



Maths at Moorside

National Curriculum:

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. At Moorside Primary School and Nursery, we embrace a high-quality mathematics education providing a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Our Intent:	<i>Every child can achieve in maths. Each one is an individual who is numerate, creative, independent, inquisitive, enquiring and confident. We provide a stimulating environment with exciting resources so that pupils can develop their mathematical skills to the full.</i>		
	Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Fluency	<p style="text-align: center;"><u>Place Value</u></p> <ul style="list-style-type: none"> • count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward • recognise the place value of each digit in a two-digit number (tens, ones) • compare and order numbers from 0 up to 100; use and = signs • read and write numbers to at least 100 in numerals and in words • using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their increasing knowledge of mental and written methods 	<p style="text-align: center;"><u>Place Value</u></p> <ul style="list-style-type: none"> • count in multiples of 6, 7, 9, 25 and 1000 • find 1000 more or less than a given number • count backwards through zero to include negative numbers • recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) order and compare numbers beyond 1000 • identify, represent and estimate numbers using different representations 	<p style="text-align: center;"><u>Place Value</u></p> <ul style="list-style-type: none"> • read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit • count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero • round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000

Addition and Subtraction

- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
 - a two-digit number and ones
 - a two-digit number and tens
 - two two-digit numbers
 - adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot

Multiplication and Division

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot

Fractions

- recognise, find, name and write fractions $\frac{3}{4}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{4}{3}$ of a length, shape, set of objects or quantity

round any number to the nearest 10, 100 or 1000

- 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.

Addition and Subtraction

- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate

Multiplication and Division

- recall multiplication and division facts for multiplication tables up to 12×12
- use place value, known and derived facts to multiply and divide mentally, including:
 - multiplying by 0 and 1;
 - dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout

- read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

Addition and Subtraction

- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)

- add and subtract numbers mentally with increasingly large numbers

Multiplication and Division

- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the

- write simple fractions for example, $\frac{2}{6} = \frac{1}{3}$ and recognise the equivalence of $\frac{4}{2}$ and $2 \frac{1}{1}$.

Measurement

- choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature ($^{\circ}\text{C}$); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels
- compare and order lengths, mass, volume/capacity and record the results using $>$, $<$ and $=$
- recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value
- find different combinations of coins that equal the same amounts of money
- 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.

Geometry - Shape

- 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

Fractions

- recognise and show, using diagrams, families of common equivalent fractions
- count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- add and subtract fractions with the same denominator recognise and write decimal equivalents of any number of tenths or hundredths recognise and write decimal equivalents to $4 \frac{1}{10}$, $2 \frac{1}{10}$, $4 \frac{3}{10}$ find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- round decimals with one decimal place to the nearest whole number
- compare numbers with the same number of decimal

formal written method of short division and interpret remainders appropriately for the context multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

Fractions

- compare and order fractions whose denominators are all multiples of the same number identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $5 \frac{2}{4} + 5 \frac{4}{4} = 5 \frac{6}{4} = 1 \frac{5}{1}$] add and subtract fractions with the same denominator and denominators that are multiples of the same number
- multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
- read and write decimal numbers as fractions [for example, $0.71 = \frac{71}{100}$]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents

- identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]

Geometry – Position and Direction

- 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 line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise).

Statistics

- 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

places up to two decimal places

Measurement

- Convert between different units of measure [for example, kilometre to metre; hour to minute]
- measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres find the area of rectilinear shapes by counting squares

Geometry - Shape

- compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes
- identify acute and obtuse angles and compare and order angles up to two right angles by size

Geometry – Position and Direction

- 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

- round decimals with two decimal places to the nearest whole number and to one decimal place read, write, order and compare numbers with up to three decimal places

Algebra

- use simple formulae
- generate and describe linear number sequences

Measurement

- convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)
- understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres

Geometry - Shape

- calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes

		<ul style="list-style-type: none"> plot specified points and draw sides to complete a given polygon. <p style="text-align: center;"><u>Statistics</u></p> <ul style="list-style-type: none"> interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. 	<ul style="list-style-type: none"> identify 3-D shapes, including cubes and other cuboids, from 2-D representations know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles draw given angles, and measure them in degrees (o) identify: angles at a point and one whole turn (total 360o) angles at a point on a straight line and 2 1 a turn (total 180o) other multiples of 90o 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. <p style="text-align: center;"><u>Geometry – Position and Direction</u></p> <ul style="list-style-type: none"> 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. <p style="text-align: center;"><u>Statistics</u></p> <ul style="list-style-type: none"> solve comparison, sum and difference problems using information presented in a line graph
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Problem Solving and Reasoning	<p style="text-align: center;"><u>Place Value</u></p> <ul style="list-style-type: none"> use place value and number facts to solve problems. identify, represent and estimate numbers using different representations, including the number line <p style="text-align: center;"><u>Addition and Subtraction</u></p> <ul style="list-style-type: none"> solve problems with addition and subtraction: recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change <p style="text-align: center;"><u>Multiplication and Division</u></p> <ul style="list-style-type: none"> solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts <p style="text-align: center;"><u>Geometry - Shape</u></p> <ul style="list-style-type: none"> compare and sort common 2-D and 3-D shapes and everyday objects. ask and answer questions about totalling and comparing categorical data 	<p style="text-align: center;"><u>Place Value</u></p> <ul style="list-style-type: none"> solve number and practical problems that involve all of the above and with increasingly large positive numbers <p style="text-align: center;"><u>Addition and Subtraction</u></p> <ul style="list-style-type: none"> 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 <p style="text-align: center;"><u>Multiplication and Division</u></p> <ul style="list-style-type: none"> 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. <p style="text-align: center;"><u>Fractions</u></p> <ul style="list-style-type: none"> solve simple measure and money problems involving fractions and decimals to two decimal places 	<p style="text-align: center;"><u>Place Value</u></p> <ul style="list-style-type: none"> solve number problems and practical problems that involve all of the above <p style="text-align: center;"><u>Addition and Subtraction</u></p> <ul style="list-style-type: none"> solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why <p style="text-align: center;"><u>Multiplication and Division</u></p> <ul style="list-style-type: none"> recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy

Statistics

- 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

Measurement

- estimate, compare and calculate different measures, including money in pounds and pence
- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

Geometry – Shape

- 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.

Geometry – Position and Direction

- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.

Statistics

- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

Fractions

- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.
- solve problems involving number up to three decimal places
recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal
- solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{4}$ and those fractions with a denominator of a multiple of 10 or 25.

Ratio and Proportion

- 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.

Algebra

- express missing number problems algebraically
- find pairs of numbers that satisfy an equation with two unknowns
enumerate possibilities of combinations of two variables.

Measurement

- estimate volume [for example, using 1 cm³ blocks to build cuboids (including cubes)] and capacity [for example, using water]
- solve problems involving converting between units of time
use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.
- 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.
- solve comparison, sum and difference problems using

			<p>information presented in a line graph</p> <ul style="list-style-type: none"> complete, read and interpret information in tables, including timetables. <p>Statistics</p> <ul style="list-style-type: none"> solve comparison, sum and difference problems using information presented in a line graph complete, read and interpret information in tables, including timetables.
<p>Implementation</p>	<p>Maths is taught daily across the school.</p> <ul style="list-style-type: none"> The working wall in each classroom is set up with concrete, pictorial, symbolic and language sections. The mastery approach incorporates all of these to help children explore and demonstrate mathematical ideas, enrich their learning experience and deepen understanding. Together, these elements help cement knowledge so pupils truly understand what they've learnt. <p>Pupils are encouraged to physically represent mathematical concepts in their daily maths lessons. Objects and pictures are used to demonstrate and visualise abstract ideas, alongside numbers and symbols.</p> <p>Concrete – children have the opportunity to use concrete objects and manipulatives to help them understand and explain what they are doing.</p> <p>Pictorial – children then build on this concrete approach by using pictorial representations, which can then be used to reason and solve problems.</p> <p>Abstract – With the foundations firmly laid, children can move to an abstract approach using numbers and key concepts with confidence.</p> <ul style="list-style-type: none"> Regular use of computer programs such as 'Times Tables Rock Stars' which help to embed times tables. Regular CPD for all staff to ensure consistency throughout school. A typical Maths lesson will provide the opportunity for <u>all</u> children, regardless of their ability, to work through Fluency, Reasoning AND Problem Solving activities. Theme days and cross curricular planning helps ensure maths is embedded in <u>all</u> subjects. 		

Impact:

Children will develop quick recall of facts and procedures.

Children will have the flexibility and fluidity to move between different contexts and representations of mathematics.

Children will have the ability to recognise relationships and make connections in mathematics

A mathematical concept or skill has been *mastered* when a child can show it in multiple ways, using the mathematical language to explain their ideas, and can independently apply the concept to new problems in unfamiliar situations.