# Byerley Park Primary School
# Mathematics Progression Map – Y4 to Y6

| | Year 4 | Year 5 | Year 6 |
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| **Number and Place Value** | - Count in multiples of 6, 7, 9, 25 and 100<br>- Find 1000 more or less than a given number<br>- Count backwards through zero to include negative numbers<br>- Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones)<br>- Order and compare numbers beyond 1000<br>- Identify, represent and estimate numbers using different representations<br>- Round any number to the nearest 10, 100 or 1000<br>- Solve number and practical problems that involve all of the above and with increasingly large positive numbers<br>- Read Roman numerals to 100 (I to C) and understand how, over time, the numeral system changed to include the concept of zero and place value | - Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit<br>- Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000<br>- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through zero<br>- Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000<br>- Solve number problems and practical problems that involve all of the above<br>- Read Roman numerals to 1000 (M) and recognise years written in Roman numerals | - Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit<br>- Round any whole number to a required degree of accuracy<br>- Use negative numbers in context, and calculate intervals across zero<br>- Solve number problems and practical problems that involve all of the above. |
| **Addition and subtraction** | - Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate<br>- Estimate and use inverse operations to check answers to a calculation<br>- Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why. | - Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction<br>- Add and subtract numbers mentally with increasingly large numbers<br>- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy<br>- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why | - Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why |

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| **Multiplication and division** | - Recall multiplication and division facts for multiplication tables up to 12 x 12<br>- Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers<br>- Recognise and use factor pairs and commutatively in mental calculations<br>- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout<br>- Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as which n objects are connected to m objects. | - Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.<br>- Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers<br>- Establish whether a number up to 100 is prime and recall prime numbers up to 19<br>- Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers<br>- Multiply and divide numbers mentally drawing upon known facts<br>- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context<br>- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000<br>- Recognise and use square numbers and cube numbers, and the notation for squared ($^2$) and cubed ($^3$)<br>- Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes<br>- Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign<br>- Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates | - Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the efficient written method of long multiplication<br>- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and 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 context<br>- Perform mental calculations, including with mixed operations and large numbers<br>- Identify common factors, common multiples and prime numbers<br>- Use their knowledge of the order of operations to carry out calculations involving the four operations<br>- Using their knowledge of the order of operations to carry out calculations involving the four operations<br>- Solve problems involving addition, subtraction, multiplication and division<br>- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy |

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| **Fractions (including decimals and percentages)** | - Recognise and show, using diagrams, families of common equivalent fractions<br>- Count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten<br>- Solve problems involving increasingly harder fractions to calculate quantities, including non-unit fractions where the answer is a whole number<br>- Add and subtract fractions with the same denominator.<br>- Recognise and write decimal equivalents of any number of tenths or hundredths<br>- Recognise and write decimal equivalents to ¼; ½; ¾<br>- Find the effect of dividing a one or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths<br>- Round decimals with one decimal place to the nearest whole number<br>- Compare numbers with the same number of decimal places up to two decimal places<br>- Solve simple measures and money problems involving fractions and decimals to two decimal places | - Compare and order fractions whose denominators are all multiples of the same number<br>- Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths<br>- Recognise mixed numbers and improper fractions and convert from one to the other and write mathematical statements >1 as a mixed number (e.g. 2/5 + 4/5 = 6/5 = 1 1/5)<br>- Add and subtract fractions with the same denominator and denominators that are multiples of the same number<br>- Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.<br>- Read and write decimal numbers as fractions (e.g. 0.71 = 71/100)<br>- Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents<br>- Round decimals with two decimal places to the nearest whole number and to one decimal place<br>- Read, write, order and compare numbers with up to three decimal places<br>- Solve problems involving numbers up to three decimal places<br>- Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal<br>- Solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25 | - 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>- Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions<br>- Multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. ¼ x ½ = 1/8)<br>- Divide proper fractions by whole numbers (e.g. 1/3 ÷ 2 = 1/6)<br>- Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. 3/8)<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>- Multiply one-digit numbers with up to two decimal places by whole numbers<br>- Use written division methods in cases where the answer has up to two decimal places<br>- Solve problems which require answers to be rounded to specified degrees of accuracy.<br>- Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts |
| **Ratio and proportion** | | | - 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 the calculation of percentages (e.g of measures, and such as 15% of 360) and the use of percentages for comparison<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 |

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| **Algebra** | | | - Use simple formulae<br>- Generate and describe linear number sequences<br>- Express missing number problems algebraically<br>- Find pairs of numbers that satisfy number sentences involving two unknowns<br>- Enumerate possibilities of combinations of two variables. |
| **Measurement** | - Convert between different units of measure (e.g. kilometre to metre; hour to minute)<br>- Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres<br>- Find the area of rectilinear shapes by counting<br>- Estimate, compare and calculate different measures, including money in pounds and pence<br>- Read, write and convert time between analogue and digital 12 and 24-hour clocks<br>- Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days | - Convert between different units of measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)<br>- Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints<br>- Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres<br>- Calculate and compare the area of rectangles (including squares) and including using standard units, square centimetres ($cm^2$) and square metres ($m^2$) and estimate the area of irregular shapes<br>- Estimate volume (e.g. using 1 $cm^3$ blocks to build cuboids (including cubes)) and capacity (e.g. using water)<br>- Solve problems involving converting between units of time<br>- Use all four operations to solve problems involving measure (for example, length, mass, volume, money)using decimal notation, including scaling | - Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate<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 three decimal places<br>- Convert between miles and kilometre<br>- Recognise that shapes with the same areas can have different perimeters and vice versa<br>- Recognise when it is possible to use formulae for area and volume of shapes<br>- Calculate the area of parallelograms and triangles<br>- Recognise when it is necessary to use the formulae for area and volume of shapes<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 (e.g. $mm^3$ and $km^3$). |
| **Geometry: properties of shape** | - Compare and classify geometric shapes, including quadrilaterals and triangles, based n their properties and sizes<br>- Identify acute and obtuse angles and compare and order angles up to two right angles by size<br>- Identify lines of symmetry in 2-D shapes presented in different orientations<br>- Complete a simple symmetric figure with respect to a specific line of symmetry. | - Identify 3-D shapes, including cubes and cuboids, from 2-D representations<br>- Know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles<br>- draw given angles, measuring them in degrees (°)<br>- Identify<br>- Angles at a point and one whole turn (total 360°)<br>- Angles at a point on a straight line and ½ a turn (total 180°)<br>- Other multiples of 90˚<br>- use the properties of a rectangle to deduce related facts and find missing lengths and angles<br>- distinguish between regular and irregular polygons based on reasoning about equal sides and angles | - draw 2D 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 radiusrecognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles |

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| **Geometry: position, direction, motion** | - Describe positions on a 2-D grid as coordinates in the first quadrant<br>- Describe movement between positions as translations of a given unit to the left/right and up/down<br>- Plot specified points and draw sides to complete a given polygon. | - Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed. | - 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 |
| **Statistics** | - Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs<br>- Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs. | - Solve comparison, sum and difference problems using information presented in a line graph<br>- Complete, read and interpret information in tables, including timetables | - Interpret and construct pie charts and line graphs and use these to solve problems<br>- Calculate and interpret the mean as an average |