COUNTING								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fast recognition of up to 3 objects, without having to count them individually (subitising) Recite numbers past 5 Say one number for each item in order 1,2,3,4,5	Count objects, actions and sounds. Subitise Count beyond ten	Have a deep understanding of numbers to 10, including the composition of each number Subitise to 5. Verbally count to 20, recognising the pattern of the counting system.	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 given a number, identify one more and one less	count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward	count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number	count backwards through zero to include negative numbers count in multiples of 6, 7, 9, 25 and 1 000 find 1000 more or less than a given number	interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero count forwards or backwards in steps of powers of 10 for any given number up to 1000 000	use negative numbers in context, and calculate intervals across zero
COMPARING NUMBERS								
Compare quantities using language "more than" "fewer than"	Compare numbers Understand the one more than/one less than relationship between consecutive numbers	Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity	use the language of: equal to, more than, less than (fewer), most, least	compare and order numbers from 0 up to 100; use <, > and = signs	compare and order numbers up to 1000	order and compare numbers beyond 1 000 *compare numbers with the same number of decimal places up to two decimal places* (copied from Fractions)	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)

IDENTIFYING, REPRESENTING AND ESTIMATING NUMBERS								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Link numerals and amounts for example, showing the right number of objects to match the numeral, up to 5. Show "finger numbers" up to 5 Knows that the last number said when counting a small set of objects tells you how many there are in total (cardinal principle	Link the number symbol with its cardinal number value	Identify and represent numbers with objects and pictorial representations including introduction to a number line	identify and represent numbers using objects and pictorial representations including the number line	identify, represent and estimate numbers using different representations, including the number line	identify, represent and estimate numbers using different representations	identify, represent and estimate numbers using different representations		

READING AND WRITING NUMBERS (including Roman Numerals)								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Link numerals and amounts eg right number of objects to match numeral 5	Link the number symbol with its cardinal value Begin to represent number with own symbols	Practice reading and writing numbers from 1 to 10 in numerals and words.	read and write numbers from 1 to 20 in numerals and words.	read and write numbers to at least 100 in numerals and in words	read and write numbers up to 1000 in numerals and in words		read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Comparing Numbers)	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Understanding Place Value)
Experiment with their own symbols and marks as well as numerals					*tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks* (copied from Measurement)	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.	read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	
UNDERSTANDING PLACE VALUE								
	Explore the composition of numbers to 10	Have a deep understanding of numbers to 10, including the composition of each number. Verbally count beyond 20, recognising the pattern of the counting system.		recognise the place value of each digit in a two-digit number (tens, ones)	recognise the place value of each digit in a three-digit number (hundreds, tens, ones)	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 1 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers) *recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents* (copied from Fractions)	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)
						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 units, tenths and hundredths (copied from Fractions)		*identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places* (copied from Fractions)

NUMBER BONDS

Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Explore the composition of numbers to 10 Automatically recall number bonds for numbers 0-10 Begin to understand the operations of addition and subtraction and use associated vocabulary. Begin to understand mathematical symbols associated with addition and subtraction.	Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some numbers bonds to 10 including double 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				

MENTAL CALCULATION

Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fast recognition of up to 3 objects, without having to count them (subitising)	Subitise Automatically recall number bonds for numbers 0 – 10 To understand and recall doubling facts up to 10.	Subitise up to 5 Automatically recall..number bonds up to 5...and some number bonds up to 10 including double facts.	add and subtract one-digit and two-digit numbers to 20, including zero	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	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 mentally with increasingly large numbers	perform mental calculations, including with mixed operations and large numbers
			read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Written Methods)	show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot				use their knowledge of the order of operations to carry out calculations involving the four operations

WRITTEN METHODS

Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Show finger numbers up to 5 Experiment with their own symbols and marks as well as numerals	To become familiar with and understand mathematical symbols linked to addition and subtraction. To begin to represent mathematical sentences with Appropriate symbols.		read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Mental Calculation)		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	add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)	

INVERSE OPERATIONS, ESTIMATING AND CHECKING ANSWERS								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	estimate the answer to a calculation and use inverse operations to check answers	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	use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

PROBLEM SOLVING								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = * - 9	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	solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction	solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
				solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change (copied from Measurement)				Solve problems involving addition, subtraction, multiplication and division

MULTIPLICATION & DIVISION FACTS								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
To learn about sharing between groups of people/toys.	To be introduced to the concepts of sharing equally and doubling.	Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally	*count in multiples of twos, fives and tens* (copied from Number and Place Value)	*count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward* (copied from Number and Place Value)	*count from 0 in multiples of 4, 8, 50 and 100* (copied from Number and Place Value)	*count in multiples of 6, 7, 9, 25 and 1 000* (copied from Number and Place Value)	*count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000* (copied from Number and Place Value)	
	To understand concept of odd and even numbers.			recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers	recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	recall multiplication and division facts for multiplication tables up to 12 × 12		

MENTAL CALCULATION								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Automatically Recall number bonds for numbers 0-10	Automatically Recall …number bonds up to 5…and some Number bonds to 10 including double facts.		show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot	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 (appears also in Written Methods)	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 (appears also in Properties of Numbers)	multiply and divide numbers mentally drawing upon known facts multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	perform mental calculations, including with mixed operations and large numbers *associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^3/_8$)* (copied from Fractions)

WRITTEN CALCULATION								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Experiment with their own symbols and marks as well as numerals	To begin to represent mathematical statements with appropriate symbols.			calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs	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 (appears also in Mental Methods)	multiply two-digit and three-digit numbers by a one-digit number using formal written layout	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 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 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 short division where appropriate for the context 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 *use written division methods in cases where the answer has up to two decimal places* (copied from Fractions (including decimals)

PROPERTIES OF NUMBERS: MULTIPLES, FACTORS, PRIMES, SQUARE AND CUBE NUMBERS								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						recognise and use factor pairs and commutativity in mental calculations (repeated)	identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.	identify common factors, common multiples and prime numbers *use common factors to simplify fractions; use common multiples to express fractions in the same denomination* (copied from Fractions)
							know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers	
							establish whether a number up to 100 is prime and recall prime numbers up to 19	
							recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})	*calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3* (copied from Measures)

COUNTING IN FRACTIONAL STEPS								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Beginning to use the term "half" and understand it means sharing into 2 equal parts			*Pupils should count in fractions up to 10, starting from any number and using the1/2 and 2/4 equivalence on the number line (Non Statutory Guidance)*	count up and down in tenths	count up and down in hundredths		

RECOGNISING FRACTIONS								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			recognise, find and name a half as one of two equal parts of an object, shape or quantity	recognise, find, name and write fractions $^1/_3$, $^1/_4$, $^2/_4$ and $^3/_4$ 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 that hundredths arise when dividing an object by one hundred and dividing tenths by ten	recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents (appears also in Equivalence)	
					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 name a quarter as one of four equal parts of an object, shape or quantity		recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators			

COMPARING FRACTIONS								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					compare and order unit fractions, and fractions with the same denominators		compare and order fractions whose denominators are all multiples of the same number	compare and order fractions, including fractions >1

COMPARING DECIMALS								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						compare numbers with the same number of decimal places up to two decimal places	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
ROUNDING INCLUDING DECIMALS								
						round decimals with one decimal place to the nearest whole number	round decimals with two decimal places to the nearest whole number and to one decimal place	solve problems which require answers to be rounded to specified degrees of accuracy

EQUIVALENCE (INCLUDING FRACTIONS, DECIMALS AND PERCENTAGES)								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Begin to solve problems involving doubling, halving and sharing Records using marks they can explain		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.	write simple fractions e.g. $^1/_2$ of 6 = 3 and recognise the equivalence of $^2/_4$ and $^1/_2$.	recognise and show, using diagrams, equivalent fractions with small denominators	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 $^1/_4$; $^1/_2$; $^3/_4$	identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths read and write decimal numbers as fractions (e.g. 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 as a decimal fraction	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 (e.g. 0.375) for a simple fraction (e.g. $^3/_8$) recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

ADDITION AND SUBTRACTION OF FRACTIONS								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					add and subtract fractions with the same denominator within one whole (e.g. $^5/_7 + {}^1/_7 = {}^6/_7$)	add and subtract fractions with the same denominator	add and subtract fractions with the same denominator and multiples of the same number	add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
							recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number (e.g. $^2/_5 + {}^4/_5 = {}^6/_5 = 1\,{}^1/_5$)	

MULTIPLICATION AND DIVISION OF FRACTIONS								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
							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 (e.g. $^1/_4 \times {}^1/_2 = {}^1/_8$)
								multiply one-digit numbers with up to two decimal places by whole numbers
								divide proper fractions by whole numbers (e.g. $^1/_3 \div 2 = {}^1/_6$)

MULTIPLICATION AND DIVISION OF DECIMALS								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
								multiply one-digit numbers with up to two decimal places by whole numbers
						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		multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
								identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
								associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^3/_8$)
								use written division methods in cases where the answer has up to two decimal places

PROBLEM SOLVING								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					solve problems that involve all of the above	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	solve problems involving numbers up to three decimal places	
						solve simple measure and money problems involving fractions and decimals to two decimal places.	solve problems which require knowing percentage and decimal equivalents of $^{1}/_{2}$, $^{1}/_{4}$, $^{1}/_{5}$, $^{2}/_{5}$, $^{4}/_{5}$ and those with a denominator of a multiple of 10 or 25.	

Statements only appear in Year 6 but should be connected to previous learning, particularly fractions and multiplication and division								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					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 unequal sharing and grouping using knowledge of fractions and multiples.			

EQUATIONS								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Experiment with their own symbols and marks as well as numerals *Solve real world Mathematical problems with numbers up to 5* *Talk about and identifies the patterns around them. Eg stripes on clothes, designs on rugs and wallpaper (use informal language)*	Continue, copy and create repeating patterns Automatically recall number bonds for numbers 0 - 10 Explore the composition	Have a deep understanding of numbers to 10, including the composition of each number Automatically recall number bonds to 5 and some number bonds to 10 including	*solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and* ***missing number problems*** *such as* *7 = * - 9*	*recognise and use the inverse relationship between addition and subtraction and use this to check calculations and* ***missing number*** *problems.* (copied from Addition and Subtraction) *recall and use addition and subtraction facts to 20 fluently, and*	solve problems, *including* ***missing number*** *problems, using number facts, place value, and more complex addition and subtraction.* (copied from Addition and Subtraction) *solve problems, including* ***missing number*** *problems, involving multiplication and division, including integer scaling* (copied from Multiplication and Division)		*use the properties of rectangles to deduce related facts and find* ***missing lengths and angles*** (copied from Geometry:	express missing number problems algebraically find pairs of numbers that satisfy number sentences involving two unknowns enumerate all possibilities of

Extend and create ABAB patterns Notice and correct an error in a repeating pattern. Begin to describe a Sequence of events , real or fictional, using words such as "first" "then"	of numbers to 10 Identifying missing numbers from number lines up to 10	double facts. Explore and represent patterns within numbers to 10, including evens and odds, double facts and how quantities can be distributed equally	(copied from Addition and Subtraction) *represent and use number bonds and related subtraction facts within 20* (copied from Addition and Subtraction)	*derive and use related facts up to 100*(copied from Addition and Subtraction)			Properties of Shapes)	combinations of two variables

FORMULAE								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						Perimeter can be expressed algebraically as 2(a + b) where a and b are the dimensions in the same unit. *(Copied from NSG measurement)*		use simple formulae *recognise when it is possible to use **formulae** for area and volume of shapes* (copied from Measurement)
SEQUENCES								
			sequence events in chronological order using language such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening (copied from Measurement)	*compare and sequence intervals of time* (copied from Measurement)				generate and describe linear number sequences

COMPARING AND ESTIMATING								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Compare quantities using language such as "more" and "fewer" Make comparisons between objects relating to size, length, weight and capacity	Compare length, weight and capacity To use prior vocabulary and supplement with Lightest /heaviest/		compare, describe and solve practical problems for: * lengths and heights [e.g. long/short, longer/shorter, tall/short, double/half]	compare and order lengths, mass, volume/capacity and record the results using >, < and =		estimate, compare and calculate different measures, including money in pounds and pence	calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2)	calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic

Investigate measure using appropriate vocabulary Heavy/light /same as/ heavier /lighter/tall/short/ Long/longer/shorter /empty Full/nearly full/nearly empty	Tallest/ shortest/ Half full/quickest/ Slowest To compare, describe and solve practical problems for >length and heights. >weight >capacity >time To order and sequence 3 comparisons of measure.		* mass/weight [e.g. heavy/light, heavier than, lighter than] * capacity and volume [e.g. full/empty, more than, less than, half, half full, quarter] * time [e.g. quicker, slower, earlier, later] sequence events in chronological order using language [e.g. before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]	compare and sequence intervals of time	compare durations of events, for example to calculate the time taken by particular events or tasks estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight (appears also in Telling the Time)	(also included in Measuring)	and square metres (m^2) and estimate the area of irregular shapes (also included in measuring) estimate volume (e.g. using 1 cm^3 blocks to build cubes and cuboids) and capacity (e.g. using water)	metres (m^3), and extending to other units such as mm^3 and km^3.

			MEASURING and CALCULATING					
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	To begin to use non –standard units to measure static objects. To record findings during investigations. To understand the importance of constant baseline		measure and begin to record the following: * **lengths and heights** * **mass/weight** * **capacity and volume** * **time** (hours, minutes, seconds**)**	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	measure, compare, add and subtract: **lengths** (m/cm/mm); **mass** (kg/g); **volume/capacity** (l/ml)	estimate, compare and calculate **different measures,** including **money in pounds and pence** (appears also in Comparing)	use all four operations to solve problems involving measure (e.g. **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 (appears also in Converting)

					measure the **perimeter** of simple 2-D shapes	measure and calculate the **perimeter** of a rectilinear figure (including squares) in centimetres and metres	measure and calculate the **perimeter** of composite rectilinear shapes in centimetres and metres	recognise that shapes with the same areas can have different **perimeters** and vice versa

TELLING THE TIME								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Understand position through words alone Begin to describe a sequence of events using words such as "first", "then"	To sequence a familiar set of events both fictional and non-fictional To be introduced to and understand the o'clock time on an analogue clock. To be able to read and draw the hands on a clock face to show this times.		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 language relating to dates, including days of the week, weeks, months and years	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. (appears also in Converting)	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, hours and o'clock; use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight (appears also in Comparing and Estimating)	read, write and convert time between analogue and digital 12 and 24-hour clocks (appears also in Converting) solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days (appears also in Converting)	solve problems involving converting between units of time	

CONVERTING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	know the number of minutes in an hour and the number of hours in a day. (appears also in Telling the Time)	know the number of seconds in a minute and the number of days in each month, year and leap year	convert between different units of measure (e.g. kilometre to metre; hour to minute)	convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)	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
			read, write and convert time between analogue and digital 12 and 24-hour clocks (appears also in Converting)	solve problems involving converting between units of time	solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate (appears also in Measuring and Calculating)
			solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days (appears also in Telling the Time)	understand and use equivalences between metric units and common imperial units such as inches, pounds and pints	convert between miles and kilometres

IDENTIFYING SHAPES AND THIER PROPERTIES								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Talk about and explore 2d and 3d shapes… using informal and mathematical language “sides”, corners”, “straight”, “flat”, ”round” Select shapes appropriately: flat surfaces for building, a triangular prism for a roof etc. Combine shapes to make new ones.	Select, rotate and manipulate shapes in order to develop spatial reasoning skills Compose and Decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can. Recognise and name common 2d and 3d shapes and talk about properties of sides, corners, edges, faces, curved and flat,		recognise and name common 2-D and 3-D shapes, including: * 2-D shapes [e.g. rectangles (including squares), circles and triangles] * 3-D shapes [e.g. cuboids (including cubes), pyramids and spheres].	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, [for example, a circle on a cylinder and a triangle on a pyramid]		identify lines of symmetry in 2-D shapes presented in different orientations	identify 3-D shapes, including cubes and other cuboids, from 2-D representations	recognise, describe and build simple 3-D shapes, including making nets (appears also in Drawing and Constructing) illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
DRAWING AND CONSTRUCTING								
Understand position through words alone eg “The bag is under the table” without pointing Select shapes appropriately: flat shapes for building eg a triangular prism for a roof Using construction sets to create various models.	Compose and decompose shapes so that children recognise a shape can have others shapes within, just as numbers can. Using various construction sets in sustained construction projects eg The Shard, The 3 bears beds and chairs.				draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them	complete a simple symmetric figure with respect to a specific line of symmetry	draw given angles, and measure them in degrees ($^{\circ}$)	draw 2-D shapes using given dimensions and angles recognise, describe and build simple 3-D shapes, including making nets (appears also in Identifying Shapes and Their Properties)

COMPARING AND CLASSIFYING								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Talk about and compare 2d and 3d shapes (eg circles, rectangles, triangles and cuboids) using informal and formal mathematical language eg sides, corners, flat, round. Make comparisons between objects relating to size, length.	Select, rotate and manipulate shapes in order to develop spatial reasoning skills. Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can. To sort shapes into categories according to their properties, eg all 3 sided shapes, shapes with curved edges.			compare and sort common 2-D and 3-D shapes and everyday objects		compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes	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	compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons

ANGLES								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					recognise angles as a property of shape or a description of a turn		know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles	
					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 acute and obtuse angles and compare and order angles up to two right angles by size	identify: * angles at a point and one whole turn (total 360°) * angles at a point on a straight line and ½ a turn (total 180°) * other multiples of 90°	recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles
					identify horizontal and vertical lines and pairs of perpendicular and parallel lines			

			POSITION, DIRECTION AND MOVEMENT					
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Understand position through words alone eg "The bag is under	Select, rotate and manipulate shapes in order to develop spatial reasoning skills		describe position, direction and movement, including half,	use mathematical vocabulary to describe position, direction and movement including		describe positions on a 2-D grid as coordinates in the first quadrant	identify, describe and represent the position of a shape following a	describe positions on the full coordinate grid (all four quadrants)

the table" with no pointing Describe a familiar route Discuss routes and locations , using words like in front of and behind.	To describe position, direction and movement including forwards, backwards, sideways, in front, behind, under, over, beside, next to, inbetween. To begin to introduce left and right.		quarter and three-quarter turns.	movement in a straight 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 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	reflection or translation, using the appropriate language, and know that the shape has not changed	draw and translate simple shapes on the coordinate plane, and reflect them in the axes.

PATTERN								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Stages of understanding repeated patterns - continue AB pattern - copy AB pattern - make own AB pattern - spot errors in an AB pattern - can identify the unit of repeat e.g. this is a red-blue pattern	Stages of understanding repeated patterns cont. - continue, copy, make own ABC pattern - continue a pattern that has ended mid-unit of repeat - can do the above with a range of patters e.g. ABB, ABBC, AABB - can begin to symbolise unit structure of a pattern the letter R for the red dinosaur -can begin to explain the rule of a pattern and then create another pattern with the same rule. -Can begin to make patterns that are not linear e.g. around a circle, or a border with fixed number of spaces	They recognise, create and describe patterns.		order and arrange combinations of mathematical objects in patterns and sequences				

INTERPRETING, CONSTRUCTING AND PRESENTING DATA								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Experiment with their own symbols and marks as well as numerals.	Compare quantities up to 10 in different Contexts. Introduction to simple tally charts. Use of 3d block towers to vote for story time book.			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	interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	complete, read and interpret information in tables, including timetables	interpret and construct pie charts and line graphs and use these to solve problems

SOLVING PROBLEMS								
Preschool	Nursery	Reception ELG	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					solve one-step and two-step questions [e.g. 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.	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	calculate and interpret the mean as an average

Camps Hill Problem Solving Progression:

There are 5 types of problems:

- **Word Problems**

These can vary from the number of operations steps required to solve it and whether they are open or closed ended questions.
Closed problems are those that only require the application of previously acquired knowledge and open-ended problems are those used in mathematical investigations where the answer is unrestricted and is determined by the ability, imagination and perseverance of the child.

- **Finding all the possibilities**

These problems aim to develop the children's systematic approach to problem solving. They need to check for repeats in their answers, have a systematic way of recording e.g. ordered list or table and have to have a way of knowing when all possibilities have been found.

- **Logic puzzles**

These are used to develop the children's skills of deductive reasoning. It requires a step-by-step approach where each step and decision follows logically from the previous step. E.g. Sudoku puzzle.

- **Finding rules and describing patterns**

These are important for encouraging children to work towards developing generalisations in mathematics. E.g. when adding two odd numbers, do they always produce an even number?

- **Diagrams/visual problems**

These are based on diagrams or are presented in a visual manner.

National curriculum aims to ensure that children ' can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and preserving in seeking solutions'(DfE 2013)

Representing is part of the problem solving process and children will be encouraged to use and develop the skill as the progress through school. Time will be given for children to practice this. Children need to learn the different ways they can do this and get to see it in a different context or using different numbers before they look for a solution.
These are the strategies that they will practice:

- Using logical reasoning
- Working backwards
- Drawing a diagram
- Drawing a table
- Creating an organised list
- Looking for a pattern
- Acting it out
- Guessing and checking

- Language is also representation and it is important that children have a good understanding of the mathematical language involved. Class discussion is important and cartoon concepts, which supports and helps them, make sense of the language involved.
- This progression map is written to help teachers promote mathematical problem solving in children.
- The progression map presents four different types of mathematical types of problems, although these can be linked and overlap. However, teachers can see the progression in each types of problem.

Problem Solving Progression

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Word problems	Use developing mathematical, ideas and methods to solve practical problems.	Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money, for example to 'pay' and 'give change'.	Solve problems involving addition, subtraction, multiplication or division in contexts of numbers, measures or pounds and pence.	Solve one-step and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations.	Solve one-step and two-step problems involving numbers, money or measures, including time; choose and carry out appropriate calculations, using calculator methods where appropriate.	Solve one-step and two-step problems involving whole numbers and decimals and all four operations, choosing and using appropriate calculation strategies, including calculator use.	Solve multistep problems, and problems involving fractions, decimals and percentages; choose and use appropriate calculation strategies at each stage, including calculator use.
Logic problems/ puzzles	Match sets of objects to numerals that represent the number of objects.	Describe a puzzle or problem using numbers, practical materials and diagrams; use these to solve the problem and set the solution in the original context.	Identify and record the information or calculation needed to solve a puzzle or problem; carry out the steps or calculations and check the solution in the context of the problem.	Represent the information in a puzzle or problem using numbers, images or diagrams; use these to find a solution and present it in context, where appropriate using £.p notation or units of measure.	Represent a puzzle or problem using number sentences, statements or diagrams; use these to solve the problem; present and interpret the solution in the context of the problem.	Represent a puzzle or problem by identifying and recording the information or calculations needed to solve it; find possible solutions and confirm them in the context of the problem.	Tabulate systematically the information in a puzzle or problem; identify and record the steps or calculations needed to solve it, using symbols where appropriate; interpret solutions in the original context and check their accuracy.

Finding all the possibilities	- Recognise similarities and differences; - Sort objects, using a number of criteria; - Explain what they are thinking and doing.	- Know that there is sometimes more than one answer to a problem - Work with objects, numbers and pictures in a systematic way to solve finding all possibilities problems. - Use simple lists and practical resources to organize answers. - Spot and describe simple patterns. - Explain how different answers or solutions are different'	- Organise the recording of possibilities in an ordered list or table. - Know when all the possibilities have been found. - Check for repeats of solutions. - Use lists or tables to find answers to other questions - Spot simples patterns and make predictions.	- Begin to make decisions about how best to organise solutions. - Describe how I know I have found all the possible solutions. - Check that my solutions meet all the criteria of the problem. - Begin to suggest extensions by asking 'what if…?'	- Develop my own systems for solving finding all possibilities problems, e.g. start with the smallest number. - List answers in a systematic way and explain why I chose to solve the problem the way I did. - Check solutions against given criteria - Recognise patterns and relationships between solutions and begin to generalise.	- Solve finding all possibilities problems by organising solutions into lists or tables. - Decide on the best way to solve a problem involving finding all possibilities. - Explain my thinking when I solve a finding all possibilities problems and begin to decide whether it was effective.	- work systematically, using my knowledge of number facts and the relationship between operations to solve problems efficiently and I can explain and justify my conclusions in words and symbols
Patterns, Sequences and Rules	Talk about, recognise and recreate simple patterns	Use familiar objects and common shapes to create and recreate patterns and build models	Continue simple patterns and involving numbers or shapes and explain why.	Describe patterns and relationships involving numbers or shapes, make predictions and test these with examples	Solve problems by Identifying patterns and relationships involving numbers or shapes.	Complete sequences by following simple rules and investigate statements by identifying and using patterns, relationships and properties of numbers or shapes.	Represent and interpret sequences, patterns and relationships in different ways, including using simple expressions and formulae in words then symbols

Test Base Progression

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number and place value		**2N6** use place value and number facts to solve problems	**3N6** solve number problems and practical problems involving **3N1 - 3N4** 3N6 - Reasoning	**4N6** solve number and practical problems that involve **4N1 - 4N5** and with increasingly large positive numbers	**5N6** solve number problems and practical problems that involve **5N1 - 5N5** 5N6 - Reasoning	**6N6** solve number problems and practical problems that involve **6N2 - 6N5** 6N6 - Reasoning
Addition and Subtraction	**1C4** solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? - 9 1C4 - Reasoning	**2C4** 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 2C4 - Reasoning **2M9** solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change **(from measures)** 2M9a - Reasoning	**3C4** solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction 3C4 - Reasoning **3M9b** add and subtract lengths (m / cm / mm) **(from measures)** 3M9b - Reasoning	**4C4** solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why 4C4 - Reasoning	**5C4** solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why 5C4 - Arithmetic & Reasoning 5C4 - Reasoning	**6C4** solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why 6C4 - Reasoning **6C8** solve problems involving addition, subtraction, multiplication and division 6C8 - Reasoning
Multiplication and division	**1C8** solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations	**2C8** solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division	**3C8** solve problems including missing number problems, involving multiplication and division, including integer scaling problems and correspondence	**4C8** solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit, integer scaling problems	**5C8a** solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes	**6C8** solve problems involving addition, subtraction, multiplication and division

	and arrays with the support of the teacher 1C8 - Reasoning	facts, including problems in contexts 2C8 - Reasoning	problems in which *n* objects are connected to *m* objects	and harder correspondence problems such as *n* objects are connected to *m* objects	**5C8b** solve problems involving addition and subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	
					5C8c solve problems involving multiplication and division including scaling by simple fractions and problems involving simple rates	**6R3** solve problems involving similar shapes where the scale factor is known or can be found **(from ratio and proportion)** 6R3 - Reasoning

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fractions, decimals and percentages			**3F10** solve problems that involve **3F1-3F4**	**4F10a** 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 4F10a - Reasoning	**5F10** solve problems involving numbers up to three decimal places 5F10 - Reasoning	
				4F10b solve simple measure and money problems involving fractions and decimals to two decimal places 4F10b - Reasoning	**5F12** solve problems that require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those with a denominator of a multiple of 10 or 25 5F12 - Reasoning	

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Statistics			**4F10b** solve simple measure and money problems involving fractions and decimals to two decimal places 4F10b - Reasoning	**5F12** solve problems that require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those with a denominator of a multiple of 10 or 25 5F12 - Reasoning	**4F10b** solve simple measure and money problems involving fractions and decimals to two decimal places 4F10b - Reasoning	**5F12** solve problems that require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those with a denominator of a multiple of 10 or 25 5F12 - Reasoning

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Money	**1M3** recognise and know the value of different denominations of coins and notes	**2M3a** recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value 2M3ab - Reasoning **2M3b** find different combinations of coins that equal the same amounts of money **2M9** solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change 2M9 - Reasoning	**3M9a** add and subtract amounts of money to give change, using both pounds (£) and pence (p) in practical contexts 3M9a - Reasoning			

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Measuring					**5M9a-d** use all four operations to solve problems involving measure [e.g. length, mass, volume, money] using decimal notation, including scaling 5M9ad - Reasoning	**6M9** solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate 6M9 - Reasoning

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Converting				**4M5** convert between different units of measurement [e.g. km to m; hour to minute] 4M5 - Reasoning	**5M5** convert between different units of metric measure [e.g. km and m; cm and m; cm and mm; g and kg; l and ml] 5M5 - Reasoning	**6M5** 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 visa versa, using decimal notation of up to three decimal places 6M5 - Reasoning

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Time			**3M4e** know the number of seconds in a minute and the number of days in each month, year and leap year 3M4e - Reasoning **3M4d** 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 / am / pm, morning, afternoon, noon and midnight 3M4d - Reasoning **3M4f** compare durations of events [e.g. to calculate the time taken by particular events or tasks 3M4f - Reasoning **3M4d** 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 / am / pm, morning, afternoon, noon and midnight 3M4d - Reasoning	**4M4c** solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days 4M4c - Reasoning **4M4c** solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days	**5M4** solve problems involving converting between units of time 5M4 - Reasoning 5M4 solve problems involving converting between units of time	**6M9** solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate 6M9 - Reasoning