

Lumbertubs milestones and progression document – Maths

Life Skills

Opportunities

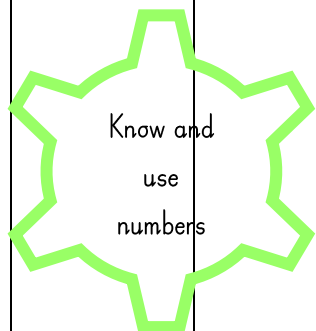
Aspirations

Our maths curriculum at Lumbertubs follows the Sarah White medium-term plans which are in line with the White Rose scheme of work. The planning and lessons taught at Lumbertubs all follow the same structure- Discover, Develop, Demonstrate. This language is used consistently across the school.

Teachers use different resources to aid their teaching and these can include Maths No Problem, White Rose or other appropriate resources.

Milestones

Concept		EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
Know and use numbers (understanding the number system and how it's used in a variety of ways)	Subitising	Numicon - expect children to know the value of the Numicon Shape by its colour, shape and structure. Move beyond counting holes. Use dot patterns. Regular, symmetrical arrangements - dice and dominoes Irregular arrangements - dot patterns Ask children 'What did you see?' 'How do you see it?'	When children are arranging objects, instead of counting, ask 'How could you arrange these objects so you know how many without counting?' When picking up 'counting' objects ask children to - 'Select 4 without counting them. Visualise dot patterns with regular and irregular arrangements. Children start to learn to break larger arrangement of images/objects into parts that can be subitised through identifying part-part-whole relationships. Organise objects by unitising ten (tens) and some more.	Children are breaking larger arrangements of images/objects into parts that can be subitised through identifying part-part-whole relationships. Encourage mental strategies. Discourage counting.	Consolidate by encouraging subitising at all times.
	Counting	Counts up to three or four objects by saying one number name for each item. Counts actions or objects which cannot be moved.	Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number.	Count in multiples of 2 to 9, 25, 50, 100 and 1000.	Read numbers up to 10 000 000. Use negative numbers in context and calculate intervals across zero.

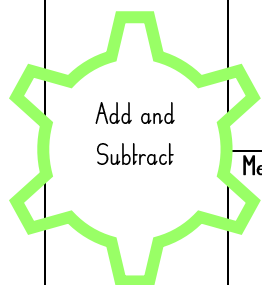


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		Counts objects to 10, and beginning to count beyond 10. Counts out up to six objects from a larger group. Counts an irregular arrangement of up to 10 objects (ELG: count reliably from 1-20)	Count, read and write numbers to 100 in numerals. Given a number, identify one more and one less. Count in steps of 2, 3, 5 and 10 from 0 or 1 and in tens from any number, forward and backward.	Find 1000 more or less than a given number. Count backwards through zero to include negative numbers.	
	Representing	Recognises numerals 1 to 5. Recognise some numerals of personal significance. Records, using marks that they can interpret and explain. Selects the correct numeral to represent 1 to 5 then 1 to 10 objects	Identify, represent and estimate numbers using different representations, including the number line. Read and write numbers initially from 1 to 20 and then to at least 100 in numerals and in words.	Identify, represent and estimate numbers using different representations. 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.	Write numbers up to 10 000 000 Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.
	Comparing	Uses the language of 'more' and 'fewer' to compare two sets of objects.	Use the language of: equal to, more than, less than (fewer), most and least. Compare and order numbers from 0 up to 100; use <, > and = signs.	Order and compare numbers beyond 1000	Order and compare numbers up to 10 000 000
	Place Value	Says the number that is one more than a given number. Finds one more or one less from a group of up to five objects, then ten objects	Recognise the place value of each digit in a two digit number (tens and ones)	Recognise the place value of each digit in a four-digit number. (thousands, hundreds, tens, and ones) Round any number to the nearest 10, 100 or 1000..	Round any whole number to a required degree of accuracy. Determine the value of each digit in any number.

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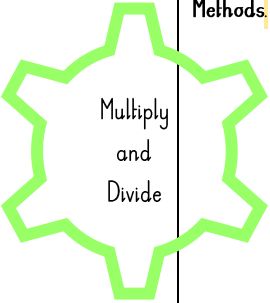
		(ELG: place 1-20 in the correct order)			
	Solving Problems	Estimate how many objects they can see (check by counting) Begins to identify own mathematical problems based on own interests and fascinations.	Use place value and number facts to solve problems	Solve number and practical problems increasingly large positive numbers	Solve number and practical problems
Add and Subtract (Understanding the concept of both adding and subtracting)	Complexity	Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer	Solve one-step problems with addition and subtraction: Using concrete objects and pictorial representations including those involving numbers, quantities and measures. Using the addition (+), subtraction (-) and equals (=) signs. Applying their increasing knowledge of mental and written methods	Solve two step addition and subtraction problems in contexts, deciding which operations and methods to use and why.	Solve multi-step addition and subtraction problems in contexts, deciding which operations and methods to use and why.
	Methods	Finds the total number of items in two groups by counting all of them. In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting	Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: One-digit and two-digit numbers to 20, including zero. A two-digit number and ones. A two-digit number and tens.	Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. Add and subtract numbers mentally, including: A three-digit number and ones. A three-digit number and tens.	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.



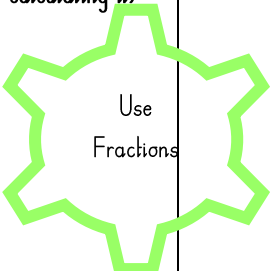
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			Two two-digit numbers. Adding three one-digit numbers. Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.	A three-digit number and hundreds. Use the associative law for addition	
	Checking	Be able to count forwards or backwards to check an answer	Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	Estimate and use inverse operations to check answers to a calculation.	Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.
	Using number facts		Represent and use number bonds and related subtraction facts within 20. Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100	Solve problems, including missing number problems, using number facts, place value and more complex addition and subtraction.	Add and subtract negative integers.
<u>Multiply and Divide</u> (understanding both the processes and concepts of multiplication and division)	Complexity	Recognise multiplication as doubling or halving	Solve one step (two step at greater depth) problems involving multiplication and division.	Solve problems involving multiplying and dividing, 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)	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 deciding which operations and methods to use and why. Solve problems involving multiplication and division,

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					including scaling by simple fractions and problems involving simple rates. Use knowledge of the order of operations to carry out calculations involving the four operations
	Methods	Be able to double and half a number (to 10)	Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ($\times$), division ($\div$) and equals ($=$) signs. Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. Solve problems involving multiplication and division using mental methods	Multiply two-digit and three-digit numbers by a one-digit number using formal written layout. 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. Use the distributive and associative law for multiplication	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.
	Checking		Use known multiplication facts to check accuracy of calculations.	Recognise and use the inverse relationship between multiplication and division and use this to check calculations and solve missing number problems.	Estimate and use inverse operations and rounding to check answers to calculations

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	Using multiplication and divisions facts		Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables. Recognise odd and even numbers. Use multiplication and division facts to solve problems	Recall multiplication and division facts for multiplication tables up to 12×12	Identify common factors, common multiples and prime numbers. Establish whether a number up to 100 is prime and recall prime numbers up to 19. 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 knowledge of factors and multiples, squares and cubes.
<u>Fractions</u> (understand the concept of part and whole and ways of calculating it) 	Recognising Fractions	Recognise fractions as sharing	Recognise, find and name a half as one of two equal parts of an object, shape or quantity. Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity. Recognise, find, name and write fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity.	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. Round decimals with one decimal place to the nearest whole number.	Compare and order fractions whose denominators are all multiples of the same number. Compare and order fractions, including fractions > 1. Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number.

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				Compare numbers with the same number of decimal places up to two decimal places. 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. Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. Compare and order unit fractions and fractions with the same denominators.	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. Identify the value of each digit in numbers given to three decimal places. Solve problems involving number up to three decimal places. Recognise the percent symbol (%) and understand that percent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal
	Equivalence		Recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$	Recognise and show, using diagrams, families of common equivalent fractions. Recognise and write decimal equivalents of any number of tenths or hundredths. Recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$	Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths. Read and write decimal numbers as fractions. Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.

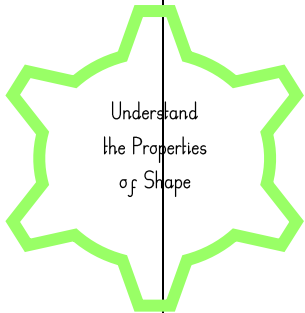
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					Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. Associate a fraction with division and calculate decimal fraction equivalents. Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts
	Solving Problems	Solve problems using sharing	Write simple fractions eg $\frac{1}{2}$ of $6 = 3$	Add and subtract fractions with the same denominator within one whole. Solve problems involving increasingly harder fractions. 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. Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in	Add and subtract fractions with the same denominator and denominators that are multiples of the same number. Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. Multiply simple pairs of proper fractions, writing the answer in its simplest form.

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				the answer as ones, tenths and hundredths. Solve simple measure and money problems involving fractions and decimals to two decimal places.	Solve problems which require knowing percentage and decimal equivalents of, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25. Divide proper fractions by whole numbers. Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places. <u>Ratio and proportion</u> 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 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 unequal sharing and grouping using knowledge of fractions and multiples
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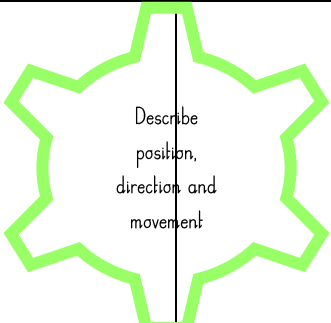
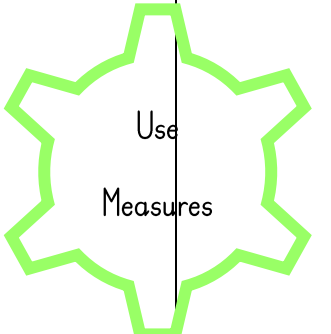
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<u>Understanding the properties of shape.</u> (recognising the names and properties of geometric shapes and angles) 		Begin to use mathematical names for solid 3D shapes and flat 2D shapes and mathematical terms to describe shapes Can select a particular named shape. Use familiar objects and common shapes to create and recreate patterns and build models.	Recognise and name common 2D and 3D shapes. Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line. Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces. Identify 2-D shapes on the surface of 3-D shapes. Compare and sort common 2-D and 3-D shapes and everyday objects.	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. 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	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 ($^{\circ}$). Identify: - Angles at a point and one whole turn (total 360°). - Angles at a point on a straight line and a turn (total 180°). - Other multiples of 90° 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.
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					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
<u>Describing position and movement</u> (recognising various types of mathematical movements)		Can describe their relative position such as behind or next to	Describe position, direction and movement, including whole, half, quarter and three-quarter turns. Order and arrange combinations of mathematical objects in patterns and sequences. Use mathematical vocabulary to describe position, direction and movement, including movement in a straight	Recognise angles as a property of shape and as an amount of rotation. Identify right angles, recognise that 2 right angles make a half turn and 4 make a whole turn. Identify angles that are greater than a right angle.	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) Draw and translate simple shapes on the coordinate plane, and reflect them in the axes

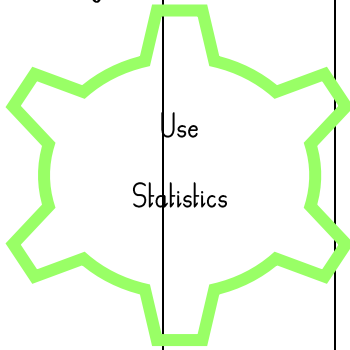
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 Describe position, direction and movement		line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)	Describe positions on a 2-D grid as coordinates in 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	
Measures (become familiar with range of measures, devices used for measuring and calculations)  Use Measures	Orders 2 or 3 items by length or height Orders 2 items by weight or capacity Uses everyday language related to time Begin to use everyday language related to money Order and sequence familiar events Measure short periods of time in simple ways	Compare, describe and solve practical problems for: •lengths and heights •mass/weight •capacity and volume •time. • Measure and begin to record: •lengths and heights •mass/weight •capacity and volume •time (hours, minutes, seconds).	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. (£ and p) 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 appropriate vocabulary.	Convert between different units of metric measure. 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 and capacity

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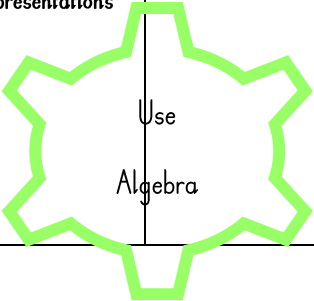
			Recognise and know the value of different denominations of coins and notes. Sequence events in chronological order using language. Recognise and use language relating to dates, including days of the week, weeks, months and years. Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times. Use standard units to estimate and measure length/height (m/cm); mass (kg/g); temperature ($^{\circ}\text{C}$); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels. Compare and order lengths, mass, volume/capacity and record the results using $>$, $<$ and $=$ Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value. Find different combinations of coins that equal the same amounts of money.	Know the number of seconds in a minute and the number of days in each month, year and leap year. Compare durations of events. 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.	Solve problems involving converting between units of time. 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. 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 up to three decimal places. Convert between miles and kilometres Recognise that shapes with the same areas can have different perimeters and vice versa.
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			Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change. Compare and sequence intervals of time. Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times. Know the number of minutes in an hour and the number of hours in a day		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.
<u>Statistics</u> (Interpret, manipulate and present data in various ways) 			Interpret and construct simple pictograms, tally charts, block diagrams and simple tables. Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity. Ask and answer questions about totalling and comparing categorical data	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, pictograms and tables. 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	Solve comparison, sum and difference problems using information presented in a line graph. Complete, read and interpret information in tables, including timetables. Interpret and construct pie charts and line graphs and use these to solve problems. Calculate and interpret the mean as an average

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				bar charts, pictograms, tables and other graphs.	
<u>Algebra</u> (recognising mathematical properties and relationships using symbolic representations)			Solve addition and subtraction problems involving missing numbers.	Solve addition and subtraction, multiplication and division problems that involve missing numbers.	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. Enumerate possibilities of combinations of two variables



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Progression of skills

	EYFS	1	2	3	4	5	6
Subitising/number sense	-recognise some numerals of personal significance - recognise numbers 1-5 -select the correct numeral to represent 1 to 5 then 1 to 10 objects -Estimate how many objects they can see -count an irregular arrangement of up to 10 objects -children to talk about how they see regular/irregular/symmetrical arrangements (dot patterns, dice, dominos etc.)	-represent number using many different resources -talk about how they visualise a number using dot patterns (irregular/regular) -children can arrange objects, instead of counting to check amount -children can select correct amount of objects without 1:1 counting -Children learn to break larger arrangement of images/objects into parts that can be subitised through identifying part-part-whole relationships.	- Organise objects by unitising ten (tens) and some more. -represent larger numbers using a variety of resources	Children are breaking larger arrangements of images/objects into parts that can be subitised through identifying part-part-whole relationships.	Encourage mental strategies. Discourage counting.	Consolidate by encouraging subitising at all times.	Consolidate by encouraging subitising at all times.
Number and place value	-count up to 3 or 4 objects by saying one number name for each item -count objects or actions that can't be moved -count out up to 6 objects from a larger group. -Count reliably from 1-20 and place them in order	-Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number - Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens	-Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward -Recognise the place value of each digit in a two-digit number (tens, ones) -Identify, represent and estimate numbers using	- 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	- 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)	- Read, write, order and compare numbers to at least 1000 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	- 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

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	-say the number that is 1 more than a given number -find one more or one less from a group of up to 5 objects then 10 objects -use the language of more and fewer to compare 2 sets of objects.	- Given a number, identify one more and one less - Identify and represent numbers using objects and pictorial representations including the number line, and use the language of equal to, more than, less than (fewer), most, least - Read and write numbers from 1 to 20 in numerals and words.	different representations, including the number line -Compare and order numbers from 0 up to 100; use $<$, $>$ and $=$ signs -Read and write numbers to at least 100 in numerals and in words -Use place value and number facts to solve problems.	- 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.	- 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.	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.	- Solve number and practical problems that involve all of the above.
Addition and subtraction	-begin to use the vocabulary involved in adding and subtracting -find the total of 2 groups by counting all of them -add and subtract 2 single digit numbers and count on or back to find the answer.	-read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs -represent and use number bonds and related subtraction facts within 20 -add and subtract one-digit and two-digit numbers to 20, including zero -solve one-step problems that involve addition and	solve problems with addition and subtraction: - using concrete objects and pictorial representations, including those involving numbers, quantities and measures - applying their increasing knowledge of mental and written methods -recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100	- add and subtract numbers mentally, including: - a three-digit number and ones - three-digit number and tens e.g. $247 + 30$, $247 - 20$ - a three-digit number and hundreds e.g. $447 + 100$, $447 - 100$ - add and subtract numbers with up to three digits, using formal written methods of columnar addition and 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	- 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,	- 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

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		subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$.	-add and subtract numbers using concrete objects, pictorial representations, and mentally, including: - a two-digit number and ones - a two-digit number and tens - two two-digit numbers - adding three one-digit numbers -show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot -recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number	- 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.	and methods to use and why.	deciding which operations and methods to use and why.	
Multiplication and division	-solve problems using doubling and halving	-Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	-recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers -calculate mathematical statements for	- 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	- recall multiplication and division facts for multiplication tables up to 12×12 - use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1;	- 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 numbers	- 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

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			multiplication and division within the multiplication tables and write them using the multiplication ($\times$), division ($\div$) and equals ($=$) signs -Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot -solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	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.	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.	- Establish whether a number up to 100 is a prime and recall prime numbers up to 19 - Multiply numbers up to four digits by a one or two digit number, using a formal written method, including long multiplication for two digit numbers. - Multiply and divide number mentally by drawing upon known facts - Divide numbers up to four digits by a one digit number using formal written method of short division and interpret remainders in context. - Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 - Recognise and use square numbers and cube numbers and notation for squared (^{2}) and cubed (^{3}) - Solve problems involving multiplication and division including their knowledge of factors and multiples, squares and cubes.	formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context - identify common factors, common multiples and prime numbers - use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. - use their knowledge of the order of operations to carry out calculations involving the four operations - 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 - solve problems involving addition, subtraction, multiplication and division
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						- Solve problems involving addition, subtraction, multiplication and division and a combination of these including the meaning of the equals sign - Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates	
Fractions	-begin to use fractions as sharing -solve problems using sharing	-recognise, find and name a half as one of two equal parts of an object, shape or quantity -recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.	-recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$, and $\frac{3}{4}$ of a length, shape, set of objects or quantity -write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$.	- Count up and down in tenths; Recognise that tenths arise from dividing a 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 show, using diagrams, equivalent fractions with small denominators. - Add and subtract fractions with the same denominator within one whole (For example $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$) - Compare and order unit fractions, and	- recognise and show, using diagrams, families of common equivalent fractions - 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 (and beyond one whole)	- 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, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1 \frac{1}{5}$] - add and subtract fractions with the same denominator and denominators that are	- 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 - recall and use equivalences between simple fractions, decimals and percentages, including in different contexts - multiply simple pairs of proper fractions,

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				fractions with the same denominators - Solve problems that involve all of the above.		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, $0.71 = 71/100$] - recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents - 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 $1/2$, $1/4$, $1/5$, $2/5$, $4/5$ and those fractions with a denominator of a multiple of 10 or 25.	writing the answer in its simplest form [for example, $1/4 \times 1/2 = 1/8$] - divide proper fractions by whole numbers [for example, $1/3 \div 2 = 1/6$] - associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $3/8$] - recall and use equivalences between simple fractions, decimals and percentages, including in different contexts
Decimals and percentages					- count up and down in hundredths; recognise that hundredths arise when dividing an object	- Read and write decimal numbers as fractions [for example, $0.71 = 71/100$]	- identify the value of each digit in numbers given to three decimal places and multiply and

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					by one hundred and dividing tenths by ten - recognise and write decimal equivalents of any number of tenths or hundredths - recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ - 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.	- 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 $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25.	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
Ratio and proportion							- solve problems involving the relative sizes of two quantities where missing values can be found by using integer

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							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 unequal sharing and grouping using knowledge of fractions and multiples.
Measures	-order 2 or 3 objects by length or height. -order 2 items by weight or capacity -use every day language related to time -begin to use every day language related to money -order and sequence familiar events -measure short periods of time in simple ways	-compare, describe and solve practical problems for: -lengths and heights [for example, long/short, longer/shorter, tall/short, double/half] mass/weight [for example, heavy/light, heavier than, lighter than] -capacity and volume [for example, full/empty, more than, less than, half, half full, quarter] -time [for example, quicker, slower, earlier, later]	-choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels -compare and order lengths, mass, volume/capacity and record the results using >, < and =	- 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	- 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	- 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	- 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

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	-can describe their relative position such as behind or next to	measure and begin to record the following: -lengths and heights, mass/weight, capacity and volume, time (hours, minutes, seconds). -recognise and know the value of different denominations of coins and notes -sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening] -recognise and use language relating to dates, including days of the week, weeks, months and years -tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.	-recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value -find different combinations of coins that equal the same amounts of money -solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change -compare and sequence intervals of time -tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times -know the number of minutes in an hour and the number of hours in a day.	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].	- 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.	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 decimal notation, including scaling.	- 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].
Geometry	-begin to use mathematical names for 'solid' 3D shapes and 'flat' 2D shapes and mathematical terms to describe shapes.	Recognise and name common 2-D and 3-D shapes, including	-identify and describe the properties of 2-D shapes, including the number of sides and line	- draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in	- compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes	- identify 3-D shapes, including cubes and other cuboids, from 2D representations	- Draw 2-D shapes accurately using given dimensions and angles - Recognise, describe and build simple 3-D

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	-select a particular named shape -use positional language to talk about size, weight, capacity, position, distance, time and money -recognise, create and describe patterns. -explore characteristics of everyday objects and shapes and use mathematical language to describe them.	-3-D shapes [for example, cuboid (incl cubes), pyramids and spheres]. -2-D shapes [for example, rectangles (including squares), circles and triangles] -Describe position, direction and movement, including whole, half, quarter and three-quarter turns	-symmetry in a vertical line -identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces -identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] -compare and sort common 2-D and 3-D shapes and everyday objects -Order and arrange combinations of mathematical objects in patterns and sequences -Use mathematical vocabulary to describe position, direction and movement, including movement in straight lines and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three quarter turns (clockwise and anticlockwise)	-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.	- 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.	- know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles - draw given angles, and measure them in degrees ($^{\circ}$) - identify: 1. angles at a point and one whole turn (total 360°) 2. angles at a point on a straight line and $1/2$ a turn (total 180°) 3. other multiples of 90° - 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. - 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.	- 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. - 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.
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Statistics				- 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.	- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and line graphs. - 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 - complete, read and interpret information in tables, including timetables.	- Interpret and construct pie charts and line graphs and use these to solve problems - Calculate and interpret the mean as an average