Lickey Hills Primary School and Nursery

Progression in Mathematics Skills - 2022

Skills	By the end of Nursery	By the end of Reception	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
Counting	•Fast recognition of up to 3 objects, without having to count them individually ('subitising'). •Recite numbers past 5. •Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle').	• Count up to 3 or 4 objects by saying a number name for each item. • Count actions, sounds or objects that cannot be moved. • Count objects to 10 and begin to count beyond 10. • Count out up to 6 objects from a larger group. • Count an irregular arrangement of up to 10 objects. **ELG - Verbally count beyond 20, recognising the pattern of the counting system**	Children can: •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	Children can: •count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward	Children can: •count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number.	Children can: •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	Children can: •count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 •interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero	Children can: •use negative numbers in context, and calculate intervals across zero
Place Value	•Compare quantities using language: 'more than', 'fewer than'.	• Use the language of more and fewer to compare 2 sets of objects. **ELG - Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity**		Children can: •recognise the place value of each digit in a two-digit number •compare and order numbers from 0 up to 100; use <, > and = signs	Children can: •recognise the place value of each digit in a three-digit number •compare and order numbers up to 1000	Children can: •recognise the place value of each digit in a four-digit number •order and compare numbers beyond 1000 •round any number to the nearest 10, 100 or 1000	Children can: •read, write, order and compare numbers up to 1 000 000 and determine the value of each digit •round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000	Children can: •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
Representing number	•Show 'finger numbers' up to 5.	•Say the correct numeral to represent 1	Children can: •identify and	Children can: •identify, represent	Children can: •identify, represent	Children can: •identify, represent	Children can: •read Roman numerals	

	•Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5. •Experiment with their own symbols and marks as well as numerals.	to 5, then 1 to 10 objects. •Recognise some numerals of personal significance. •Recognise numerals 1 to 5. **ELG -Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.** **ELG - Subitise (recognise quantities without counting) up to 5.**	represent numbers using objects and pictorial representations including the number line, & use language of, equal to, more than, less than (fewer), most, least •read and write numbers from 1 to 20 in numerals and words •read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs	and estimate numbers using different representations, including the number line •read and write numbers to at least 100 in numerals and in words	and estimate numbers using different representations •read and write numbers up to 1000 in numerals and in words	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	to 1000 (M) and recognise years written in Roman numerals •recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})	
Number facts (+/-)		•Say the number that is one more than a given number. •Understand the 'one more than/one less than' relationship between consecutive numbers. **ELG: Have a deep understanding of number to 10, including the composition of each number.**	Children can: •given a number, identify one more and one less •represent and use number bonds and related subtraction facts within 20	Children can: •use place value and number facts to solve problems recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100				
Mental +/-		•Find the total number of items in 2 groups by counting all of them. •Explore the composition of numbers up to 10. •Automatically recall number bonds for numbers 0-10.	Children can: •add and subtract one-digit and two-digit numbers to 20, including zero	Children can: •add and subtract numbers using concrete objects, pictorial representations, and mentally, including TU+U, TU+T, TU+TU and U+U+U	Children can: •add and subtract numbers mentally, including: HTU+U, HTU+T and HTU+H		Children can: •add and subtract numbers mentally with increasingly large numbers	Children can: •perform mental calculations, including with mixed operations and large numbers

		•Begin to use the vocabulary involved in adding and subtracting. •Record, using marks that they can interpret and explain. **ELG - Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.**		•show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot				
Written +/-				Children can: •add and subtract numbers with up to two digits, using formal written methods of columnar addition and subtraction, following conceptual CPA based learning	Children can: •add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	Children can: •add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	Children can: •add and subtract whole numbers with more than 4 digits, including using formal written methods	
Problems +/-	•Solve real world mathematical problems with numbers up to 5.	Begin to identify their own mathematical problems based on own interests and fascinations.	Children can: •solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ – 9.	Children can: •solve problems with addition and subtraction, using concrete, pictorial and abstract representations •recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	Children can: •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	Children can: •estimate and use inverse operations to check answers to a calculation •solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	Children can: •use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy •solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	

Number facts (x/÷)				•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	•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 (non-prime) numbers •establish whether a number up to 100 is prime and recall prime numbers up to 19	•identify common factors, common multiples and prime numbers
Mental (x/÷)				Children can: •calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs •show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot	Children can: •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 methods	Children can: •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	Children can: •multiply and divide numbers mentally drawing upon known facts •multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	Children can: •perform mental calculations, including with mixed operations and large numbers
Written (x/÷)					Children can: •Progress to formal written methods calculations as above	Children can: •multiply two-digit and three-digit numbers by a one-digit number using formal written layout	Children can: •multiply numbers up to 4 digits by a one- or two-digit number using a formal written	Children can: •multiply multi-digit numbers up to 4 digits by a two-digit whole number using the 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	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 context
Problems (x/÷)			Children can: •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.	Children can: •solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts	Children can: •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.	Children can: •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	Children can: •solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes •solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign •solve problems involving multiplication and	Children can: •use their knowledge of the order of operations to carry out calculations involving the four operations •solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why •solve problems involving addition, subtraction, multiplication and division

							division, including scaling by simple fractions and problems involving simple rates	•use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
Recognising fractions			Children can: •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.	Children can: •recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity	Children can: •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	Children can: •count up and down in hundredths. •recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.	Children can: •recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number	
Comparing fractions					Children can: •compare and order unit fractions, and fractions with the same denominators •recognise and show, using diagrams, equivalent fractions with small denominators	Children can: •recognise and show, using diagrams, families of common equivalent fractions	Children can: •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	Children can: •use common factors to simplify fractions •use common multiples to express fractions in the same denomination •compare and order fractions, including fractions > 1
Finding fractions of quantities					Children can: •recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators •recognise and use	Children can: •solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a		

					fractions as numbers: unit fractions and non-unit fractions with small denominators	whole number		
Fraction calculations				Children can: •write simple fractions for example, 1/2 of 6 = 3 and recognise the equivalence of 2/4 and 1/2.	Children can: •add and subtract fractions with the same denominator within one whole [for example, 5/7 + 1/7 = 6/7]	Children can: •add and subtract fractions with the same denominator	Children can: •add and subtract fractions with the same denominator and denominators that are multiples of the same number •multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	Children can: •add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions •multiply simple pairs of proper fractions, writing the answer in its simplest form •divide proper fractions by whole numbers
Decimals as fractional amounts						Children can: •recognise and write decimal equivalents of any number of tenths or hundredths •recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ •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	Children can: •read and write decimal numbers as fractions	Children can: •associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction •identify the value of each digit in numbers given to three decimal places
Ordering decimals						Children can: •round decimals with one decimal place to the nearest whole number •compare numbers with the same number	Children can: •recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents •round decimals	

						of decimal places up to two decimal places	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	
Calculating with decimals								Children can: •multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places •multiply one-digit number with up to two decimal places by whole numbers •use written division methods in cases where the answer has up to two decimal places
Percentages							Children can: •recognise the per cent 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	Children can: •solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
Fraction problems					Children can: •solve problems using all fraction knowledge	Children can: •solve simple measure and money problems involving fractions and decimals to two decimal places	Children can: •solve problems involving number up to three decimal places •solve problems which require knowing	Children can: •solve problems which require answers to be rounded to specified degrees of accuracy •recall and use

							percentage and decimal equivalents of ½ , ¼ , 1/5 , 2/5 , 4/5 and those fractions with a denominator of a multiple of 10 or 25	equivalences between simple fractions, decimals and percentages, including in different contexts.
Ratio & Proportion								Children can: •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 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.
Algebra								Children can: •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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Measures	• Make comparisons between objects relating to size, length, weight and capacity.	Order 2 or 3 items by length or height. •Order 2 items by weight or capacity. •Compare length, weight and capacity.	Children can: •compare, describe and solve practical problems for: length/height, weight/mass, capacity/volume & time •measure and begin to record length/height, weight/mass, capacity/volume & time	Children can: •choose and use appropriate standard units to estimate and measure length/height (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 =	Children can: •measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)	Children can: •Convert between different units of measure estimate, compare and calculate different measures, including money in pounds and pence	Children can: •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 •estimate volume and capacity	Children can: •solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate •use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places convert between miles and kilometres
Mensuration					Children can: •measure the perimeter of simple 2-D shapes	Children can: •measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres •find the area of rectilinear shapes by counting squares	Children can: •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 (cm^2) and square metres (m^2) and estimate the area of irregular shapes	Children can: •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.
Money			Children can: •recognise and know the value of different denominations of coins and notes	Children can: •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	Children can: •add and subtract amounts of money to give change, using both £ and p in practical contexts		Children can: •use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling	
Time	• Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then...'	• Order and sequence familiar events. • Measure short periods of time in simple ways.	Children can: •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	Children can: •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	Children can: •tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks •estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight •know the number of seconds in a minute and the number of	Children can: •Convert between different units of measure (e.g. Hours to minutes) •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	Children can: •solve problems involving converting between units of time	

					days in each month, year and leap year compare durations of events			
Shape vocabulary	•Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: 'sides', 'corners'; 'straight', 'flat', 'round'. •Talk about and identifies the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs' etc.	•Begin to use mathematical names for solid 3D shapes and flat 2D shapes, and mathematical terms to describe shapes.	Children can: •recognise and name common 2-D shapes (e.g. square, circle, triangle) •recognise and name common 3-D shapes (e.g. cubes, cuboids, pyramids & spheres)	•Use terms including vertices, edges, faces, symmetry	Children can: •identify horizontal and vertical lines and pairs of perpendicular and parallel lines			Children can: •illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
Properties of 2D shape	•Combine shapes to make new ones – an arch, a bigger triangle etc. • Extend and create ABAB patterns – stick, leaf, stick, leaf. • Notice and correct an error in a repeating pattern.	•Begin to use mathematical names for solid 3D shapes and flat 2D shapes, and mathematical terms to describe shapes. •Compose and decompose shapes so that children can recognise that a shape can have other shapes within it, just as numbers can. •Continue, copy and create repeating patterns.		Children can: •identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line. •compare and sort common 2-D and 3-D shapes and everyday objects.	Children can: •draw 2-D shapes	Children can: •compare and classify geometric shapes, including quadrilaterals and triangles, based on properties and sizes •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.	Children can: •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.	Children can: •draw 2-D shapes using given dimensions and angles compare and classify geometric shapes based on their properties and sizes
Properties of 3D shape	•Select shapes appropriately: flat	•Begin to use mathematical names		Children can: •identify and	Children can: •make 3-D shapes		Children can: •identify 3-D shapes,	Children can: •recognise, describe

	surfaces for building, a triangular prism for a roof etc. •Combine shapes to make new ones – an arch, a bigger triangle etc.	for solid 3D shapes and flat 2D shapes, and mathematical terms to describe shapes. •Use familiar objects and common shapes to create and recreate patterns.		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.	using modelling materials recognise 3-D shapes in different orientations and describe them		including cubes and other cuboids, from 2-D representations	and build simple 3-D shapes, including making nets •find unknown angles in any triangles, quadrilaterals, and regular polygons
Angles					<u>Children can:</u> •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 or less than right angle	<u>Children can:</u> •identify acute and obtuse angles and compare and order angles up to two right angles by size	<u>Children can:</u> •know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles •draw given angles, and measure them in degrees (°) •identify angles at a point and one whole turn (total 360°); at a point on a straight line and ½ a turn (total 180°) •identify other multiples of 90°	<u>Children can:</u> •recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles
Position & Direction	•Understand position through words alone – for example, "The bag is under the table," – with no pointing. • Describe a familiar route. • Discuss routes and locations, using words like 'in front of' and 'behind'.	•Describe their relative position such as behind or next to. •Select, rotate and manipulate shapes in order to develop spatial reasoning skills.	<u>Children can:</u> •describe position, direction and movement, including whole, half, quarter and three-quarter turns.	<u>Children can:</u> •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		<u>Children can:</u> •describe positions on a 2-D grid as coordinates in the first quadrant •describe movements between positions as translations of a given unit to the left/right and up/down •plot specified points	<u>Children can:</u> •identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed	<u>Children can:</u> •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.

				line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and ¾ turns		and draw sides to complete a given polygon		
Interpreting data				Children can: •interpret and construct simple pictograms, tally charts, block diagrams and simple tables	Children can: •interpret and present data using bar charts, pictograms and tables	Children can: •interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	Children can: •complete, read and interpret information in tables, including timetables	Children can: •interpret and construct pie charts and line graphs calculate and interpret the mean as an average
Extract info from data				Children can: •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	Children can: •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	Children can: •solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs	Children can: •solve comparison, sum and difference problems using information presented in a line graph	Children can: •use pie charts and line graphs to solve problems