calculate the hypotenuse of a right-angled triangle</li> <li>• Calculate missing sides in right-angled triangles</li> <li>• Use Pythagoras theorem on coordinate axes</li> <li>• Explore proofs of Pythagoras' theorem</li> </ul> |
| <ul style="list-style-type: none"> <li>• Link constructions and geometrical reasoning</li> </ul>   | <ul style="list-style-type: none"> <li>• Find the results of a series of transformations</li> </ul>   | <ul style="list-style-type: none"> <li>• Use Pythagoras' theorem in 3D shapes</li> </ul>  |

# Year 9 Summer Learning map

## Reasoning with Proportion



| Enlargement and Similarity  | Solving Ratio and Proportion Problems  | Rates  |
|---|--|--|
| <ul style="list-style-type: none"> <li>• recognise enlargement and similarity</li> <li>• Enlarge a shape by a positive integer scale factor</li> <li>• Enlarge a shape by a positive integer scale factor from a point</li> <li>• Enlarge a shape by a positive fractional scale factor</li> <li>• Work out missing sides and angles in a pair of given similar shapes</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Solve problems with direct proportion</b></li> <li>• <b>Direct proportion and conversion graphs</b></li> <li>• Solve problems with inverse proportion</li> <li>• <b>Solve ratio problems given the whole or a part</b></li> <li>• Solve 'best buy' problems</li> </ul> | <ul style="list-style-type: none"> <li>• Solve speed, distance and time problems with and without a calculator</li> <li>• Use distance/time graphs</li> <li>• Solve problems with density, mass and volume</li> <li>• Solve flow problems and their graphs</li> <li>• Rates of change and their units</li> </ul> |
| <ul style="list-style-type: none"> <li>• Enlarge a shape by a negative scale factor</li> <li>• Solve problems with similar triangles</li> <li>• Explore ratios in right-angled triangles</li> </ul>   | <ul style="list-style-type: none"> <li>• Graphs of inverse relationships</li> <li>• Solve problems with ratio and algebra</li> </ul>   | <ul style="list-style-type: none"> <li>• Convert compound units</li> </ul>   |

# Year 9 Summer Learning map

## Representations and Revision



| Probability  | Algebraic Representation   | Revision (suggestions)   |
|--|--|--|
| <ul style="list-style-type: none"> <li>• <b>Single event probability</b></li> <li>• Relative frequency – include convergence</li> <li>• Expected outcomes</li> <li>• Independent events</li> <li>• Use diagrams to work out probabilities</li> </ul> | <ul style="list-style-type: none"> <li>• Draw and interpret quadratic graphs</li> <li>• Interpret graphs, including reciprocal and piece-wise</li> <li>• Represent inequalities</li> </ul> | <ul style="list-style-type: none"> <li>• Standard form, product of primes, error intervals</li> <li>• Scatter graphs, statistical graphs, measures, tables and timetables, data handling project</li> <li>• Find the rule for the <math>n^{\text{th}}</math> term of a sequence, investigating algebraic proof</li> <li>• Using graphs, equations, tables etc. to solve complex word problems</li> </ul> |
| <ul style="list-style-type: none"> <li>• Use tree diagrams</li> <li>• Use tree diagrams to solve 'without replacement' problems</li> </ul>   | <ul style="list-style-type: none"> <li>• Investigate graphs of simultaneous equations</li> </ul>   |  |