YEAR 8 PROGRAMME OF STUDY

	Proportional Reasoning	Representations
Autumn	Ratio and scale — Key Piece — Multiplicative change — Key Piece — Multiplying and dividing fractions	Working in the Cartesian plane — Key Piece — Representing data — Tables & Probability — Key Piece/WA1

	Algebraic Techniques	Developing Number
Spring	Brackets, equations and inequalities — Key Piece — Sequences — Key Piece — Indices	Fractions and percentages — Key Piece — Standard index form — Key Piece — Number sense — WA2

	Developing Geometry	Reasoning with Data
Summer	Angles in parallel lines and polygons — Key Piece — Area of trapezia and circles — Key Piece — Line symmetry and reflection	The data handling cycle — Key Piece — Measures of location — Key Piece/WA3

YEAR 8 AUTUMN TERM

Proportional Reasoning

- Understand the meaning and representation of ratio
- Understand and use ratio notation
- Solve problems involving ratios of the form $1:n$ or $n:1$
- Solve proportional problems involving the ratio $m:n$
- Divide a value into a given ratio
- Express ratios in their simplest integer form
- **Express ratios in the form $1:n$** Ⓗ
- Compare ratios and related fractions
- Understand pi as a ratio
- **Understand gradient of a line as a ratio** Ⓗ

Multiplicative Change

- Solve problems involving direct proportion
- Explore conversion graphs
- Convert between currencies
- **Explore direct proportion graphs** Ⓗ
- Explore relationships between similar shapes
- Understand scale factors as multiplicative representations
- Draw and interpret scale diagrams
- Interpret maps using scale factors and ratios

Multiplying & Dividing Fractions

- Represent multiplication of fractions
- Multiply a fraction by an integer
- Find the product of a pair of unit fractions
- Find the product of a pair of any fractions
- Divide an integer by a fraction
- Divide a fraction by a unit fraction
- Understand and use the reciprocal
- Divide any pair of fractions
- Multiply and divide improper and mixed fractions
- Multiply and divide algebraic fractions

Working in the Cartesian Plane

- Work with coordinates in all four quadrants
- Identify and draw lines that are parallel to the axes
- Recognise and use the line $y = x$
- Recognise and use lines of the form $y = kx$
- Link $y = kx$ to direct proportion problems
- **Explore the gradient of the line $y = kx$** Ⓗ
- Recognise and use lines of the form $y = x + a$
- Explore graphs with negative gradient $(y = -kx, y = a - x, x + y = a)$
- Link graphs to linear sequences
- Plot graphs of the form $y = mx + c$
- **Explore non-linear graphs** Ⓗ
- **Find the midpoint of a line segment** Ⓗ

Representing Data

- Draw and interpret scatter graphs
- Understand and describe linear correlation
- Draw and use line of best fit
- Identify non-linear relationships
- Identify different types of data
- Read and interpret ungrouped frequency tables
- Read and interpret grouped frequency tables
- Represent grouped discrete data
- Represent continuous data grouped into equal classes
- Construct and interpret two-way tables

Probability

- Construct sample spaces for one or more events
- Find probabilities from a sample space
- Find probabilities from two-way tables
- Find probabilities from Venn diagrams
- Use the product rule for finding the total number of possible outcomes

YEAR 8 SPRING TERM

Brackets, Equations & Inequalities

- Form algebraic expressions
- Use directed number with algebra
- Multiply out a single bracket
- Factorise into a single bracket
- Expand multiple single brackets and simplify
- **Expand a pair of binomials** Ⓗ
- Solve equations, including with brackets
- Form and solve equations with brackets
- Understand and solve simple inequalities
- Form and solve inequalities
- **Solve equations and inequalities with unknowns on both sides** Ⓗ
- **Form and solve equations and inequalities with unknowns on both sides** Ⓗ
- Identify and use formulae, expressions, identities and equations

Sequences

- Generate sequences given a rule in words
- Generate sequences given a simple algebraic rule
- Generate sequences given a complex algebraic rule
- **Find the rule for the nth term of a linear sequence** Ⓗ

Indices

- Adding and subtracting expressions with indices
- Simplifying algebraic expressions by multiplying indices
- Simplifying algebraic expressions by dividing indices
- Using the addition law for indices
- Using the addition and subtraction law for indices
- **Exploring powers of powers** Ⓗ

Fractions & Percentages

- Convert fluently between key fractions decimals and percentages
- Calculate key fractions, decimals and percentages of an amount without a calculator
- Calculate fractions, decimals and percentages of an amount using calculator methods
- Percentage decrease with a multiplier.
- Convert between decimals and percentages greater than 100%
- Calculate percentage increase and decrease using a multiplier
- Express one number as a fraction or a percentage of another without a calculator
- Express one number as a fraction or a percentage of another using calculator methods
- Work with percentage change
- Choose appropriate methods to solve percentage problems
- **Find the original amount given the percentage less than 100%** (H)
- **Find the original amount given the percentage greater than 100%** (H)
- **Choose appropriate methods to solve complex percentage problems** (H)

Standard Form

- Investigate positive powers of 10
- Work with numbers greater than 1 in standard form
- Investigate negative powers of 10
- Work with numbers between 0 and 1 in standard form
- Compare and order numbers in standard form
- Mentally calculate with numbers in standard form
- Use a calculator to work with numbers in standard form
- Add and subtract numbers in standard form
- Multiply and divide numbers in standard form
- **Understand and use negative indices** (H)
- **Understand and use fractional indices** (H)

Number Sense

- Round numbers to powers of 10 and 1 significant figure (R)
- Round numbers to a given number of decimal places
- Estimate the answer to a calculation
- **Understand and use error interval notation** (H)
- Calculate using the order of operations
- Calculate with money
- Convert metric measures of lengths
- Convert metric units of weight and capacity
- **Convert metric units of area** (H)
- **Convert metric units of volume** (H)
- Solve problems involving time and the calendar

YEAR 8 SUMMER TERM

Angles in Parallel Lines & Polygons

- Understand and use basic angles rules and notation
- Investigate angles between parallel lines and the transversal
- Identify and calculate with alternate and corresponding angles
- Identify and calculate with co-interior, alternate and corresponding angles
- Solve complex problems with parallel line angles
- Constructions triangles and special quadrilaterals
- Investigate the properties of special quadrilaterals
- Identify and calculate with sides and angles in special quadrilaterals
- Understand and use the properties of diagonals of quadrilaterals
- Understand and use the sum of exterior angles of any polygon
- Calculate and use the sum of the interior angles in any polygon
- Calculate missing interior angles in regular polygons
- **Prove simple geometric facts** (H)
- **Construct an angle bisector** (H)
- **Construct a perpendicular bisector of a line segment** (H)

Area of Trapezia and Circles

- Calculate the area of triangles, rectangles and parallelograms
- Calculate the area of a trapezium
- Calculate the perimeter and area of compound shapes (1)
- Investigate the area of a circle
- Calculate the area of a circle and parts of a circle without a calculator
- Calculate the area of a circle and parts of a circle with a calculator
- Calculate the perimeter and area of compound shapes (2)

Line Symmetry & Reflection

- Recognise line symmetry
- Reflect a shape in a horizontal or vertical line 1 (shapes touching the line)
- Reflect a shape in a horizontal or vertical line 2 (shapes not touching the line)
- Reflect a shape in a diagonal line 1 (shapes touching the line)
- Reflect a shape in a diagonal line 2 (shapes not touching the line)

The Data Handling Cycle

- Set up a statistical enquiry
- Design and criticise questionnaires
- Draw and interpret pictograms, bar charts and vertical line charts
- Draw and interpret multiple bar charts
- Draw and interpret pie charts
- Draw and interpret line graphs
- Choose the most appropriate diagram for given set of data
- Represent and interpret grouped quantitative data
- Find and interpret the range
- Compare distributions using charts
- Identify misleading graphs

Measures of Location

- Understand and use the mean, median and mode
- Choose the most appropriate average
- **Find the mean from an ungrouped frequency table** (H)
- **Find the mean from an grouped frequency table** (H)
- Identify outliers
- Compare distributions using averages and the range