**MATHEMATICS**

**Teacher in charge - Mr S Edwards**

**Aims**

- To build on the skills, concepts and knowledge developed during Year 6
- To continue to involve pupils in activities which will nurture confidence and enthusiasm for Mathematics
- To give all pupils the opportunity to develop their potential to the full

**Course Description**

The Year 7 course is focused on pedagogic progression designed to build upon learning in Year 6. The faculty have developed differentiated schemes of work to cater for all abilities. Pupils follow an appropriate scheme of work based on their previous attainment. Lessons are taught using a wide variety of teaching techniques to encompass many different learning strategies.

| Learning Objectives Foundation Path | Learning Objectives Higher Path |
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| **Number**<br>• 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<br>• read, write, order and compare numbers up to 10 000 000 and determine the value of each digit<br>• use negative numbers in context, and calculate intervals across zero<br>• identify common factors, common multiples and prime numbers<br>• solve problems which require answers to be rounded to specified degrees of accuracy<br>• use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy<br>• round any whole number to a required degree of accuracy<br>• perform mental calculations, including with mixed operations and large numbers<br>• solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why<br>• multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication<br>• solve problems involving addition, subtraction and multiplication<br>• use their knowledge of the order of operations to carry out calculations<br>• divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division; interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context<br>• 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<br>• use written division methods in cases where the answer has up to two decimal places<br>• solve problems involving division<br>• use their knowledge of the order of operations to carry out calculations involving the four operations<br>• use common factors to simplify fractions; use common multiples to express fractions in the same denomination<br>• compare and order fractions, including fractions > 1<br>• associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8]<br>• recall and use equivalences between simple fractions, decimals and percentages, including in different contexts | **Number**<br>• use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor and lowest common multiple<br>• use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5<br>• recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions<br>• order positive and negative integers, decimals and fractions<br>• use the symbols =, ≠, <, >, ≤, ≥<br>• round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures)<br>• estimate answers; check calculations using approximation and estimation, including answers obtained using technology<br>• recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)<br>• understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals)<br>• apply the four operations, including formal written methods, to integers and decimals<br>• use conventional notation for priority of operations, including brackets<br>• recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions) apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers<br>• express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1<br>• define percentage as 'number of parts per hundred'<br>• express one quantity as a percentage of another<br>• apply the four operations, including formal written methods, to simple fractions (proper and improper), and mixed numbers<br>• interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively<br>• compare two quantities using percentages<br>• solve problems involving percentage change, including percentage increase/decrease |

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| **Ratio, Proportion and Rates of Change**<br>• solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts<br>• solve problems involving similar shapes where the scale factor is known or can be found<br>• solve problems involving unequal sharing and grouping using knowledge of fractions and multiples | **Ratio, Proportion and Rates of Change**<br>• use ratio notation, including reduction to simplest form<br>• divide a given quantity into two parts in a given part:part or part:whole ratio |
| **Geometry and Measures**<br>• draw 2-D shapes using given dimensions and angles<br>• recognise, describe and build simple 3-D shapes, including making nets<br>• compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons<br>• illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius<br>• 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<br>• recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles<br>• recognise that shapes with the same areas can have different perimeters and vice versa<br>• calculate the area of parallelograms and triangles<br>• calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres ($cm^3$) and cubic metres ($m^3$), and extending to other units [for example, $mm^3$ and $km^3$]<br>• recognise when it is possible to use formulae for area and volume of shape<br>• solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate<br>• describe positions on the full coordinate grid (all four quadrants)<br>• draw and translate simple shapes on the coordinate plane, and reflect them in the axes | **Geometry and Measures**<br>• use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries<br>• use the standard conventions for labelling and referring to the sides and angles of triangles<br>• draw diagrams from written description<br>• identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres<br>• derive and apply the properties and definitions of: special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; and triangles and other plane figures using appropriate language<br>• use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)<br>• use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate<br>• change freely between related standard units (e.g. time, length, area, volume/capacity, mass) in numerical contexts<br>• measure line segments and angles in geometric figures<br>• apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles<br>• use standard units of measure and related concepts (length, area, volume/capacity)<br>• calculate perimeters of 2D shapes<br>• know and apply formulae to calculate area of triangles, parallelograms, trapezia<br>• calculate surface area of cuboids<br>• know and apply formulae to calculate volume of cuboids<br>• understand and use standard mathematical formulae<br>• work with coordinates in all four quadrants<br>• understand use lines parallel to the axes, $y = x$ and $y = -x$<br>• solve geometrical problems on coordinate axes<br>• identify, describe and construct congruent shapes including on coordinate axes, by considering rotation, reflection and translation<br>• describe translations as 2D vectors |
| **Algebra**<br>• use simple formulae<br>• convert between miles and kilometres<br>• generate and describe linear number sequences<br>• enumerate possibilities of combinations of two variables<br>• express missing number problems algebraically<br>• find pairs of numbers that satisfy an equation with two unknowns | **Algebra**<br>• understand and use the concepts and vocabulary of expressions, equations, formulae and terms<br>• 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<br>• simplify and manipulate algebraic expressions by collecting like terms and multiplying a single term over a bracket<br>• where appropriate, interpret simple expressions as functions with inputs and outputs<br>• substitute numerical values into formulae and expressions<br>• use conventional notation for priority of operations, including brackets<br>• generate terms of a sequence from a term-to-term rule<br>• recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)<br>• solve linear equations in one unknown algebraically |

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| **Statistics**<br>• interpret and construct pie charts and line graphs and use these to solve problems.<br>• calculate and interpret the mean as an average | **Statistics**<br>• 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<br>• interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean and mode) and spread (range) |

**Grouping**

Pupils in Year 7 are grouped from baseline data. They will be continually monitored over the year to ensure they remain in the correct group. Classes cover work that is appropriate for the ability of the group. The progress of each pupil is carefully monitored to ensure that they are in the correct group. Our aim is to teach every pupil according to their ability and to ensure that they are extended as much as possible.

**Homework**

40 minutes of homework is set weekly and recorded on Show My Homework. Most homework is set on Sparxmaths. At the start of the year, pupils are given a training lesson on how to use Sparxmaths and a letter is sent to parents explaining how it works. If none has been set, the expectation is that pupils review their work. Where necessary, longer pieces of homework are set and pupils are given an appropriate length of time to complete the work.

**Assessment**

Work is regularly marked and collated in individual evidence folders to assist pupils' progress. These are recorded for each pupil as part of each individual's 'Progression Passport'. A formal End of Year assessment will take place.