YEAR 9 PROGRAMME OF STUDY

Autumn

Reasoning with Algebra

Straight Line Graphs — Key Piece — Forming and Solving Equations — Key Piece — Testing Conjectures

Constructing in 2 and 3 Dimensions

Three-dimensional shapes — Key Piece — Constructions and congruency — Key Piece/WA1

Spring

Reasoning with Number

Numbers — Key Piece — Using percentages — Key Piece — Maths and Money

Reasoning with Geometry

Deduction — Key Piece — Rotation and translation — Key Piece — Pythagoras' Theorem — WA2

Summer

Reasoning with Proportion

Enlargement and Similarity — Key Piece — Solving Ratio and Proportion Problems — Key Piece — Rates

Representations and Revision

Probability — Key Piece — Algebraic Representation — Key Piece — Revision — WA3

YEAR 9 AUTUMN TERM

Straight Line Graphs

- *Equations of lines parallel to the axis and $y = x$ and $y = -x$* (R)
- *Using tables of values* (R)
- Compare gradients
- Compare intercepts
- Understand and use $y = mx + c$
- Write an equation in the form $y = mx + c$
- Find the equation of a straight line from a graph
- Interpret gradient and intercept of real life graphs
- **Model real life graphs involving inverse proportion** (H)
- **Explore perpendicular lines** (H)

Forming and Solving Equations

- *Solve one and two-step equations and inequalities* (R)
- *Solve one and two-step equations and inequalities with brackets* (R)
- Inequalities with negative numbers
- Solve equations with unknowns on both sides
- Solve inequalities with unknowns on both sides
- Equations and inequalities in other mathematical contexts
- Formulae and equations
- Rearrange formulae (one-step)
- Rearrange formulae (two-step)
- **Rearrange complex formulae** (H)

Testing Conjectures

- *Factors, multiples and primes* (R)
- True or false
- Always, sometimes, never
- Show that
- Conjectures about number
- Expand a pair of binomials
- Conjectures with algebra
- Explore the 100 grid

Three Dimensional Shapes

- Know names of 2-D and 3-D shapes
- Recognise prisms
- Accurate nets of cuboids and 3-D shapes
- Sketch and recognise nets of cuboids and other 3-D shapes
- Plans and elevations
- *Find area of 2-D shapes* (R)
- Surface area of cubes and cuboids
- Surface area of triangular prisms
- Surface area of a cylinder
- Volume of cubes and cuboids
- Volume of other 3-D shapes
- **Explore volumes of cones, pyramids and spheres** (H)

Constructions & Congruency

- *Draw and measure angles* (R)
- *Construct and interpret scale drawings* (R)
- Locus of distance from a point
- Locus of distance from a straight line / shape
- Locus equidistant from two points
- Construct a perpendicular bisector
- Construct a perpendicular from a point
- Construct a perpendicular to a point
- Locus of distance from two lines
- Construct an angle bisector
- *Construct triangles from given information.* (R)
- Identify congruent figures
- Explore congruent triangles
- Identify congruent triangles

YEAR 9 SPRING TERM

Numbers

- Integers, real and rational numbers
- **Understand and use surds** (H)
- *Work with directed number* (R)
- Solve problems with integers
- Solve problems with decimals
- *HCF and LCM* (R)
- *Adding and subtracting fractions* (R)
- *Multiplying and dividing fractions* (R)
- Solve problems with fractions
- *Numbers in standard form* (R)

Using Percentages

- *Use the equivalence of fractions, decimals and percentages* (R)
- *Calculate percentage increase and decrease* (R)
- *Express a change as a percentage* (R)
- Solve 'reverse' percentage problems
- Recognise and solve percentage problems (non-calculator)
- Recognise and solve percentage problems (calculator)
- **Solve problems with repeated percentage change** (H)

Maths and Money

- Solve problems with bills and bank statements
- Calculate simple interest
- Calculate compound interest
- Solve problems with VAT
- Calculate wages and taxes
- Solve problems with exchange rates
- Solve unit pricing problems

Deduction

- *Angles in parallel lines* (R)
- Solve angle problems (using chains of reasoning)
- Angle problems with algebra
- Conjectures with angles
- Conjectures with shapes
- **Link constructions and geometrical reasoning** (H)

Rotation & Translation

- Identify the order of rotational symmetry of a shape
- Compare and contrast rotational symmetry with lines of symmetry
- Rotate a shape about a point on a shape
- Rotate a shape about a point not on a shape
- Translate points and shapes by a given vector
- Compare rotation and reflection of shapes
- **Find the result of a series of transformations** (H)

Pythagoras' Theorem

- *Squares and square roots* (R)
- Identify the hypotenuse of a right-angled triangle
- Determine whether a triangle is right-angled
- Calculate the hypotenuse of a right-angled triangle
- Calculate missing sides in right-angled triangles
- Use Pythagoras' theorem on coordinate axis
- Explore proofs of Pythagoras' theorem
- **Use Pythagoras' theorem in 3-D shapes** (H)

Enlargement & Similarity

- Recognise enlargement and similarity
- Enlarge a shape by a positive integer scale factor
- Enlarge a shape by a positive integer scale factor from a point
- Enlarge a shape by a positive fractional scale factor
- **Enlarge a shape by a negative scale factor** (H)
- Work out missing sides and angles in a pair of given similar shapes
- **Solve problems with similar triangles** (H)
- **Explore ratios in right-angled triangles** (H)

Solve Ratio & Proportion Problems

- *Solve problems with direct proportion* (R)
- *Direct proportion and conversion graphs* (R)
- Solve problems with inverse proportion
- **Graphs of inverse relationships** (H)
- *Solve ratio problems given the whole or a part* (R)
- Solve 'best buy' problems
- **Solve problems ratio and algebra** (H)

Rates

- Solve speed, distance and time problems without a calculator
- Solve speed, distance and time problems with a calculator
- Use distance/time graphs
- Solve problems with density, mass and volume
- Solve flow problems and their graphs
- Rates of change and their units
- **Convert compound units** (H)

Probability

- *Single event probability* (R)
- Relative frequency
- Expected outcomes
- Independent events
- **Use tree diagrams** (H)
- **Use tree diagrams to solve 'without replacement' problems** (H)
- Use diagrams to work out probabilities

Algebraic Representation

- Draw and interpret quadratic graphs
- Interpret graphs, including reciprocal and piece-wise
- **Investigate graphs of simultaneous equations** (H)
- Represent inequalities