MATHEMATICS
Vision & Aims

At Moorthorpe, Mathematics will provide us with a foundation for understanding the world and solving problems.

Our Mathematics curriculum aims to ensure that all pupils will:

- be fluent, reliable calculators

- display genuine and deep understanding by exploring concepts using concrete and pictorial approaches

- articulate and represent reasoning using the language of mathematics

- be skilled problems solvers, consciously applying a range of logical and systematic strategies

- be adept at distinguishing between using the relevant mental and written procedures

- show rapid recall of number facts rooted in secure understanding

- make links and connections across mathematical domains and apply skills throughout the wider curriculum

- show resilience, perseverance and independent thought

High-quality provision for all

Thriving children. Engaged parents. Skilled staff. Remarkable outcomes.

MATHEMATICS
LONG TERM PLAN

KS1	Overview
Autumn 1	Place Value (Y1 within 10) Addition & Subtraction (Y1 within 10)
Autumn 2	Money Properties of Shape Place Value (Y1 within 20)
Spring 1	Addition & Subtraction (Y1 within 20) Length/Height, Weight/Mass, Volume/Capacity & Temperature Place Value (Y1 within 50)
Spring 2	Multiplication & Division Fractions
Summer 1	Fractions Statistics
Summer 2	Place Value (Y1 within 100) Time Position & Direction

LKS2	Overview
Autumn 1	Place Value Addition & Subtraction
Autumn 2	Multiplication & Division
Spring 1	Length, Perimeter & Area Money Fractions & Decimals
Spring 2	Fractions & Decimals
Summer 1	Statistics Time
Summer 2	Properties of Shape, Position & Direction Mass & Capacity

UKS2	Overview
Autumn 1	Place Value Addition & Subtraction Multiplication & Division
Autumn 2	Multiplication & Division Fractions, Decimals & Percentages
Spring 1	Fractions, Decimals & Percentages Perimeter, Area & Volume
Spring 2	Converting Units Ratio & Algebra
Summer 1	Properties of Shape, Position & Direction Statistics
Summer 2	Problem Solving & Investigations

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Year	Place Value
EYFS	Count reliably with numbers one to twenty, place them in order and say which number is one more or one less than a given number
Year 1	- Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number - Count numbers to 100 in numerals; count in multiples of twos, fives and tens - Identify and represent numbers using objects and pictorial representations - Read and write numbers to 100 in numerals - Read and write numbers from 1 to 20 in numerals and words - Given a number, identify one more and one less
Year 2	- Count in steps of 2, 3 and 5 from 0, and in tens from any number, forward and backward - Read and write numbers to at least 100 in numerals and in words - Identify, represent and estimate numbers using different representations, including the number line - Recognise the place value of each digit in a two-digit number - Compare and order numbers from 0 up to 100; use <, > and = signs - Use place value and number facts to solve problems
Year 3	- Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number - Identify, represent and estimate numbers using different representations Read and write numbers up to 1,000 in numerals and words - Recognise the value of each digit in a three-digit number - Order and compare numbers beyond 1000 - Round any number to the nearest 10, 100 or 1,000 - Solve number and practical problems that involve all of the above and with increasingly large positive numbers
Year 4	- Count in multiples of 6, 7, 9, 25 and 1,000 - Count backwards through zero to include negative numbers - Identify, represent and estimate numbers using different representations - Read Roman numerals to 100 - Find 1,000 more or less than a given number - Recognise the place value of each digit in a four-digit number - Order and compare numbers beyond 1,000 - Round any number to the nearest 10, 100 or 1,000 - Solve number and practical problems that involve all of the above and with increasingly large positive numbers

Year 5	- Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000 - Count forwards and backwards with positive and negative whole numbers, including through zero - Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit - Read Roman numerals to 1,000 and recognise years written in Roman numerals - Interpret negative numbers in context - Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 & 100,000 - Solve number and practical problems that involve all of the above
Year 6	- Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit - Round any whole number to a required degree of accuracy - Use negative numbers in context, and calculate intervals across zero - Solve number and practical problems that involve all of the above

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Year	Addition & Subtraction
EYFS	Using quantities and objects, add and subtract two single-digit numbers and count on or back to find the answer
Year 1	- Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs - Represent and use number bonds and related subtraction facts within 20 - Add and subtract one-digit and two-digit numbers to 20, including zero - Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? - 9
Year 2	- Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 - Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another number cannot - Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems - Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: - a two-digit number and ones - a two-digit number and tens - adding three one-digit numbers - Solve problems including missing number problems, using number facts, place value, and more complex addition and subtraction
Year 3	- Estimate the answer to a calculation and use inverse operations to check answers - 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 with up to three digits, using formal written methods of columnar addition and subtraction - Solve problems including missing number problems, using number facts, place value, and more complex addition and subtraction
Year 4	- Estimate and use inverse operations to check answers to a calculation - Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate - Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why
Year 5	- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy - 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 - Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Year 6	- Perform mental calculations, including with mixed operations and large numbers - Use 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 to use and why

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Year	Multiplication & Division
EYFS	Solve problems involving doubling, halving and sharing.
Year 1	- 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
Year 2	- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers - Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot - Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x). division (÷) and equals (=) signs - Solve problems involving multiplication and division, using arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts
Year 3	- Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables - Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods - Solve problems including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects
Year 4	- Recall multiplication and division facts for multiplication tables up to 12x12 - 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 - 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

Year 5	- 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
	- Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})
	- Multiply numbers up to 4 digits by a one or tw0-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 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 1,000
	- Solve problems involving multiplication and division including their knowledge of factors and multiples, squares and cubes
	- Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates
Year 6	- Identify common factors, common multiples and prime numbers
	- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
	- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
	- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
	- Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
	- Perform mental calculations, including with mixed operations and large numbers
	- Solve problems involving addition, subtraction, multiplication and division
	- Use their knowledge of the order of operations to carry put calculations involving the four operations

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Year	Fractions, Decimals & Percentages
EYFS	Solve problems involving doubling, halving and sharing.
Year 1	- 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
Year 2	- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, set of objects or quantity - Recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$ - Write simple fractions, for example $\frac{1}{2}$ of 6 = 3
Year 3	- Count up and down in tenths; recognise that tenths arise from dividing an object into ten equal parts and in dividing one-digit numbers or quantities by 10 - Recognise, find and write fractions of a discrete set of objects; unit fractions and non-unit fractions with small denominators - Recognise and use fractions as numbers; unit fractions and non-unit fractions with small denominators - Recognise and show, using diagrams, equivalent fractions with small denominators - Add and subtract fractions with same denominator within one whole
Year 4	- Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing by ten - Recognise and show, using diagrams, families of common equivalent fractions - Add and subtract fractions with the same denominator - 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 - Recognise and write decimal equivalents of any number of tenths or hundredths - Recognise and write decimal equivalents to $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$ - Round decimals with one decimal place to the nearest whole number - Compare numbers with the same number of decimal places up to two decimal places - 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 - Solve simple measure and money problems involving fractions and decimals to two decimal places

Year 5	- Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths - Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number (for example, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$ - Compare and order fractions whose denominators are all multiples of the same number - 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 - Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents - Round decimals with two decimal places to the nearest whole number and to one decimal place - Read, write, order and compare numbers with up to three decimal places - Solve problems involving number up to three decimal places - Recognise the % symbol and understand that per cent relates to number of parts per hundred - Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25
Year 6	- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination - Compare and order fractions, including fractions > 1 - Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions - Multiply simple pairs of proper fractions, writing the answer in its simplest form - Divide proper fractions by whole numbers - Identify the value of each digit in numbers given to three decimal places - Multiply and divide numbers by 10, 100 and 1,000 giving answers up to three decimal places - Multiply one-digit numbers with up to two decimal places by whole numbers - Use written division methods in cases where the answer has up to two decimal places - Solve problems which require answers to be rounded to specified degrees of accuracy - Associate a fraction with division and calculate decimal fraction equivalents for a simple fraction - Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts

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Year	Ratio, Proportion & Algebra
Year 1	- Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? - 9
Year 2	- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
Year 3	- Solve problems, including missing number problems, for the level of calculation expected at Year 3
Year 4	- Solve problems, including missing number problems, for the level of calculation expected at Year 4
Year 5	- Solve problems, including missing number problems, for the level of calculation expected at Year 5
Year 6	- Solve problems involving the relative sixes of two quantities where missing values can be found by using integer multiplication and division facts - Solve problems involving the calculation of percentages and the use of percentages for comparison - Solve problems involving similar shapes where the scale factor is known or can be found - Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples - 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 two variables

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Year	Measurement
EYFS	Use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems
Year 1	- Compare, describe and solve practical problems lengths and heights; mass and weight; capacity and volume; and time - Measure and begin to record lengths and heights; mass and weight; capacity and volume; and time - Recognise and know the value of different denominations of coins and notes - Sequence events in chronological order - 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
Year 2	- Choose and use appropriate standard units to estimate and measure length, height, mass, temperature and capacity. - Compare and order lengths, mass, volume/capacity and record the results using >. < and = - Recognise and use symbols for pounds and pence; combine amounts to make a particular value - Find different combinations of coins that equal the same amounts of money - Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change - Compare and sequence intervals of time - Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times - Know the number of minutes in an hour and the number of hours in a day
Year 3	- Measure, compare, add and subtract lengths, mass and volume/capacity - Add and subtract money to give change, using both £ and p in practical contexts - Tell and write the time from an analogue clock (including Roman numerals), 12-hour and 24-hour clocks - Estimate and read time with increasing accuracy to the nearest minute; record and compare time - Know the number of seconds in a minute and the number of days in each month, year and leap year - Compare durations of events - Measure the perimeter of simple 2-D shapes

Year 4	- Convert between different units of measure - Estimate, compare and calculate different measures - Estimate, compare and calculate different measures, including money in pounds and pence - Read, write and convert time between analogue and digital 12 and 24-hour clocks - Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days - Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres - Find the area of rectilinear shapes by counting squares
Year 5	- Convert between different units of metric measure - Understand and use approximate equivalences between metric units and common imperial units - Use all four operations to solve problems involving measure using decimal notation, including scaling - Use all four operations to solve problems involving measure - Solve problems involving converting between units of time - 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 and square metres and estimate the area of irregular shapes - Estimate volume and capacity using $1cm^3$ objects and water
Year 6	- Solve problems involving calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate - Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation up to three decimal places - Convert between miles and kilometres - Use, read, write and convert between standard units, converting measurements of time from a smaller unit of measure to a larger unit, and vice versa - 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 and cubic metres, and extending to other unites

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Year	Geometry
EYFS	- Recognise, create and describe patterns - Explore characteristics of everyday objects and shapes and use mathematical language to describe them
Year 1	- Recognise and name common 2-D and 3-D shapes - Describe position, direction and movement, including whole, half, quarter and three-quarter turns
Year 2	- Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line - Identify 2-D shapes on the surface of 3-D shapes - Compare and sort common 2-D & 3-D shapes and everyday objects - Order and arrange combinations of mathematical objects in patterns and sequences - Use mathematical vocabulary to describe position, direction and movement, including movement in 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)
Year 3	- Draw 2-D shapes - Make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them - Recognise angles as a property of shape or a description of a turn - Identify right angles, recognise that two right angles make a half-turn, three make three-quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle - Identify horizontal and vertical lines and pairs of perpendicular and parallel lines
Year 4	- Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes - Identify lines of symmetry in 2-D shapes presented in different orientations - Identify acute and obtuse angles and compare and order angles up to two right angles by size - Identify lines of symmetry in 2-D shapes presented in different orientations - Complete a simple symmetric figure with respect to a line of symmetry - Describe positions on a grid as coordinates in the first quadrant - Describe movements between positions as translations of a given unit to the left/right and up/down - Plot specified points and draw sides to complete a given polygon

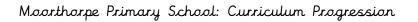|	

Year 5	- Distinguish between regular and irregular polygons based on reasoning about equal sides and angles
	- Use the properties of rectangles to deduce related facts and find missing lengths and angles
	- 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
	- Identify:
	   - angles at a point and one whole turn
	   - angles at a point on a straight line and half a turn (total 180^0)
	   - other multiples of 90^0
	- 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

Year 6	- Draw 2-D shapes using given dimensions and angles - Compare and classify geometric shapes based on their properties and sizes - Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius - Recognise, describe and build simple 3-D shapes, including making nets - Find unknown angles in any triangles, quadrilaterals, and regular polygons - Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles - Describe positions on the full coordinate grid (all four quadrants) - Draw and translate simple shapes on the coordinate plane, and reflect them in the axes

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Year	Statistics
Year 2	- 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
Year 3	- Interpret and present data using bar charts, pictograms and tables - Solve one-step and two-step questions using information presented in scaled bar charts and pictograms and tables
Year 4	- Interpret and present discrete and continuous data using graphical methods, including bar charts and time graphs - Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs
Year 5	- Complete, read and interpret information in tables, including timetables - Solve comparison, sum and difference problems using information presented in a line graph
Year 6	- Interpret and construct pie charts and line graphs and use these to solve problems - Calculate and interpret the mean as an average

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Year	Vocabulary				
EYFS	number, zero to twenty, count, more less, fewer, pair, order, add, subtract, take away, difference, double, halve, full, empty, weigh, balance, simple prepositional and comparative language, shape, group, share, sort, pattern, repeating, common 2-D shapes				
Year 1	**Place Value** equal to same as equation odd even tens ones digits value compare ordinal consecutive] equal groups equal parts half quarter	**Calculation** number bonds plus sum altogether minus inverse bridge through multiply divide	**Shape** position direction north east south west quarter turn half turn face edge vertices cube cuboid pyramid sphere spherical cone cylinder prism surface	**Measure** container days & months minute hour o'clock half past length width height cm mass/weight capacity money coin money pence penny pound cost	**Other** puzzle problem solving reasoning describe explain sequence continue predict bar model known unknown
Year 2	**Place Value** partition recombine hundreds numerator denominator three quarters third equivalent/ce greater/less integer	**Calculation** array row column	**Shape** 90-degree turn right angle straight line line of symmetry symmetrical mirror line reflection quadrilaterals compass	**Measure** quarter past/to calendar temperature degree m/km, l/ml, g/kg	**Other** tally survey graph pictogram chart popular common investigate roughly
Year 3	**Place Value** thousand unit fraction non-unit tenths	**Calculation** column addition & subtraction product multiples	**Shape** horizontal vertical diagonal perpendicular parallel orientation rectilinear pentagon hexagon heptagon octagon	**Measure** leap year twelve hour twenty-four digital analogue hour perimeter	**Other** diagram axis/axes frequency Carroll Venn approximately represent precise statement

	Place Value	Calculation	Shape	Measure	Other
Year 4	Roman numerals round derive hundredths decimals ascending descending	derive estimate factors factor pairs remainder	coordinates translation quadrants x & y-axis polygons hemisphere rhombus trapezium kite rectilinear	convert area acute obtuse breadth	continuous discrete line graph
Year 5	powers of 10 proper improper mixed number fifths percentage	efficient composite prime square cube formal written method	dimensions reflex angle revolution regular irregular equilateral isosceles scalene protractor	volume imperial metric pint gallon yard foot inch mile tonne pound ounce	ratio proportion pie chart
Year 6	simplify degree of accuracy	order of operations reduce	diameter radius circumference vertically opposite four quadrants	GMT/BST currency	mean mode median range distribution construct linear sequence substitute variables known values