Holy Family Catholic Primary School
Mathematics – Intent and Long-Term Plan 2023 – 2024

In our holy family, we all thrive socially, academically and spiritually to our fullest potential.

Studying mathematics stimulates curiosity, fosters creativity and equips children with the skills they need in life beyond school. Being able to efficiently use a wide range of maths skills will enable pupils to access a wide range of experiences as well as being able to support them in their learning in other areas of the curriculum. Therefore, we intend to provide the highest quality maths education for all, which will be used successfully in each and every career our children choose in later life.

National Curriculum Purpose of study	*Mathematics is a creative and highly interconnected 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. A high-quality mathematics education therefore provides 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.*
National Curriculum Aims	*The national curriculum for mathematics aims to ensure that all pupils:* • *become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately* • *reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language* • *can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions* *Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.* *The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on*

Development Matters National Curriculum objectives Our Learning Intentions	FS1	FS2

Develop fast recognition of up to 3 objects, without having to count them individually ('subitising').
Recite numbers past 5.
Say one number for each item in order: 1,2,3,4,5.
Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle').
Show 'finger numbers' up to 5.
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.
Solve real world mathematical problems with numbers up to 5.
Compare quantities using language: 'more than', 'fewer than'.
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'
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'
Make comparisons between objects relating to size, length, weight and capacity
Select shapes appropriately: flat surfaces for building, a triangular prism for a roof, etc.
Combine shapes to make new ones – an arch, a bigger triangle, etc
Talk about and identify the patterns around them.
For example: stripes on clothes, designs on rugs and wallpaper.
Use informal language like 'pointy', 'spotty', 'blobs', etc.
Extend and create ABAB patterns – stick, leaf, stick, leaf.
Notice and correct an error in a repeating pattern.
Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then...'
Count objects, actions and sounds.
Subitise.
Link the number symbol (numeral) with its cardinal number value.
Count beyond ten.
Compare numbers
Understand the 'one more than/one less than' relationship between consecutive numbers.
Explore the composition of numbers to 10
Automatically recall number bonds for numbers 0-5 and some to 10
Select, rotate and manipulate shapes to develop spatial reasoning skills
Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can
Continue, copy and create repeating patterns.
Compare length, weight and capacity.

L.I. to classify objects based on one attribute
L.I. to match equal and unequal sets
L.I. to compare objects and sets
L.I. to order objects and sets
L.I. to recognize, describe, copy and extend colour and size patterns
L.I. to count and represent the numbers 1 to 3
L.I. to estimate and check by counting
L.I. to count up to six objects
L.I. to know one more and one fewer
L.I. to order numbers 1-6
L.I. to have conservation of numbers within six
L.I. to explore zero
L.I. to explore addition and subtraction
L.I. to estimate, order, compare, discuss and explore capacity, weight and lengths
L.I. to describe and sort 3-D shapes
L.I. to describe position accurately
L.I. to know days of the week and seasons
L.I. to sequence daily events
L.I. to count up to ten objects
L.I. to represent, order and explore numbers to ten
L.I. to say one more or fewer, one greater or less
L.I. to explore addition as counting on and subtraction as taking away
L.I. to count up to 15 objects and recognise different representations
L.I. to order and explore numbers to 15

L.I. to say one more or fewer
L.I. to count and share in equal groups
L.I. to group into fives and tens
L.I. to understand the relationship between grouping and sharing
L.I. to count up to 10 objects
L.I. to represent, order and explore numbers to 15
L.I. know one more or fewer up to 15
L.I. to double and halve
L.I. to know the relationship between doubling and halving
L.I. to describe and sort 2D and 3D shapes
L.I. to recognize, complete and create patterns
L.I. to understand commutativity
L.I. to explore addition and subtraction
L.I. to compare two amounts
L.I. to understand the relationship between doubling and halving
L.I. to recognise coins and their values
L.I. to make combinations of money to total 20p
L.I. to calculate change from 10p
L.I. to describe capacities
L.I. to compare volumes
L.I. to compare weights
L.I. to estimate, compare and order lengths
L.I. to explore numbers and strategies
L.I. to recognise and extend patterns
L.I. to apply number, shape and measures knowledge
L.I. to count forwards and backwards
L.I. to know one more, one less beyond 20
L.I. to estimate and count beyond 20
L.I. to group and share numbers beyond 20

Year 1	Year 2

Pupils should be taught to:
• 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 2s, 5s and 10s
• given a number, identify 1 more and 1 less
• identify and represent numbers using objects and pictorial representations including the number line, and use the 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
• represent and use number bonds and related subtraction facts within 20
• add and subtract one-digit and two-digit numbers to 20, including 0
• solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? – 9
• 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
• recognise, find and name a half as 1 of 2 equal parts of an object, shape or quantity
• recognise, find and name a quarter as 1 of 4 equal parts of an object, shape or quantity
• compare, describe and solve practical problems for:
  • lengths and heights
  • mass/weight
  • capacity and volume
  • time
• measure and begin to record the following:
  • lengths and heights
  • mass/weight
  • capacity and volume
  • time (hours, minutes, seconds)
  • recognise and know the value of different denominations of coins and notes
	Pupils should be taught to:
	• count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward
	• recognise the place value of each digit in a two-digit number (10s, 1s)
	• identify, represent and estimate numbers using different representations, including the number line
	• 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
	• use place value and number facts to solve problems
	• solve problems with addition and subtraction:
	  • using concrete objects and pictorial representations, including those involving numbers, quantities and measures
	  • applying their increasing knowledge of mental and written methods
	• 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 1s
	  • a two-digit number and 10s
	  • 2 two-digit numbers
	  • adding 3 one-digit numbers
	• show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 number from another cannot
	• recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
	• 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 (×), division (÷) and equals (=) signs

	• 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
	• recognise and name common 2-D and 3-D shapes, including:
	  • 2-D shapes
	  • 3-D shapes
	• describe position, direction and movement, including whole, half, quarter and three-quarter turns
	
	L.I. to represent compare and explore numbers within 10
	L.I. to know one more and one less up to the number 10
	L.I. to double and halve with numbers up to 10
	L.I. to represent and explain addition and subtraction within 10
	L.I. to understand commutativity within 10
	L.I. to know addition and subtraction facts within 10
	L.I. to identify, describe , sort and classify 2D and 3D shapes
	L.I. to investigate repeating patterns
	L.I. to use and follow instructional and positional language
	L.I. to identify, represent, compare and order numbers to 20
	L.I. to double and halve numbers to 20
	L.I. to know one more and one less with numbers to 20
	L.I. to represent and explain addition and subtraction strategies including make ten
	L.I. to use known facts to add and subtract
	L.I. to read, write and tell the time to 0'clock and half past on analogue clock
	L.I. to sequence daily activities
	L.I. to recognise whole and half turns linked to time
	L.I. to model, explain and choose addition and subtraction strategies
	L.I. to represent, sequence, explore and compare 2 digit numbers
	L.I. to count in 2s, 5s and 10s
	L.I. to describe and complete number patterns
	L.I. to illustrate, explain and link addition and subtraction with equations
	L.I. to apply make ten strategy
	L.I. to use language to quantify and compare difference
	L.I. to identify half and quarter of a shape or object
	L.I. to find half and quarter of a quantity
	L.I. to compare and measure lengths and mass using cm and kg
	L.I. to double and halve lengths and mass
	L.I. to read, write, represent, compare and order numbers to 100
	L.I. to know one more, one fewer, ten more, ten fewer with numbers up to 100
	L.I. to identify number patterns
	L.I. to explore addition and subtraction involving 2-digit numbers and ones
	L.I. to represent and explain addition and subtraction with regrouping
	L.I. to investigate number bonds within 20
	L.I. to name coins and notes and understand their value
	L.I. to represent the same value using different coins
	L.I. to find change
	L.I. to share equally into groups
	L.I. to double
	L.I. to link halving to fractions
	L.I. to add equal groups
	L.I. to explore arrays
	L.I. to compare capacities, volumes and lengths
	L.I. to explore litres
	L.I. to apply understanding of fractions to capacity
		• show that multiplication of 2 numbers can be done in any order (commutative) and division of 1 number by another cannot
		• solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts
		• recognise, find, name and write fractions third, quarter, 2 quarters, three quarters of a length, shape, set of objects or quantity
		• write simple fractions, for example half of 6 = 3 and recognise the equivalence 2 quarters and one half
		• choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels
		• 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
		• 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
		• identify and describe the properties of 2-D shapes, including the number of sides, and line symmetry in a vertical line
		• identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces
		• identify 2-D shapes on the surface of 3-D shapes
		• compare and sort common 2-D and 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)
		• interpret and construct simple pictograms, tally charts, block diagrams and 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
		
		L.I. to read, write, represent, partition, compare and order numbers to 100
		L.I. to explore patterns including odds and evens, tens and ones
		L.I. to apply number bonds to add and subtract
		L.I. to represent and explain addition and subtraction of two 2-digit numbers
		L.I. to add three 1-digit numbers
		L.I. to begin to use a bar model for representation
		L.I. to create, label and sketch bar models
		L.I. to draw and measure lengths in centimetres
		L.I. to use <> and = to compare and order lengths in metres and centimetres
		L.I. to represent and interpret: pictograms, block diagrams, tables and tally charts
		L.I. to calculate the times tables 2,5, and 10 to skip counting
		L.I. to relate the 2 times table to doubling
		L.I. to explore representations of multiplication and division
		L.I. to understand commutativity
		L.I. to tell the time on an analogue clock: quarter past, quarter to and five minute intervals
		L.I. to calculate durations of time in minutes and seconds
		L.I. to sequence daily events
		L.I. to know how many minutes in an hour and hours in a day
		L.I. to use part-whole relationships
		L.I. to understand fractions as part of a whole or a whole set
		L.I. to relate fractions to division
		L.I. to recognise some equivalent fractions

		L.I. to illustrate, represent and explain addition and subtraction involving regrouping including make ten, round and adjust and near doubles strategies L.I. to recognise coins and notes L.I. to use £ and p accurately L.I. to add and subtract amounts L.I. to calculate change L.I. to explore, sort and describe 2D shapes L.I. to recognise lines of symmetry in 2D shapes L.I. to identify 2D shapes on 3D shapes L.I. to compare and sort 2D and 3D shapes L.I. to use language to describe position, direction and rotation to follow a route L.I. to represent numbers within 1000 in different ways L.I. to compare numbers within 1000 using symbols L.I. to read scales L.I. to read and measure temperature L.I. to estimate, measure and understand litres and millilitres L.I. to compare and order capacities L.I. to weigh and compare kilograms and grams L.I. to apply addition and subtraction strategies to solve equations L.I. to illustrate and explain addition and subtraction using column method L.I. to know multiplication and divisions facts for 3 and 4 L.I. to relate 4 times table to doubling the 2 times tables L.I. to describe, interpret and represent using arrays and bar models L.I. to recognise inverse relationships

Year 3	Year 4

Pupils should be taught to:
• count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
• recognise the place value of each digit in a 3-digit number (100s, 10s, 1s)
• compare and order numbers up to 1,000
• identify, represent and estimate numbers using different representations
• read and write numbers up to 1,000 in numerals and in words
• solve number problems and practical problems involving these ideas
• add and subtract numbers mentally, including:
  • a three-digit number and 1s
  • a three-digit number and 10s
  • a three-digit number and 100s
• add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction
• 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
• 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
• 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
• 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 the same denominator within one whole
• compare and order unit fractions, and fractions with the same denominators
• solve problems that involve all of the above
• measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)
• measure the perimeter of simple 2-D shapes
• add and subtract amounts of money to give change, using both £ and p in practical contexts
• 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, am/pm, morning, afternoon, noon and midnight
• know the number of seconds in a minute and the number of days in each month, year and leap year
• compare durations of events
• draw 2-D shapes and 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 2 right angles make a half-turn, 3 make three-quarters of a turn and 4 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
• 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
	Pupils should be taught to:
	• count in multiples of 6, 7, 9, 25 and 1,000
	• find 1,000 more or less than a given number
	• count backwards through 0 to include negative numbers
	• recognise the place value of each digit in a four-digit number (1,000s, 100s, 10s, and 1s)
	• order and compare numbers beyond 1,000
	• identify, represent and estimate numbers using different representations
	• 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
	• read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of 0 and place value
	• add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
	• 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
	• 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 3 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 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects
	• 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 100 and dividing tenths by 10
	• 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 hundreds
	• recognise and write decimal equivalents to quarter, half, three quarters
	• 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 1 decimal place to the nearest whole number
	• compare numbers with the same number of decimal places up to 2 decimal places
	• solve simple measure and money problems involving fractions and decimals to 2 decimal places
	• 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
	• 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
	• 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 2 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 specific line of symmetry
	• 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

	L.I. to read, write, order and compare numbers to 100 L.I. to calculate mentally using known facts, round and adjust, near doubles, adding on to find the difference L.I. to derive new facts from a known fact L.I. to read, write, represent, partition, order and compare 3-digit numbers L.I. to find 10 and 100 more or less L.I. to round to the nearest multiple of 10 and 100 L.I. to collect, interpret and present data using charts and tables L.I. to develop and use a range of calculation strategies L.I. to illustrate and explain formal written methods - column method L.I. to measure, draw and compare lengths L.I. to add and subtract lengths L.I. to calculate perimeter L.I. to know multiplication and division facts for 2,3,4,5,6,8 and 10 L.I. to use multiplicative structures: equal groups / parts, change and comparison/ correspondence problems L.I. to understand relationships: commutativity and inverse L.I. to multiply and divide by 10 and 100 L.I. to multiply a 2-digit number 2,3,4,5 and corresponding division situations L.I. to divide 2-digit by a 1-digit L.I. to tell, record, write and order the time (analogue and digital) L.I. to use 12-hour, a.m. and p.m. L.I. to measure, calculate and compare durations L.I. to understand fractions using part-whole relationships L.I. to understand fractions as part of w whole or a whole set and as a number L.I. to add, subtract, compare and order fractions L.I. to identify angles including right angles and recognise a quarter turn L.I. to identify and draw parallel and perpendicular lines L.I. to draw/make, classify and compare 2D and 3D shapes L.I. to measure the perimeter L.I. to read scales with different intervals when measuring mass and volume L.I. to weigh and compare masses and capacities with mixed units L.I. to estimate mass and capacity L.I. to recall and use multiplication and division facts for 6 and 8 times tables L.I. to add and subtract mentally L.I. to find 10, 100 and 1000 more or less L.I. to order and compare beyond 1000 L.I. to round numbers	• plot specified points and draw sides to complete a given polygon • interpret and present discrete and continuous data using appropriate 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 L.I. to read, write, represent, order and compare numbers with 4-digit place value L.I. to find 10, 100, 1000 more or less L.I. to round numbers to the nearest 10, 100, 1000 L.I. to select appropriate strategies to add and subtract L.I. to illustrate and explain appropriate addition and subtraction strategies including column method with regrouping L.I. to understand the distributive property including multiplying three 1-digit numbers L.I. to use mental multiplication and division strategies using place value and known and derived facts L.I. to use short multiplication and division L.I. to read, interpret and construct pictograms, bar charts and time graphs L.I. to compare tables, pictograms and bar charts L.I. to identify and explore patterns in multiplication tables including 7 and 9 L.I. to explore different interpretations and representation of fractions L.I. to recognise equivalent fractions L.I. to represent fractions greater than one as mixed number and improper fractions L.I. to add and subtract fractions with the same denominator including fractions greater than one L.I. to convert analogue to digital time, 12 to 24 hours L.I. to convert between units of time L.I. to recognise decimal equivalents to tenths, quarters and halves L.I. to compare and order numbers with same number of decimals places L.I. to multiply and divide by 10 and 100 including decimals L.I. to calculate the perimeter of rectangles and rectilinear figures L.I. to calculate area of rectangles and rectilinear and compare L.I. to investigate area and perimeter L.I. to convert units of measure L.I. to select appropriate units to measure L.I. to use strategies to investigate problems: trial and improvement, organising using lists and tables, working systematically L.I. to classify, compare and order angles L.I. to compare and classify 2D shapes L.I. to identify lines of symmetry L.I. to describe and plot using coordinates L.I. to describe translations L.I. to recognise Roman numerals up to 100 L.I. to recognise place value of other number systems L.I. to recognise number sequences and patters L.I. to use understanding of 3D shapes L.I. to identify 3D shapes from 2D representations

	Year 5	Year 6
	Pupils should be taught to: • 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 0 • round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000 • solve number problems and practical problems that involve all of the above • read Roman numerals to 1,000 (M) and recognise years written in Roman numerals • 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 • 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 • identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 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 • 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 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 • 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 • solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates • 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 • 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 2 decimal places to the nearest whole number and to 1 decimal place • read, write, order and compare numbers with up to 3 decimal places • solve problems involving number up to 3 decimal places • recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction • solve problems which require knowing percentage and decimal equivalents of half, quarter, fifth, two fifths, four fifths and those fractions with a denominator of a multiple of 10 or 25 • convert between different units of metric measure	Pupils should be taught to: • 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 0 • solve number and practical problems that involve all of the above • 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 • identify common factors, common multiples and prime numbers • use their knowledge of the order of operations to carry out calculations involving the 4 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 • use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy • 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 • 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 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places • multiply one-digit numbers with up to 2 decimal places by whole numbers • use written division methods in cases where the answer has up to 2 decimal places • solve problems which require answers to be rounded to specified degrees of accuracy • recall and use equivalences between simple fractions, decimals and percentages, including in different contexts • solve problems involving the relative sizes of 2 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 • use simple formulae • generate and describe linear number sequences • express missing number problems algebraically • find pairs of numbers that satisfy an equation with 2 unknowns • enumerate possibilities of combinations of 2 variables • solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 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 3 decimal places • convert between miles and kilometres • recognise that shapes with the same areas can have different perimeters and vice versa

- 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
- calculate and compare the area of rectangles (including squares), including using standard units, square centimetres (cm^2) and square metres (m^2), and estimate the area of irregular shapes
- estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity
- solve problems involving converting between units of time
- use all four operations to solve problems involving measure using decimal notation, including scaling
- 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 1 whole turn (total 360°)
  - angles at a point on a straight line and half a turn (total 180°)
  - other multiples of 90°
  - 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
- 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
- solve comparison, sum and difference problems using information presented in a line graph
- complete, read and interpret information in tables, including timetables

L.I. to read, write, order and compare numbers up to one million
L.I. to round numbers within one million to the nearest multiple of powers of ten
L.I. to read Roman numerals up to M
L.I. to use rounding to estimate
L.I. to use a range of mental calculation strategies to add and subtract integers
L.I. to illustrate and explain the written method of column addition and subtraction
L.I. to select efficient calculation strategies
L.I. to complete, read and interpret data presented in line graphs
L.I. to read and interpret timetables including calculating intervals
L.I. to identify multiples and factors
L.I. to investigate prime numbers
L.I. to multiply and divide by 10, 100 and 1000 (integers)
L.I. to derived facts
L.I. to illustrate and explain formal multiplication and division strategies such as short and long
L.I. to use a range of mental calculation strategies
L.I. to investigate area and perimeter of rectilinear shapes
L.I. to estimate area of non-rectilinear shapes
L.I. to read, write, order and compare decimals
L.I. to round decimals to the nearest whole number
L.I. to represent, identify, name, write, order and compare fractions (including improper and mixed numbers)
L.I. to calculate fractions of amounts
L.I. to classify, compare and order angles
L.I. to measure and draw angles with a protractor
L.I. to understand and use angle facts to calculate missing angles
L.I. to add, subtract fractions with denominators that are multiples of the same number
L.I. to multiply fractions (and mixed numbers) by a whole number
L.I. to explore percentage, decimal, fractions equivalence
L.I. to identify coordinates in all four quadrants
L.I. to identify translation and reflection
L.I. to calculate intervals across zero as a context for negative numbers

- 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 (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3]
- draw 2-D shapes using given dimensions and angles
- recognise, describe and build simple 3-D shapes, including making nets
- compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
- 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 4 quadrants)
- draw and translate simple shapes on the coordinate plane, and reflect them in the axes
- interpret and construct pie charts and line graphs and use these to solve problems
- calculate and interpret the mean as an average

L.I. to represent read, write, order and compare numbers up to ten million
L.I. to round numbers, make estimates and use this to solve problems in context
L.I. to solve multi-step problems involving addition and subtraction
L.I. to identify and use properties of number, focusing on primes
L.I. to multiply larger integers and decimal numbers using a range of strategies
L.I. to divide integers by 1 digit and 2 digit numbers representing remainders appropriately
L.I. to illustrate and explain formal multiplication and division strategies
L.I. to understand the use of brackets
L.I. to use knowledge of the order of operations to carry out calculations
L.I. to generate and describe linear number sequences
L.I. to express missing number problems algebraically
L.I. to solve equations with unknown values
L.I. to deepen understanding of equivalence
L.I. to order, simplify and compare fractions, including those greater then one
L.I. to recall equivalence between common fractions and decimals
L.I. to find decimal quotients using short division
L.I. to add and subtract fractions
L.I. to compare and classify a range of geometric shapes
L.I. to use angle facts to find unknown angles
L.I. to draw a range of geometric shapes using given dimensions and angles
L.I. to describe, draw, translate and reflect shapes on a co-ordinate plane
L.I. to recognise and construct 3D shapes
L.I. to name and illustrate parts of a circle
L.I. to represent multiplication involving fractions
L.I. to multiply two proper fractions
L.I. to divide a fraction by an integer
L.I. to use, read, write and convert between standard units of measures; length, mass, time, money and volume as well as imperial units
L.I. to calculate the area of parallelograms and triangles
L.I. to calculate, estimate and compare the volume of cuboids
L.I. to calculate and compare percentages of amounts
L.I. to connect percentages with fractions
L.I. to explore the equivalence of fractions, decimal and percentages
L.I. to calculate the mean
L.I. to construct and interpret line graphs and pie charts
L.I. to compare pie charts
L.I. to use fractions to express proportion
L.I. to identify ratio as a relationship between quantities and as a scale factor
L.I. to solve problems with unequal sharing involving ratio

	L.I. to convert between metric units of length, mass and capacity and units of time L.I. to know and use approximate conversion between imperial and metric L.I. to use mental strategies to add and subtract involving decimals L.I. to formal written strategies to add, subtract and multiply involving decimals L.I. to multiply and divide by 10, 100 and 1000 involving decimals L.I. to derive multiplication facts involving decimals L.I. to classify 2D shapes and reason about regular and irregular polygons L.I. to know the properties of diagonals of quadrilaterals L.I. to classify 3D shapes L.I. to recognise 2D representations of 3D shapes L.I. to use cube numbers and notation L.I. to estimate volume L.I. to convert units of volume L.I. to use negative numbers and calculating intervals across zero L.I. to calculate the mean L.I. to interpret remainders L.I. to investigate numbers: consecutive, palindromic, multiples	

Implementation

Maths Mastery is taught from FS2 through to Y6, covering all aspects of the National Curriculum.

Each child is taught maths every day, using both a Maths Meeting at the start of the day, lasting 15 mins, and a main lesson later in the day, lasting an hour.

The Maths Meeting is a recap and consolidation session of objectives and skills the children already know.

The main lesson consists of 6 parts; Do it Now, New Learning, Talk Task, Developing Learning, Independent Task and the Plenary. All vocabulary is introduced and explained on a 'Star Words' slide after the 'Do it Now' and before 'New Learning'. This six-part lesson gives a structure through which to implement the pedagogical principles of the curriculum. The different parts of the lesson allow teachers to bring the different dimensions of depth to the foreground. Having a consistent structure for each lesson ensures that learners are exposed to the pedagogies associated with each dimension.

In Foundation, the lesson is structured differently and they complete the 'Do Now', 'New Learning' and 'Talk Task' before going into continuous provision, which will include at least one activity that matches the lesson they have just been taught. There will also be activities from the previous week's Maths learning available to them in the continuous provision. The teacher would expect to see the children accessing this learning independently at this point. This lesson structure is slightly different compared to the rest of the school to ensure our Early Years children learn in ways best suited to their age and stage of development.

<u>The Dimensions for Depth</u>

The Dimensions for Depth are the core principles in our Mathematics Mastery programme and underpin every lesson. "In order to solve problems (real-life or otherwise) effectively we need to engage each of these three principles" (Helen Drury, 2014).

<u>Principle 1. Conceptual Understanding</u>

Mathematics tasks are about constructing meaning and making sense of relationships. Learners deepen their understanding by representing concepts using objects, pictures, symbols and words (CPA Approach).

<u>Principle 2: Language and Communication</u>

Mathematical language strengthens conceptual understanding by enabling pupils to explain and reason.

The content of our curriculum carefully progresses in order to induct learners into the mathematical community. This often starts with more informal language initially, building up to formal and precise mathematical language. Talk tasks are part of every lesson in the curriculum to help with this development.

<u>Principle 3: Mathematical Thinking</u>

Our curriculum is designed to give learners the opportunities to think mathematically.

Throughout the curriculum, tasks are set that require learners to specialise and generalise, to work systematically,

Concrete-Pictorial-Abstract (CPA)

We implement our approach through high quality teaching delivering appropriately challenging work for all individuals. To support this, we use a Concrete-Pictorial-Abstract (CPA) approach to teaching mathematical concepts. Reinforcement of learning is achieved by going back and forth between these representations, building pupils' conceptual understanding instead of an understanding based on completing mathematical procedures.

- <u>Concrete</u> - the doing: A pupil is introduced to an idea or a skill by acting it out with real objects. This is a 'hands on' component using real objects and it is the foundation for conceptual understanding. 'Concrete' refers to objects such as Dienes apparatus, fraction tiles, counters, or other objects that can be physically manipulated.
- <u>Pictorial</u> - the seeing: A pupil may also begin to relate their understanding to pictorial representations, such as a diagram or picture of the problem.
- <u>Abstract</u> - the symbolic: A pupil is now capable of representing problems by using mathematical notation, for example: 12 ÷ 2 = 6. This is the most formal and efficient stage of mathematical understanding. Abstract representations can simply be an efficient way of recording the maths, without being the actual maths.

Also see Calculation Policy for specifics of methods of calculation.

Assessment will be completed primarily through ongoing teacher assessment - and an end of term Maths Mastery test to support that assessment.

Teachers will summarise pupils' attainment against the objectives that have been covered. This summative assessment will be collated on a termly basis.

Teachers will identify gaps in learning and address these on an individual level, group level or class level where appropriate using a range of assessment for learning techniques. Same day intervention should take place at some point the same day.

Books are used for ongoing recording, both with worksheets and children writing in books.

Mathematics – Unit Organisation and Vocabulary

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn 1 Autumn 2	Early Mathematical Experiences Pattern and Early Number Numbers within 6 Addition and subtraction within 6 Measures Shape and sorting Calendar and Time	Numbers to 10 Addition and subtraction within 10 Shape and patterns Numbers o 20 Addition and subtraction within 20	Numbers within 100 Addition and subtraction of 2 digit numbers Addition and subtraction word problems Measures: length Graphs Multiplication and division 2,5,10	Number sense and exploring calculation strategies Place Value Graphs Addition and subtraction Length and perimeter	Reasoning with large numbers Addition and subtraction Multiplication and division Discrete and continuous data	Reasoning with large whole integers Integer addition and subtraction Line graphs and timetables Multiplication and division Perimeter and area	Integers and decimals Multiplication and division Calculation problems Fractions Missing angles and length
Spring 1 Spring 2	Numbers within 10 Addition and subtraction within 10 Numbers within 15 Grouping and sharing Numbers within 20 Doubling and halving	Time Exploring calculation strategies within 20 Numbers to 50 Addition and subtraction within 20 Fractions Measures: length and mass	Time Fractions Addition and subtraction of 2-digit numbers Money Face, shapes and patterns: lines and turns	Multiplication and division Deriving multiplication and division facts Time Fractions	Securing multiplication facts Fractions Time Decimals Area and perimeter	Fractions and decimals Angles Fractions and percentages Transformations	Coordinates and shapes Fractions Decimals and measure Percentage and statistics Proportion problems
Summer 1 Summer 2	Shape and pattern Addition and subtraction within 20 Money Measures Depth of numbers within 20 Numbers beyond 20	Numbers 50 to 100 and beyond Addition and subtraction Money Multiplication and division Measures: Capacity and volume	Numbers within 1000 Measures: capacity and volume Measures: Mass Exploring calculation strategies Multiplication and division – 3 and 4	Angles and shape Measures Securing multiplication and division Exploring calculation strategies and place value	Solving measures and money problems Shape and symmetry Position and direction Reasoning with pattern and sequences 3-D Shape	Converting unites of measure Calculating with whole numbers and decimals 2d and 3D shape Volume Problem solving	Consolidation
New Vocabulary	Above Add Addition Altogether Balance Before Below Between Capacity Circle Clock Compare Corner Cost Count Cube Cuboid Curved surface Cylinder 2-D 3-D Describe Difference Direction Distance Double Edge Empty Equal Face	Analogue clock Anticlockwise Approximate Array Block graph Chart Chronological Clockwise Cone Continuous surface Data Decreasing Diagram Digit Divide Estimate Even number Facts Fraction Half turn Hour Increasing Kilogram Known fact Left Litre Mental calculation Metre Minute Oblong	Angle Calculate Centimetre Column Commutative Consecutive Denominator Division Efficient Frequency Gram Heptagon Hexagon Inverse operations Millilitre Multiple Multiplication Multiply Near double Non-unit fraction Numerator Octagon Operation Pentagon Pictogram Quadrilateral Relationship Right angle Rotation Scale	Acute angle Axis (plural: axes) Bar graph Columnar addition/ subtraction Factor Formal written methods Horizontal Irregular Kilometre Millimetre Numeral Obtuse angle Parallel Perimeter Perpendicular Place holder Prism Product Regular Roman numeral Round Square-based pyramid Triangle-based pyramid	Area Associative law Convert Coordinate Decimal fraction Distributive law Grid Improper fraction Integer Interval Isosceles Kite Line graph Mixed numbers Negative number Parallelogram Plot Point Positive number Proper fraction Protractor Quotient Rectilinear Rhombus Scalene Short division Short multiplication Simplify Square centimetre Trapezium	Angle at a point Angle on a line Average (mean) Common factor Common multiple Congruent Cube number Cubic centimetre Cubic metre Decagon Degree Diagonal Divisible Dodecagon Long division Long multiplication Negative integer Nonagon Percentage Polygon Polyhedron (pl. polyhedra) Prime factor Prime number Remainder Reflection Reflex angle Scale (not to scale) Square metre Square number	Arc Brackets Centre Circumference Compasses Common fraction Degree of accuracy Diameter Equivalent expression Factorise Foot/feet Formula Gallon Imperial unit Inch Intersect Metric unit Mile Net Order of operations Origin Ounce Pie chart Pint Pound (mass) Proportion Quadrant Radius Ratio Similar

	Fewer First Flat Full Group Half Intersection of sets Last Length Less Line Long Mass Measure Minus More Next Number bond Number line Number track Order Pair Pattern Plus Rectangle Second Sequence Set Share Short Side Size Sort Square Straight Subtract Subtraction Sum Surface Take away Tall Time Total Triangle Venn diagram Vertex (pl. vertices) Weight Zero	Odd number Partition Place value Position Pound (sterling) Property Pyramid Quantity Quarter Quarter turn Repeated addition Repeated subtraction Represent Right Rule Scales Sign Standard unit Sphere Symbol Table Turn Unit Volume	Symmetry Tally Temperature Unit fraction Vinculum			Tetrahedron Transformation Translation	Square millimetre Square kilometre Vertically opposite angles