Newnham Junior School – Maths Curriculum Map

Number Knowledge – Pupils should be taught to:-	Measurement Knowledge – Pupils should be taught to:-	Geometry Knowledge – Pupils should be taught to:-	Statistics Knowledge – Pupils should be taught to:-
Year 3			
Number & Place Value ♣ **count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number** ♣ **recognise the place value of each digit in a three-digit number (hundreds, tens, ones)** ♣ **compare and order numbers up to 1000** ♣ **identify, represent and estimate numbers using different representations** ♣ **read and write numbers up to 1000 in numerals and in words** ♣ **solve number problems and practical problems involving these ideas.** Pupils now use multiples of 2, 3, 4, 5, 8, 10, 50 and 100. They use larger numbers to at least 1000, applying partitioning related to place value using varied and increasingly complex problems, building on work in year 2 (for example, 146 = 100 + 40 and 6, 146 = 130 + 16). Using a variety of representations, including those related to measure, pupils continue to count in ones, tens and hundreds, so that they become fluent in the order and place value of numbers to 1000. **Addition & Subtraction** **add and subtract numbers mentally, including:** ♣ **a three-digit number and ones ♣ a three-digit number and tens ♣ a three-digit number and hundreds** ♣ **add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction** ♣ **estimate the answer to a calculation and use inverse operations to check answers** ♣ **solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.** Pupils practise solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100. Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent	**Measurement (overall)** ♣ **measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)** ♣ **measure the perimeter of simple 2-D shapes** ♣ **add and subtract amounts of money to give change, using both £ and p in practical contexts ♣ tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks ♣ estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight** ♣ **know the number of seconds in a minute and the number of days in each month, year and leap year** ♣ **compare durations of events [for example to calculate the time taken by particular events or tasks].** Pupils continue to measure using the appropriate tools and units, progressing to using a wider range of measures, including comparing and using mixed units (for example, 1 kg	**Properties of Shapes** ♣ **draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them** ♣ **recognise angles as a property of shape or a description of a turn** ♣ **identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle** ♣ **identify horizontal and vertical lines and pairs of perpendicular and parallel lines.** Pupils' knowledge of the properties of shapes is extended at this stage to symmetrical and non-symmetrical polygons and polyhedra. Pupils extend their use of the properties of shapes. They should be able to describe the properties of 2-D and 3-D shapes using accurate language, including lengths of lines and acute and obtuse for angles greater or lesser than a right angle. Pupils connect decimals and rounding to drawing and measuring straight lines in centimetres, in a variety of contexts.	**Statistics (overall)** ♣ **interpret and present data using bar charts, pictograms and tables** ♣ **solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.** Pupils understand and use simple scales (for example, 2, 5, 10 units per cm) in pictograms and bar charts with increasing accuracy. They continue to interpret data presented in many contexts.

Number Knowledge – Pupils should be taught to:-	Measurement Knowledge – Pupils should be taught to:-	Geometry Knowledge – Pupils should be taught to:-	Statistics Knowledge – Pupils should be taught to:-
Multiplication & Division ♣ **recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables** ♣ **write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods** ♣ **solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.** Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables. Pupils develop efficient mental methods, for example, using commutativity and associativity (for example, 4 × 12 × 5 = 4 × 5 × 12 = 20 × 12 = 240) and multiplication and division facts (for example, using 3 × 2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3) to derive related facts (for example, 30 × 2 = 60, 60 ÷ 3 = 20 and 20 = 60 ÷ 3). Pupils develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division. Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children). **Fractions** ♣ **count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10** ♣ **recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators** ♣ **recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators** ♣ **recognise and show, using diagrams, equivalent fractions with small denominators**	and 200g) and simple equivalents of mixed units (for example, 5m = 500cm). The comparison of measures includes simple scaling by integers (for example, a given quantity or measure is twice as long or five times as high) and this connects to multiplication. Pupils continue to become fluent in recognising the value of coins, by adding and subtracting amounts, including mixed units, and giving change using manageable amounts. They record £ and p separately. The decimal recording of money is introduced formally in year 4. Pupils use both analogue and digital 12-hour clocks and record their times. In this way they become fluent in and prepared for using digital 24-hour clocks in year 4.		

Number Knowledge – Pupils should be taught to:-	Measurement Knowledge – Pupils should be taught to:-	Geometry Knowledge – Pupils should be taught to:-	Statistics Knowledge – Pupils should be taught to:-
♣ **add and subtract fractions with the same denominator within one whole [for example, 7 5 + 7 1 = 7 6]** ♣ **compare and order unit fractions, and fractions with the same denominators** ♣ **solve problems that involve all of the above.** Pupils connect tenths to place value, decimal measures and to division by 10. They begin to understand unit and non-unit fractions as numbers on the number line, and deduce relations between them, such as size and equivalence. They should go beyond the [0, 1] interval, including relating this to measure. Pupils understand the relation between unit fractions as operators (fractions of), and division by integers. They continue to recognise fractions in the context of parts of a whole, numbers, measurements, a shape, and unit fractions as a division of a quantity. Pupils practise adding and subtracting fractions with the same denominator through a variety of increasingly complex problems to improve fluency.			

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Number Knowledge – Pupils should be taught to:-	Measurement Knowledge – Pupils should be taught to:-	Geometry Knowledge – Pupils should be taught to:-	Statistics Knowledge – Pupils should be taught to:-
Year 4			
Number & Place Value ♣ **count in multiples of 6, 7, 9, 25 and 1000** ♣ **find 1000 more or less than a given number** ♣ **count backwards through zero to include negative numbers** ♣ **recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)** ♣ **order and compare numbers beyond 1000** ♣ **identify, represent and estimate numbers using different representations** ♣ **round any number to the nearest 10, 100 or 1000** ♣ **solve number and practical problems that involve all of the above and with increasingly large positive numbers** ♣ **read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.** Using a variety of representations, including measures, pupils become fluent in the order and place value of numbers beyond 1000, including counting in tens and hundreds, and maintaining fluency in other multiples through varied and frequent practice. They begin to extend their knowledge of the number system to include the decimal numbers and fractions that they have met so far. They connect estimation and rounding numbers to the use of measuring instruments. Roman numerals should be put in their historical context so pupils understand that there have been different ways to write whole numbers and that the important concepts of zero and place value were introduced over a period of time. **Addition & Subtraction** ♣ **add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate** ♣ **estimate and use inverse operations to check answers to a calculation** ♣ **solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why** Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency **Multiplication & Division** ♣ **recall multiplication and division facts for multiplication tables up to 12 × 12**	**Measurement (overall)** ♣ **Convert between different units of measure [for example, kilometre to metre; hour to minute]** ♣ **measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres** ♣ **find the area of rectilinear shapes by counting squares** ♣ **estimate, compare and calculate different measures, including money in pounds and pence** ♣ **read, write and convert time between analogue and digital 12- and 24-hour clocks** ♣ **solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.** Pupils build on their understanding of place value and decimal notation to record metric measures, including money. They use multiplication to convert from larger to smaller units. Perimeter can be expressed algebraically as 2(a + b) where a and b are the dimensions in the same unit.	**Properties of Shape** ♣ **compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes** ♣ **identify acute and obtuse angles and compare and order angles up to two right angles by size** ♣ **identify lines of symmetry in 2-D shapes presented in different orientations** ♣ **complete a simple symmetric figure with respect to a specific line of symmetry.** Pupils continue to classify shapes using geometrical properties, extending to classifying different triangles (for example, isosceles, equilateral, scalene) and quadrilaterals (for example, parallelogram, rhombus, trapezium). Pupils compare and order angles in preparation for using a protractor and compare lengths and angles to decide if a polygon is regular or irregular. Pupils draw symmetric patterns using a variety of media to become familiar with different orientations of lines of symmetry; and recognise line symmetry in a variety of diagrams, including where the line of symmetry does not dissect the original shape	**Statistics (overall)** ♣ **interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.** ♣ **solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.** Pupils understand and use a greater range of scales in their representations. Pupils begin to relate the graphical representation of data to recording change over time.

Number Knowledge – Pupils should be taught to:-	Measurement Knowledge – Pupils should be taught to:-	Geometry Knowledge – Pupils should be taught to:-	Statistics Knowledge – Pupils should be taught to:-
♣ **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** ♣ **recognise and use factor pairs and commutativity in mental calculations** ♣ **multiply two-digit and three-digit numbers by a one-digit number using formal written layout** ♣ **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 n objects are connected to m objects.** Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency. Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example 600 ÷ 3 = 200 can be derived from 2 x 3 = 6). Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers. Pupils write statements about the equality of expressions (for example, use the distributive law 39 × 7 = 30 × 7 + 9 × 7 and associative law (2 × 3) × 4 = 2 × (3 × 4)). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations for example, 2 x 6 x 5 = 10 x 6 = 60. Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children. **<u>Fractions (including decimals)</u>** ♣ **recognise and show, using diagrams, families of common equivalent fractions** ♣ **count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.** ♣ **solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number** ♣ **add and subtract fractions with the same denominator** ♣ **recognise and write decimal equivalents of any number of tenths or hundredths** ♣ **recognise and write decimal equivalents to 4 1 , 2 1 , 4 3**	They relate area to arrays and multiplication.	**<u>Position & Direction</u>** ♣ **describe positions on a 2-D grid as coordinates in the first quadrant** ♣ **describe movements between positions as translations of a given unit to the left/right and up/down** ♣ **plot specified points and draw sides to complete a given polygon.** Pupils draw a pair of axes in one quadrant, with equal scales and integer labels. They read, write and use pairs of coordinates, for example (2, 5), including using coordinate plotting ICT tools.	

Number Knowledge – Pupils should be taught to:-	Measurement Knowledge – Pupils should be taught to:-	Geometry Knowledge – Pupils should be taught to:-	Statistics Knowledge – Pupils should be taught to:-
♣ **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** ♣ **round decimals with one decimal place to the nearest whole number** ♣ **compare numbers with the same number of decimal places up to two decimal places** ♣ **solve simple measure and money problems involving fractions and decimals to two decimal places.** Pupils should connect hundredths to tenths and place value and decimal measure. They extend the use of the number line to connect fractions, numbers and measures. Pupils understand the relation between non-unit fractions and multiplication and division of quantities, with particular emphasis on tenths and hundredths. Pupils make connections between fractions of a length, of a shape and as a representation of one whole or set of quantities. Pupils use factors and multiples to recognise equivalent fractions and simplify where appropriate (for example, 9 6 = 3 2 or 4 1 = 8 2). Pupils continue to practise adding and subtracting fractions with the same denominator, to become fluent through a variety of increasingly complex problems beyond one whole. Pupils are taught throughout that decimals and fractions are different ways of expressing numbers and proportions. Pupils' understanding of the number system and decimal place value is extended at this stage to tenths and then hundredths. This includes relating the decimal notation to division of whole number by 10 and later 100. They practise counting using simple fractions and decimals, both forwards and backwards. Pupils learn decimal notation and the language associated with it, including in the context of measurements. They make comparisons and order decimal amounts and quantities that are expressed to the same number of decimal places. They should be able to represent numbers with one or two decimal places in several ways, such as on number lines.			

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Number Knowledge – Pupils should be taught to:-	Measurement Knowledge – Pupils should be taught to:-	Geometry Knowledge – Pupils should be taught to:-	Statistics Knowledge – Pupils should be taught to:-
Year 5			
Number & Place Value ♣ **read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit** ♣ **count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000** ♣ **interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero** ♣ **round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000** ♣ **solve number problems and practical problems that involve all of the above** ♣ **read Roman numerals to 1000 (M) and recognise years written in Roman numerals.** Pupils identify the place value in large whole numbers. They continue to use number in context, including measurement. Pupils extend and apply their understanding of the number system to the decimal numbers and fractions that they have met so far. They should recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule. They should recognise and describe linear number sequences (for example, 3, 3 2 1 , 4, 4 2 1 ...), including those involving fractions and decimals, and find the term-to-term rule in words (for example, add 2 1). **Addition & Subtraction** ♣ **add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)** ♣ **add and subtract numbers mentally with increasingly large numbers** ♣ **use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy** ♣ **solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.** Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency. They practise mental calculations with increasingly large numbers to aid fluency (for example, 12 462 – 2300 = 10 162). **Multiplication & Division**	**Measurement (overall)** ♣ **convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)** ♣ **understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints** ♣ **measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres** ♣ **calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes** ♣ **estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water]** ♣ **solve problems involving converting between units of time ♣ use all four operations to solve problems involving measure [for example, length, mass, volume, money] using**	**Properties of Shape** ♣ **identify 3-D shapes, including cubes and other cuboids, from 2-D representations** ♣ **know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles** ♣ **draw given angles, and measure them in degrees (o)** ♣ **identify:** ♣ **angles at a point and one whole turn (total 360o)** ♣ **angles at a point on a straight line and 2 1 a turn (total 180o)** ♣ **other multiples of 90o** ♣ **use the properties of rectangles to deduce related facts and find missing lengths and angles** ♣ **distinguish between regular and irregular polygons based on reasoning about equal sides and angles.** Pupils become accurate in drawing lines with a ruler to the nearest millimetre, and measuring with a protractor. They use conventional markings for parallel lines and right angles. Pupils use the term diagonal and make conjectures about the angles formed between sides, and between diagonals and parallel sides, and other properties of quadrilaterals, for example using dynamic geometry ICT tools.	**Statistics (overall)** ♣ **solve comparison, sum and difference problems using information presented in a line graph** ♣ **complete, read and interpret information in tables, including timetables.** Pupils connect their work on coordinates and scales to their interpretation of time graphs. They begin to decide which representations of data are most appropriate and why.

Newnham Junior School – Maths Curriculum Map

Number Knowledge – Pupils should be taught to:-	Measurement Knowledge – Pupils should be taught to:-	Geometry Knowledge – Pupils should be taught to:-	Statistics Knowledge – Pupils should be taught to:-
♣ **identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers** ♣ **know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers** ♣ **establish whether a number up to 100 is prime and recall prime numbers up to 19** ♣ **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** ♣ **multiply and divide numbers mentally drawing upon known facts** ♣ **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** ♣ **multiply and divide whole numbers and those involving decimals by 10, 100 and 1000** ♣ **recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)** ♣ **solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes** ♣ **solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign** ♣ **solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.** Pupils practise and extend their use of the formal written methods of short multiplication and short division. They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations. They use and understand the terms factor, multiple and prime, square and cube numbers. Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (for example, 98 ÷ 4 = 4 98 = 24 r 2 = 24 2 1 = 24.5 ≈ 25). Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings	**decimal notation, including scaling.** Pupils use their knowledge of place value and multiplication and division to convert between standard units. Pupils calculate the perimeter of rectangles and related composite shapes, including using the relations of perimeter or area to find unknown lengths. Missing measures questions such as these can be expressed algebraically, for example 4 + 2b = 20 for a rectangle of sides 2 cm and b cm and perimeter of 20cm. Pupils calculate the area from scale drawings using given measurements. Pupils use all four operations in problems involving time and money, including conversions (for example, days to weeks, expressing the answer as weeks and days). .	Pupils use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems. <u>Position & Direction</u> ♣ **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.** Pupils recognise and use reflection and translation in a variety of diagrams, including continuing to use a 2-D grid and coordinates in the first quadrant. Reflection should be in lines that are parallel to the axes.	

Number Knowledge – Pupils should be taught to:-	Measurement Knowledge – Pupils should be taught to:-	Geometry Knowledge – Pupils should be taught to:-	Statistics Knowledge – Pupils should be taught to:-
or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres. Distributivity can be expressed as a(b + c) = ab + ac. They understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements (for example, 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x 9 x 10 = 92 x 10). Pupils use and explain the equals sign to indicate equivalence, including in missing number problems **Fractions (including decimals & percentages)** ♣ **compare and order fractions whose denominators are all multiples of the same number** ♣ **identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths ♣ recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, 5 2 + 5 4 = 5 6 = 1 5 1] ♣ add and subtract fractions with the same denominator and denominators that are multiples of the same number** ♣ **multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams** ♣ **read and write decimal numbers as fractions [for example, 0.71 = 100 71]** ♣ **recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents** ♣ **round decimals with two decimal places to the nearest whole number and to one decimal place** ♣ **read, write, order and compare numbers with up to three decimal places** ♣ **solve problems involving number up to three decimal places** ♣ **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** ♣ **solve problems which require knowing percentage and decimal equivalents of 2 1 , 4 1 , 5 1 , 5 2 , 5 4 and those fractions with a denominator of a multiple of 10 or 25.** Pupils connect equivalent fractions > 1 that simplify to integers with division and other fractions > 1 to division with remainders, using the number line and other models, and hence move from these to improper and mixed fractions.			

Number Knowledge – Pupils should be taught to:-	Measurement Knowledge – Pupils should be taught to:-	Geometry Knowledge – Pupils should be taught to:-	Statistics Knowledge – Pupils should be taught to:-
Pupils connect multiplication by a fraction to using fractions as operators (fractions of), and to division, building on work from previous years. This relates to scaling by simple fractions, including fractions > 1. Pupils practise adding and subtracting fractions to become fluent through a variety of increasingly complex problems. They extend their understanding of adding and subtracting fractions to calculations that exceed 1 as a mixed number. Pupils continue to practise counting forwards and backwards in simple fractions. Pupils continue to develop their understanding of fractions as numbers, measures and operators by finding fractions of numbers and quantities. Pupils extend counting from year 4, using decimals and fractions including bridging zero, for example on a number line. Pupils say, read and write decimal fractions and related tenths, hundredths and thousandths accurately and are confident in checking the reasonableness of their answers to problems. They mentally add and subtract tenths, and one-digit whole numbers and tenths. They practise adding and subtracting decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 (for example, 0.83 + 0.17 = 1) Pupils should go beyond the measurement and money models of decimals, for example, by solving puzzles involving decimals. Pupils should make connections between percentages, fractions and decimals (for example, 100% represents a whole quantity and 1% is 100 1, 50% is 100 50 , 25% is 100 25) and relate this to finding 'fractions of'.			

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Number Knowledge – Pupils should be taught to:-	Measurement Knowledge – Pupils should be taught to:-	Geometry Knowledge – Pupils should be taught to:-	Statistics Knowledge – Pupils should be taught to:-
Year 6			
Number & Place Value ♣ **read, write, order and compare numbers up to 10 000 000 and determine the value of each digit** ♣ **round any whole number to a required degree of accuracy** ♣ **use negative numbers in context, and calculate intervals across zero** ♣ **solve number and practical problems that involve all of the above.** Pupils use the whole number system, including saying, reading and writing numbers accurately. **Addition, Subtraction, Multiplication & Division** ♣ **multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication** ♣ **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** ♣ **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** ♣ **perform mental calculations, including with mixed operations and large numbers** ♣ **identify common factors, common multiples and prime numbers** ♣ **use their knowledge of the order of operations to carry out calculations involving the four operations** ♣ **solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why** ♣ **solve problems involving addition, subtraction, multiplication and division** ♣ **use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.** Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division. They undertake mental calculations with increasingly large numbers and more complex calculations.	**Measurement (overall)** ♣ **solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate** ♣ **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** ♣ **convert between miles and kilometres** ♣ **recognise that shapes with the same areas can have different perimeters and vice versa** ♣ **recognise when it is possible to use formulae for area and volume of shapes** ♣ **calculate the area of parallelograms and triangles** ♣ **calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].** Pupils connect conversion (for example, from kilometres to miles) to a graphical representation as preparation for understanding linear/proportional graphs.	**Properties of Shape** ♣ **draw 2-D shapes using given dimensions and angles** ♣ **recognise, describe and build simple 3-D shapes, including making nets** ♣ **compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons** ♣ **illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius ♣ recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.** Pupils draw shapes and nets accurately, using measuring tools and conventional markings and labels for lines and angles. Pupils describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements. These relationships might be expressed algebraically for example, $d = 2 \times r$; $a = 180 – (b + c)$. **Position & Direction**	**Statistics (overall)** ♣**interpret and construct pie charts and line graphs and use these to solve problems** ♣ **calculate and interpret the mean as an average.** Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts. Pupils both encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects. They should connect conversion from kilometres to miles in measurement to its graphical representation. Pupils know when it is appropriate to find the mean of a data set.

Newnham Junior School – Maths Curriculum Map

Number Knowledge – Pupils should be taught to:-	Measurement Knowledge – Pupils should be taught to:-	Geometry Knowledge – Pupils should be taught to:-	Statistics Knowledge – Pupils should be taught to:-
Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency. Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures. Pupils explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9. Common factors can be related to finding equivalent fractions. **Fractions (including decimals & percentages)** ♣ **use common factors to simplify fractions; use common multiples to express fractions in the same denomination** ♣ **compare and order fractions, including fractions > 1** ♣ **add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions ♣ multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, 4 1 × 2 1 = 8 1]** ♣ **divide proper fractions by whole numbers [for example, 3 1 ÷ 2 = 6 1]** ♣ **associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 8 3]** ♣ **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** ♣ **multiply one-digit numbers with up to two decimal places by whole numbers** ♣ **use written division methods in cases where the answer has up to two decimal places** ♣ **solve problems which require answers to be rounded to specified degrees of accuracy** ♣ **recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.** Pupils should practise, use and understand the addition and subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator. They should start with fractions where the denominator of one fraction is a multiple of the other (for example, 2 1 + 8 1 = 8 5) and progress to varied and increasingly complex problems.	They know approximate conversions and are able to tell if an answer is sensible. Using the number line, pupils use, add and subtract positive and negative integers for measures such as temperature. They relate the area of rectangles to parallelograms and triangles, for example, by dissection, and calculate their areas, understanding and using the formulae (in words or symbols) to do this. Pupils could be introduced to compound units for speed, such as miles per hour, and apply their knowledge in science or other subjects as appropriate. **Ratio & Proportion** Knowledge – Pupils should be taught to:- ♣ **solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts** ♣ **solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison** ♣ **solve problems involving similar shapes where the scale factor is known or can be found** ♣ **solve problems involving**	♣ **describe positions on the full coordinate grid (all four quadrants)** ♣ **draw and translate simple shapes on the coordinate plane, and reflect them in the axes.** Pupils draw and label a pair of axes in all four quadrants with equal scaling. This extends their knowledge of one quadrant to all four quadrants, including the use of negative numbers. Pupils draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates using the properties of shapes. These might be expressed algebraically for example, translating vertex (a, b) to (a – 2, b + 3); (a, b) and (a + d, b + d) being opposite vertices of a square of side d. **Algebra** ***Knowledge – Pupils should be taught to:-*** ♣ **use simple formulae generate and describe linear number sequences** ♣ **express missing number problems algebraically** ♣ **find pairs of numbers that satisfy an equation with two unknowns**	

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Pupils should use a variety of images to support their understanding of multiplication with fractions. This follows earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, for example as parts of a rectangle. Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example, if 4 1 of a length is 36cm, then the whole length is 36 × 4 = 144cm). They practise calculations with simple fractions and decimal fraction equivalents to aid fluency, including listing equivalent fractions to identify fractions with common denominators. Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction (for example, 3 ÷ 8 = 0.375). For simple fractions with recurring decimal equivalents, pupils learn about rounding the decimal to three decimal places, or other appropriate approximations depending on the context. Pupils multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers. Pupils multiply decimals by whole numbers, starting with the simplest cases, such as 0.4 × 2 = 0.8, and in practical contexts, such as measures and money. Pupils are introduced to the division of decimal numbers by one-digit whole number, initially, in practical contexts involving measures and money. They recognise division calculations as the inverse of multiplication. Pupils also develop their skills of rounding and estimating as a means of predicting and checking the order of magnitude of their answers to decimal calculations. This includes rounding answers to a specified degree of accuracy and checking the reasonableness of their answers.	**unequal sharing and grouping using knowledge of fractions and multiples** Pupils recognise proportionality in contexts when the relations between quantities are in the same ratio (for example, similar shapes and recipes). Pupils link percentages or 360° to calculating angles of pie charts. Pupils should consolidate their understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems. They might use the notation a:b to record their work. Pupils solve problems involving unequal quantities, for example, 'for every egg you need three spoonfuls of flour', ' 5 3 of the class are boys'. These problems are the foundation for later formal approaches to ratio and proportion.	♣ **enumerate possibilities of combinations of two variables.** Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: missing numbers, lengths, coordinates and angles formulae in mathematics and science equivalent expressions (for example, a + b = b + a) generalisations of number patterns number puzzles (for example, what two numbers can add up to).	