MATHS PROGRESSION

Overview:
We place a strong emphasis on the children learning and practising the fundamentals of mathematics, particularly number and calculation. We encourage the use of concrete objects and manipulatives to support a thorough understanding. We focus on deepening the children's understanding through three areas: fluency, problem solving and reasoning. We want the children to think mathematically when problem solving and see that they can apply the maths knowledge and understanding that they have learnt previously, to a problem. This in turn will enhance students' mathematical understanding and development.

- Fluency is primarily developed through varied and frequent practice.
- Reasoning is developed in two ways: routinely in lessons through a consistent teaching approach of asking 'why?' more often than 'how?'; and through specific topic activities designed to teach skills in the context of the topic.
- Problem solving is developed both through routine problems and non-routine problems; the latter are focused on specific problem-solving skills shown below and taught in the context of the topic.

In each year, pupils will be learning to:

Number and Place Value			
Themes within subject	**Year R**	**Year 1**	**Year 2**
Counting	**count objects, actions and sounds matching one number name to each item** **subitise to 5 (ELG)** and count to check **count beyond 20 verbally (ELG)**	**count to and across 100, forwards, beginning with 0 or 1** **count to and across 100, forwards and backwards, beginning with any given number** **count to and across 100, backwards, beginning with any given number** **count in multiples of twos** **begin to recognise odd and even numbers**	**count in multiples of threes, fives and tens** **recognise odd and even numbers**
Represent	**link the number symbol with its cardinal number value to 10** **write recognisable numbers to 10**	**identify and represent one and two digit numbers using objects and pictorial representations*** **identify and represent numbers using the number line** **count, read and write numbers to 100 in numerals** **read and write numbers from 1 to 20 in words**	**estimate one and two digit numbers using different representations*** **estimate one and two digit numbers using the number line** **count, read and write numbers to 100 in numerals and words**

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Compare	**compare quantities up to 10** **using the language of greater than/less than, more than,/fewer, the same (ELG)** **understand the one more/one less relationship between consecutive numbers**	**given a number, identify one more and one less** **use the language of equal to, more than, less than, most, least, (fewer)** know and use <, > and = signs for numbers within 10	**recognise the place value of each digit in a two-digit number (tens, ones)** **compare and order numbers from 0 up to 100** **use <, > and = signs**
Reasoning and Problem Solving (refer to skills at the end of the document)	**recognise the pattern of the counting system counting verbally**	**solve problems related to place value and number**	**solve problems related to place value and number**
Terminology	more, less, fewer, number, count, check, same, different, amount	digit, numeral, figure(s), compare, order/a different order, size, value, between, halfway between, above, below, tens, ones	numbers to one hundred, hundreds, partition, recombine

Addition and Subtraction

Themes within subject	Year R	Year 1	Year 2
Recall, Represent and Use	**automatically recall number bonds to 5 (ELG)** **automatically recall some number bonds to 10 (ELG)**	**read, write and interpret mathematical statements involving addition (+) and equals (=) signs** **read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs** **represent and use number bonds within 20**	**recall and use addition and subtraction facts to 20** **use + and - facts up to 100 related to known addition and subtraction facts to 20,** **understand that addition of two numbers can be done in any order (commutative)**

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		represent and use subtraction facts related to number bonds within 20	**understand that subtraction of one number from another cannot be done in any order** **recognise the inverse relationship between addition and subtraction**
Calculations	**understand different ways of making numbers up to 10 (ELG)** **use visual representations* such as part-part whole up to 10**	**add and subtract one-digit and two-digit numbers to 20, including zero**	**add and subtract a two-digit number and ones using concrete objects, pictorial representations*, and mentally** **add and subtract a two-digit number and tens using concrete objects, pictorial representations*, and mentally** **add and subtract two two-digit numbers using concrete objects, pictorial representations*, and mentally** **add three one-digit numbers** **use the inverse relationship between addition and subtraction to check calculations**
Reasoning and Problem Solving (refer to skills at the end of the document)	**solve real world mathematical problems with numbers up to ten**	**solve one-step problems that involve addition and subtraction**	**show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot** **solve problems with addition and subtraction involving numbers** **solve problems with addition and subtraction involving quantities**

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			solve problems with addition and subtraction involving measures **derive + and – facts up to 100 related to known addition and subtraction facts to 20**
Terminology	number bonds, more, less, altogether, count on, count back, part, whole	number line, add, plus, make, sum, total, near double, equals, is the same as (including equals sign), difference between, subtract, take away, minus, how many…?, how much…?	Inverse, bar model

Multiplication and Division

Themes within subject	Year R	Year 1	Year 2
Recall, Represent and Use	**double numbers and quantities of objects up to 5+5 (ELG)** **recognise even and odd numbers to 10 (ELG)**	**double numbers and quantities of objects to 20** **halve numbers and quantities of objects to 10**	**recall and use multiplication facts for the 2 times table** **recall and use multiplication facts for the 5 times table** **recall and use multiplication facts for the 10 times table** **understand that multiplication of two numbers can be done in any order (commutative)** **recall and use division facts for the 2 times table** **recall and use division facts for the 5 times table** **recall and use division facts for the 10 times table** **understand division of one number by another cannot be done in any order** start to recognise the inverse relationship between multiplication and division

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Calculations	**share even objects to 10, recognising that numbers can be split equally (ELG)**	**calculate simple multiplication and division answers using concrete objects** **calculate simple multiplication and division answers using pictorial representations*** **calculate simple multiplication and division answers using arrays, with the support of the teacher**	**calculate mathematical statements for multiplication within the tables they know** **write mathematical statements using the multiplication (×) and equals (=) signs** **calculate mathematical statements for division within the tables they know** **write mathematical statements using the division (÷) and equals (=) signs**
Reasoning and Problem Solving (refer to skills at the end of the document)	**solve real world mathematical problems with numbers to 10 and beyond ten**	**solve one-step problems involving multiplication and division as above** ***make connections between arrays, number patterns and counting in twos, fives and tens***	**solve problems involving multiplication and division as above, including problems in contexts** **show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot**
Terminology	double, half, halve, share, share equally, group in twos, threes etc., equal groups of, total	once, twice, three times, five times, multiply, multiply by, repeated addition, array, row, column, divide, divided by, left over, pair	multiple of times multiplication

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Fractions			
Themes within subject	**Year R**	**Year 1**	**Year 2**
Recognise and Write	**recognise that a group of objects can be shared equally between two people (ELG)**	**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 and find fractions $^1/_3$, $^1/_4$, $^2/_4$ and $^3/_4$ of a length, shape, set of objects or quantity** **name and write fractions $^1/_3$, $^1/_4$, $^2/_4$ and $^3/_4$ of a length, shape, set of objects or quantity**
Compare		recognise the equivalence of two halves and four quarters, using objects or shapes	**recognise the equivalence of $^2/_4$ and $^1/_2$**
Calculations		**recognise that two halves, or four quarters, make a whole**	**write simple fractions, e.g. $^1/_2$ of 6 = 3**
Terminology	share equally, half	whole, equal parts, four equal parts, one half, two halves, a quarter, two quarters	three quarters, one third, a third, equivalence, equivalent

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Algebra			
Themes within subject	**Year R**	**Year 1**	**Year 2**
Algebra		**solve missing number problems such as □ - 9 = 7** **solve missing number problems by guessing and checking**	**use the inverse relationship between addition and subtraction to solve missing number problems**
Terminology		split, separate, explain, problem missing number	predict, describe, record, order

Measurement

Note: In this section, problem solving and reasoning are integrated into the different themes, separated by a dotted line. See progression at the end of the document when teaching problem solving and reasoning.

Themes within subject	**Year R**	**Year 1**	**Year 2**
Length	**compare length, using comparative language, such as 'than'**	**measure and begin to record lengths and heights** **compare and describe lengths and heights,** e.g. long/short, longer/shorter, tall/short, double/half	**choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm** **estimate and measure length/height (m/cm), to the nearest appropriate unit, using rulers** **compare and order lengths and record the results using >, < and =**
	use comparative language to group objects	**solve practical problems for lengths and heights**	
Area and Volume	**compare capacity, using comparative language, such as 'than'**	**measure and begin to record capacity and volume** **Compare and describe capacity and volume,** e.g. full/empty, more than, less than, half, half full, quarter	**choose and use appropriate standard units to estimate and measure capacity (litres/ml) using measuring vessels** **estimate and measure capacity (litres/ml), to the nearest appropriate unit, using measuring vessels**

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			compare and order volume/capacity and record the results using >, < and =
	use comparative language to group objects	solve practical problems for lengths and heights solve practical problems for capacity and volume	
Temperature		compare and describe temperature e.g. hot/warm/cold, hotter/colder	estimate and measure temperature (°C), using thermometers
Mass and Weight	compare weight, using comparative language, such as 'heavier than'	Compare and describe mass and weight, e.g. heavy/light, lighter than measure and begin to record mass/weight	choose and use the appropriate standard unit to estimate mass (kg/g) measure mass (kg/g) to the nearest appropriate unit, using scales compare and order mass, and record the results using >, < and =
	use comparative language to group objects	solve practical problems for mass/weight	
Money	begin to use everyday language related to money in role play	recognise and know the value of different denominations of coins and notes	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

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			solve simple problems in a practical context involving addition of money of the same unit **solve simple problems in a practical context involving subtraction of money of the same unit, including giving change**
Time	**use everyday language related to time** order and sequence two or three familiar events measure short periods of time in simple ways	**compare and describe 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 **recognise and use language of dates - days of the week, weeks, months and years** **tell the time to the hour and half past the hour** **draw the hands on a clock face to show the time to the hour and half past the hour** **measure and begin to record time (hours, minutes, seconds)**	**compare and sequence intervals of time** **tell and write the time to five minutes, including quarter past/to the hour** **draw the hands on a clock face to show the times to five minutes, including quarter past/to the hour** **know the number of minutes in an hour and the number of hours in a day**
		solve practical problems for time	

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Terminology	days of the week, before, after, next, last, now, soon, early, late, quick, quicker, quickest, quickly, fast, faster, fastest, slow, slower, slowest, slowly, old, older, oldest, new, newer, newest, once, twice, first, second, third, etc., money, coin, penny, pence, pound, measure	time, seasons, hour, o'clock, half past, clock, watch, hands, always, never, often, sometimes, usually, estimate, close to, about the same as, just over, just under, too many, too few, not enough, enough, length, width, height, depth, long, longer, longest, short, shorter shortest, tall, taller, tallest, high, higher, highest, Low, wide, narrow, deep, shallow, thick, thin, far, near, close, metre, ruler, metre stick, price, cost, buy, sell, spend, spent, pay, change, costs more, costs less, cheaper, costs the same as	quarter past/to, centimetres, metres, kilometres, grams, kilograms, millimetres, litres, temperature, degrees

Shapes

Note: In this section, problem solving and reasoning are integrated into the different themes, separated by a dotted line. See progression at the end of the document when teaching problem solving and reasoning.

Themes within subject	Year R	Year 1	Year 2
2D Shapes	**see how a shape can have other shapes within it** e.g. two triangles can make a square	**recognise and name rectangles (including squares), circles and triangles**	**recognise and name quadrilaterals, pentagons, hexagons, octagons** **describe the number of sides of shapes met so far** **identify any line symmetry in a vertical line for shapes met so far**
	develop spatial reasoning skills by selecting, rotating and manipulating shapes		**compare and sort common 2-D shapes and everyday objects**
3D Shapes	copy increasingly complex 2D pictures and patterns with these 3D resources **see how a shape can have other shapes within it** e.g. squares on the faces of a cube	**recognise and name cubes, pyramids and spheres** identify that circles are round, but really spheres are spherical	**recognise and name cuboids, cylinders, other prisms and cones** **describe the number of edges, vertices and faces** **identify 2-D shapes on the surface of 3-D shapes,** e.g. a circle on a cylinder and a triangle on a pyramid

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	select, rotate and manipulate shapes in order to develop spatial reasoning skills.		**compare and sort common 3-D shapes and everyday objects**
Position and Direction	use positional language such as top, bottom, middle, between, inside describe their relative position such as 'behind' or 'next to' or 'in front'	**describe position, using words like** left, right**, top, middle, bottom, on top of, in front of, above, between around, near, close, far, inside, outside** **describe their own movement using words like forwards, backwards,** sideways, left, right, **up, down** **describe their own turning movement, including whole, half, quarter and three-quarter turns**	**describe movement of another person or robot using mathematical words like straight line, rotation, left, right** **describe rotation of another person or robot as clockwise or anti-clockwise** **describe rotation of another person or robot as a number of right angles for quarter, half and three-quarter turns**
Terminology	before, after, beside, next to, opposite, apart, between, middle, make, build, draw	edge, centre, direction, journey, left, right, across, close, far, near, along, through, to, from, towards, away from, movement, slide, roll, turn, whole turn, half turn, stretch, bend, corner (point, pointed), face, side, edge,	rotation, clockwise, anticlockwise, straight line, ninety degree turn, right angle, size, bigger, larger, smaller, symmetrical, line of symmetry, fold, match, mirror line, reflection

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Statistics			
Themes within subject	**Year R**	**Year 1**	**Year 2**
Present and Interpret	count how many objects share a particular simple property **present results using practical resources, pictures, drawings or numerals**	**interpret simple tables** **present results using lists and simple tables, with support**	**interpret tally charts,** e.g. how many ___ are there? **interpret simple pictograms with simple ratios 1, 2**, e.g. how many of x are there? **interpret simple pictograms with simple ratios 10,** 5, e.g. how many of x are there? **interpret block diagrams** **count objects in different categories showing the results in a simple table** **construct tally charts** **construct simple pictograms (ratio 2 or 10)** **construct block diagrams**
Reasoning and Problem Solving (refer to skills at the end of the document)		**compare how many objects there are in simple categories shown in a table** e.g. are there more apples or more oranges?	**solve problems that need adding up of objects in different categories** **compare how many objects there are in different categories,** e.g. which fruit is there most of? **ask a friend a question that needs adding up or comparing** **sort objects in different categories by quantity**

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Terminology	set, list, information, order, count,	table, label, title, tally, match	vote, graph, block graph, pictogram, represent, most popular, most common, least popular, least common
Reasoning and Problem Solving			
Themes within subject	**Year R**	**Year 1**	**Year 2**
Reasoning	**recognise and describe simple repeating patterns involving numbers or shapes e.g. AABBAABB, ABCABC** **continue simple repeating patterns involving numbers or shapes** **create simple repeating patterns involving numbers or shapes** **say what they are trying to find out** **sort familiar objects into three or more obvious groups e.g. different colours** sort familiar objects into two or more groups based on comparisons e.g. long/short/dark/light **describe ways they have sorted objects using comparative language e.g. longer/shorter**	**recognise, describe and continue more complex patterns involving numbers or shapes** **create more complex patterns involving numbers or shapes** **give reasons to justify what might come next in a simple sequence of shapes or numbers** **make predictions and test these with examples, using mathematical language** **with support, answer a question by recording information in lists and simple tables** **say what they have found out** **explain why an answer is correct or incorrect** **use diagrams** (e.g. three separate circles) **to sort objects into three or more separate groups according to a given criterion** **suggest a different criterion for grouping the same objects**	**respond to 'What if…?' questions, making predictions based on mathematical knowledge** **justify their reasoning logically, using phrases, such as 'I know that… so… ' or 'I am sure of that because…'** **describe and explain decisions and methods chosen** **explain what they have found out using mathematical language** **record work and results in lists and simple tables** **use a simple Venn diagram (two overlapping circles) to sort objects into three groups – x; y; and both x and y**

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Problem Solving	**While solving real-world mathematical problems…**		
	think aloud how to work things out **answer questions by choosing and using suitable equipment** **record simple numerical and pictorial representations** **use concrete objects to work out the answer** explain to an adult how they worked out the answer	**identify what the question means** **identify the key information given in a one-step puzzle or word problem** **identify the operation needed to solve a one-step puzzle or word problem** **use concrete objects or pictures to help work out the answer** **use arrays to help work out the answer with support of an adult** **check the answer in the context of the problem to be sure it makes sense** **show the working out and the answer clearly** try a range of possible solutions to solve problems	**identify the key information in a two-step puzzle or word problem, where the two steps are shown in the question** **identify the operations needed to solve a two-step word problem, where the two steps are shown in the question** suggest a way to solve a problem **apply their increasing knowledge of mental and written methods** **use multiplication and division methods as needed,** e.g. arrays, repeated addition, mental methods and facts. **adopt a suggestion by an adult or their peers** **use lists and tables to organise and interpret given information, with support** **use diagrams to find a solution, with support** begin to work systematically **check work for mistakes, including considering appropriate units**
Terminology	create, continue, copy, repeat, repeating pattern, carry on, answer	justify, sequence, word problem, operation, working out	two-step, list, table, organise, reasoning, logical

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Appendices:

*Progression of representations and written methods / calculations (school specific, linked to scheme)

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