

**Mathematics Year 7 Curriculum:** We aim to educate our students so that they have the skills, mathematical knowledge and confidence to take their place in our ever changing, technologically driven world. We want them to enjoy their mathematical education and we try to instil in them a love of the subject and an appreciation of how important it is in day to day life. Every lesson incorporates an element of stretch and challenge at every level and we encourage our students to aim high. Ultimately we want our students to leave us with the excellent qualifications that will allow them to fulfil their dreams, whatever they may be.

There are 5 main areas of Mathematics that will be covered in Year 7: **Number:** – calculations involving whole numbers, fractions, decimals, percentages, negative numbers, factors, multiples, prime numbers, rounding, estimation; **Handling Data:** – collection, representation and analysis of data. **Algebra:** - sequences, rules of algebra, coordinates and straight line graphs, ratio and proportion; **Shape and space:**- area, perimeter, volume, angles, 2D and 3D shapes, and **Problem solving/using and applying Mathematics.**

Autumn Term:

1. Analysing and displaying data
2. Number skills
3. Equations, functions and formulae
4. Fractions

Key Objectives Autumn Term - To be able to:

- use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor and lowest common multiple, use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5, recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions.
- order positive and negative integers, decimals and fractions, use the symbols =, ≠, <, >, ≤, ≥
- understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals), apply the four operations, including formal written methods, to integers and decimals, use conventional notation for priority of operations, including brackets, recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)
- understand and use the concepts and vocabulary of expressions, equations, formulae and terms, use and interpret algebraic notation, including:  $ab$  in place of  $a \times b$ ,  $3y$  in place of  $y + y + y$  and  $3 \times y$ ,  $a^2$  in place of  $a \times a$ ,  $a^3$  in place of  $a \times a \times a$ ,  $a/b$  in place of  $a \div b$ , brackets, simplify and manipulate algebraic expressions by collecting like terms and multiplying a single term over a bracket, where appropriate, interpret simple expressions as functions with inputs and outputs, substitute numerical values into formulae and expressions, use conventional notation for priority of operations, including brackets. Be able to factorise expressions.
- Use two way tables, interpret and draw dual bar charts and compound bar charts, choose the most appropriate average for a set of data, compare sets of data using the averages and the range, be able to group data and draw and interpret grouped frequency diagrams, interpret and draw line graphs, recognise when a graph is misleading, draw and interpret pie charts and scatter diagrams.
- Simplify fractions, write one quantity as a fraction of another, use the 4 operations with fractions, understand equivalent fractions, decimals and percentages.

Spring Term:

1. Angles and shapes
2. Decimals
3. Equations

Key Objectives Spring Term - To be able to:

- Work out unknown angles when two or more lines meet or cross at a point. Work out unknown angles involving parallel lines. Understand how to prove that a geometric result is true. Use properties of a triangle to work out unknown angles. Use the properties of isosceles and equilateral triangles to solve problems. Describe the line and rotational symmetry of quadrilaterals. Describe the properties of quadrilaterals and use them to solve geometric problems. Work out the interior and exterior angles of a polygon.
- Write decimals in ascending and descending order. Round to decimal places. Add and subtract decimals. Multiply a decimal by an integer and a decimal. Divide a decimal by a whole number and vice versa. Convert between fractions decimals and percentages. Compare different proportions using percentages. Calculate percentages with and without a calculator. Calculate percentage increases and decreases. Work backwards to solve a percentage problem.
- Write and solve simple equations. Solve problems using equations. Write and solve two-step equations. Write and solve equations that have brackets. Write and solve equations with letters on both sides. Solve equations that include  $x^2$  and  $x^3$ . Use trial and improvement to find solutions to 1 decimal place.

Summer Term:

1. Multiplicative reasoning
2. Perimeter, area and volume
3. Sequences and graphs

Key Objectives Summer Term - To be able to:

- Convert between metric and imperial units. Write a ratio in its simplest form. Simplify a ratio expressed in fractions or decimals. Share a quantity in 2 or more parts in a given ratio. Understand the relationship between ratio and proportion. Solve simple word problems involving ratio and direct and inverse proportion. Solve problems involving ratio and proportion using the unitary method. Solve best buy problems.
- Calculate the area of triangles, parallelograms and trapezia. Calculate the perimeter and area of shapes made from rectangles and triangles. Identify nets of and understand the properties of different 3D shapes. Calculate the surface area and volume of cubes and cuboids. Convert between different units of volume:  $\text{cm}^3$ , ml and litres. Convert between metric measures for area and volume.
- Work out the terms of an arithmetic sequence using the term-to-term rule. Work out a given term in a simple arithmetic sequence. Work out and use expressions for the  $n$ th term in an arithmetic sequence. Generate sequences and predict how they will continue. Recognise geometric sequences and work out the term-to-term rule. Use positive and negative coordinates. Work out the midpoint of a line segment. Draw straight-line graphs. Recognise straight-line graphs parallel to the axes. Recognise graphs of  $y = x$  and  $y = -x$ .

Key Performance Standards

- Use positive whole number powers and roots, eg  $x^2$  or  $\sqrt{x}$
- Apply the four operations ( $\times$ ,  $+$ ,  $-$ ,  $\div$ ) with decimal numbers
- Write a quantity as a fraction or percentage of another
- Use multiplication to understand and describe percentage change
- Add, subtract, multiply and divide with fractions and mixed numbers
- Check calculations using approximation, estimation or inverse operations
- Simplify and manipulate algebraic expressions by collecting like terms (eg  $2a + 3a = 5a$ )

- Simplify and manipulate algebraic expressions by multiplying a single term over a bracket eg  $4(3x - 1) = 12x - 3$
- Substitute numbers into formulae
- Solve linear equations in one unknown eg find  $x$  if  $2x + 1 = 5$
- Recognise and be able to draw lines parallel to the axes, and the lines  $y = x$  and  $y = -x$
- Calculate surface area and volume of cubes and cuboids
- Understand and use geometric notation for labelling angles, lengths, equal lengths and parallel lines.
- Be able to group data and display it in an appropriate format, calculate the three averages and the range and know which one is the most appropriate measure to summarise the data.