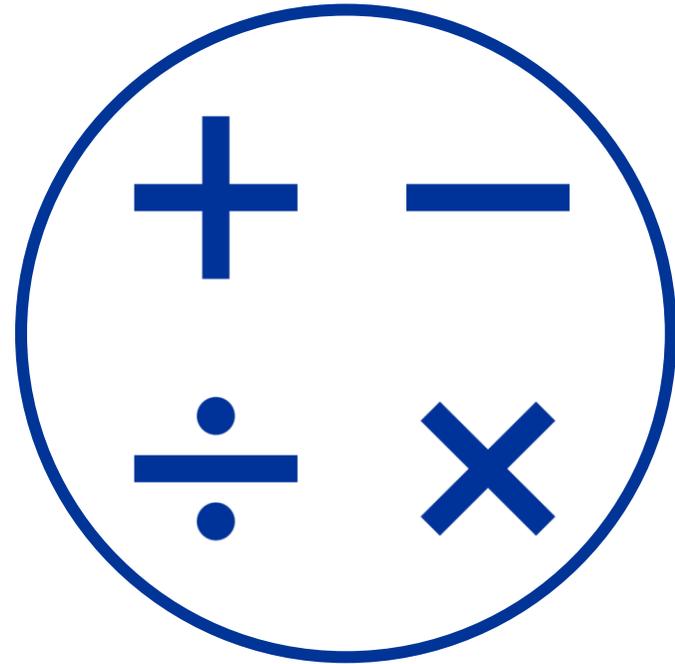


# Subject Overview

# Mathematics



*Here, children thrive...*

## Mathematics curriculum intent

At Boughton Heath Academy we recognise the importance of mathematics throughout each child's everyday and future life. It enables children to understand relationships and patterns in both number and space in the world around them. It is essential to everyday life, critical to science, technology and engineering and necessary for financial literacy and most forms of employment. We intend to give each child the self-confidence and resilience to reach their full potential by ensuring that they have the tools to calculate fluently, reason logically, problem solve and think in abstract ways.

Teachers reinforce an expectation that all children are capable of achieving high standards in Mathematics – **EVERYONE CAN!** Maths is for **EVERYONE!** To develop secure and deep conceptual understanding, staff plan for the use of concrete resources, varied representations and structures (outlined and guided through Power Maths).

Through our study of Mathematics, we aim 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.

## Implementation

### Curriculum structure & sequencing

In order to improve our mastery approach and further improve the quality and consistency of our maths teaching, we have implemented Power Maths – a government recommended, high-quality mastery textbook.

We recognise the value of making a coherent journey through the national curriculum and each year group follows a medium term plan where small, cumulative steps build a solid foundation of deep mathematical understanding.

### Content & concepts

The vast majority of children progress through the curriculum content at the same pace. Lessons are adapted by emphasising deep knowledge and through strengthening activities. It is seen through the concrete resources used, and/or representations and structures within a lesson to help embed a mathematical concept. Our aim for each child is to move through the concrete, pictorial and abstract cycle in order to show a mastery understanding. In order to meet the needs of all pupils, children working at a greater depth of understanding within an area of mathematics have 'deepening' opportunities planned by staff.

### Enrichment and personal development:

We believe Mathematics is at its most engaging when it is brought to life and meaningful to children. Each lesson begins with a mathematical problem which draws out the new learning. Mathematics is applied across our curriculum. Children are given plenty of enrichment opportunities through the year through National Maths week, TTRS and NumBots competitions, Maths competitions and sponsored events. All children have access to Mathletics to support their mathematical learning at home.

## Maths in the Early Years Foundation Stage

Mathematics in the Early Years Foundation Stage (EYFS) is an integral part of children's mathematical development, one of the seven key areas of learning outlined in the EYFS framework and supported by the non-statutory guidance provided by Development Matters. Mathematics strands are set out in the early learning goals of 'Number' and 'Numerical Patterns'.

At Boughton Heath, Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures.

Development Matters guides educators in facilitating this exploration, suggesting age-appropriate goals and activities that help children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.



Number



Numerical Patterns

## Mathematics – Development Matters

Children in Reception will be learning to:

- 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.

## Mathematics – Early Learning Goals



Number

- Have a deep understanding of number to 10, including the composition of each number;
- Subitise (recognise quantities without counting) up to 5;
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.



Numerical Patterns

- Verbally count beyond 20, recognising the pattern of the counting system;
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

## Inclusion within Mathematics

We are an inclusive school and as such, do not believe in narrowing the curriculum for any learner. Our curriculum is designed with inclusion of all at heart, and our curriculum intent is therefore the same for all children.

However we are mindful that there are an abundance of factors which need to be considered in order for all learners to be able to access learning according to their individual needs; perhaps none more so than for those learners with Special Educational Needs and Disabilities (SEND).

Therefore, whilst our curriculum intent is the same for all learners; our implementation of the curriculum may well look different for different groups of pupils. Teachers will plan, scaffold, challenge and embed learning through activities which are adapted to meet children's needs – we call this adapted implementation. This is to ensure that our curriculum can be met by all within an inclusive environment, mindful and responsive to children's needs.

We use guidance set out within the NASEN teacher handbook to assist us in amending our implementation within Mathematics. Examples of this, though not an exhaustive list, can be seen to the right. Note, these are suggestions of what may be implemented but all teachers will amend according to learner need.



Mathematical language and vocabulary is clearly defined, applied in context and over learnt. Oral rehearsal is promoted throughout lessons.



Staff may scribe for children to ensure a child's explanations and articulation is not limited by writing competence.



Make regular references to relevant language throughout the lesson and school day using tools such as working and display walls.



Use small group teaching opportunities to dedicate more time and support to provide additional learning opportunities to learners working towards a planned objective.

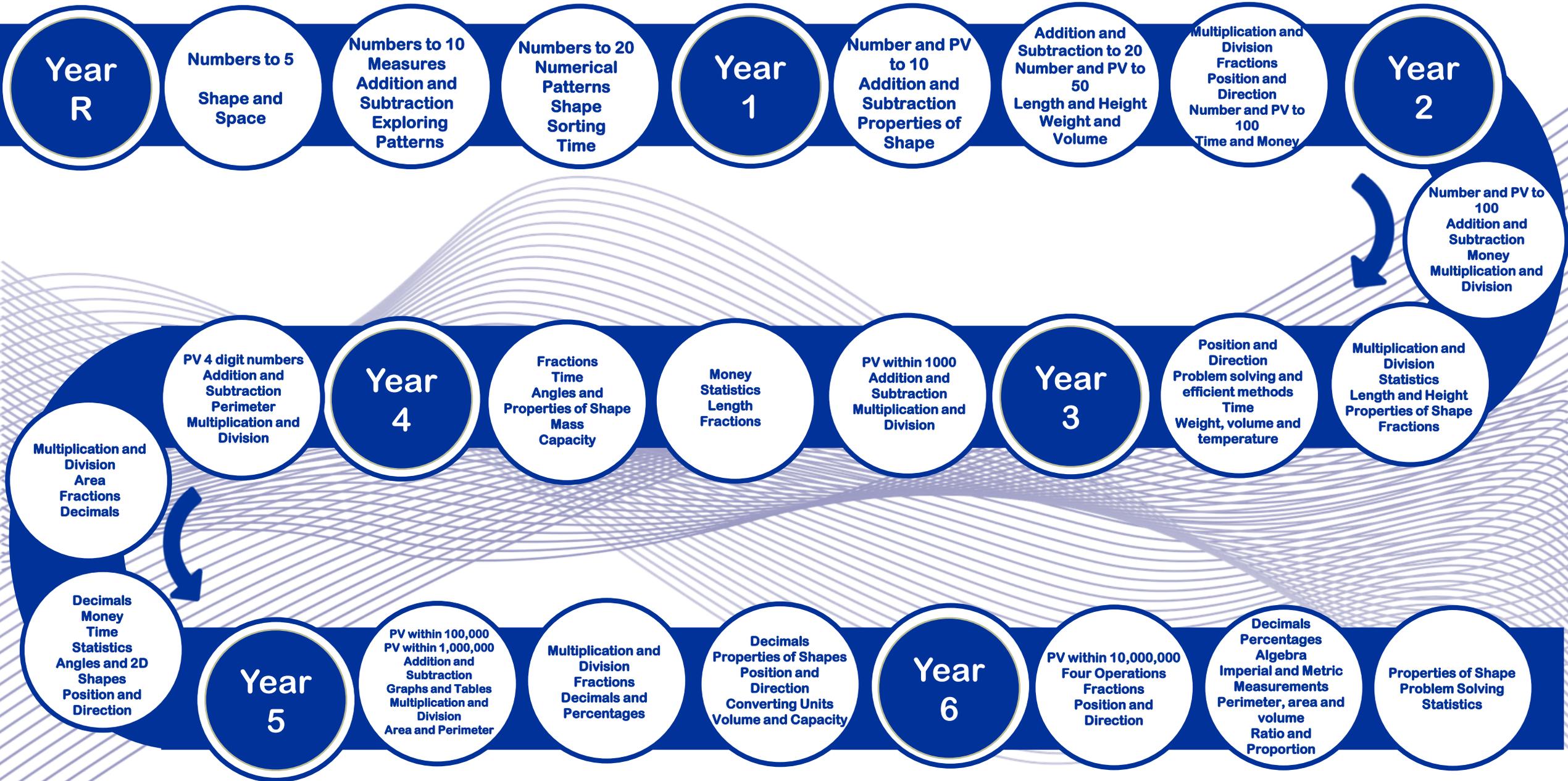


Provide learners with manipulatives and illustrations to support their understanding of mathematical concepts.



**Same intent,  
adapted implementation**

# Boughton Heath Academy Curriculum Road Map - Mathematics



# Boughton Heath Academy Curriculum Road Map – Mathematics Endpoints

Mathematics End Points							
Expected Standard	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Children develop confidence and mental fluency at each stage in their mathematical learning. They are fluent in the fundamentals of mathematics, reason mathematically and solve problems by applying their mathematics to a variety of problems.						
	<p>Have a deep understanding of number to 10, including the composition of each number.</p> <p>Able to subitise (recognise quantities without counting) up to 5.</p> <p>Recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.</p> <p>Able to verbally count beyond 20, recognising the pattern of the counting system.</p> <p>Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.</p> <p>Able to explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.</p>	<p>Count within 100, forwards and backwards, starting with any number.</p> <p>Reason about the location of numbers to 20 within the number system, including comparing using <math>&lt;</math> <math>&gt;</math> and <math>=</math></p> <p>Develop fluency in addition and subtraction facts within 10.</p> <p>Count forwards and backwards in multiples of 2, 5 and 10, up to 10 multiples, beginning with any multiple, and count forwards and backwards through the odd numbers.</p> <p>Compose numbers to 10 from 2 parts, and partition numbers to 10 into parts, including recognising odd and even numbers.</p> <p>Read, write and interpret equations containing addition),</p>	<p>Recognise the place value of each digit in two-digit numbers, and compose and decompose two-digit numbers using standard and nonstandard partitioning.</p> <p>Reason about the location of any two-digit number in the number system, including identifying the previous and next multiple of 10.</p> <p>Secure fluency in addition and subtraction facts within 10, through continued practice.</p> <p>Add and subtract across 10.</p> <p>Recognise the subtraction structure of 'difference' and answer questions of the form, "How</p>	<p>Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply to work out how many 10s there are in other three-digit multiples of 10.</p> <p>Recognise the place value of each digit in three-digit numbers, and compose and decompose three-digit numbers using standard and non-standard partitioning.</p> <p>Reason about the location of any three-digit number in the number system, including identifying the previous and next multiple of 100 and 10.</p> <p>Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts.</p>	<p>Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100</p> <p>Recognise the place value of each digit in four-digit numbers, and compose and decompose four-digit numbers using standard and nonstandard partitioning.</p> <p>Reason about the location of any four-digit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each.</p> <p>Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts.</p> <p>Recall multiplication and division facts up to, and recognise products in multiplication tables as</p>	<p>Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01.</p> <p>Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and nonstandard partitioning</p> <p>Reason about the location of any number with up to 2 decimals places in the number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each.</p> <p>Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number</p>	<p>Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000).</p> <p>Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and nonstandard partitioning.</p> <p>Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts.</p>

# Boughton Heath Academy Curriculum Road Map – Mathematics Endpoints

Mathematics End Points							
Expected Standard	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Children develop confidence and mental fluency at each stage in their mathematical learning. They are fluent in the fundamentals of mathematics, reason mathematically and solve problems by applying their mathematics to a variety of problems.						
		<p>subtraction and equals symbols, and relate additive expressions and equations to real-life contexts.</p> <p>Recognise common 2D and 3D shapes presented in different orientations, and know that rectangles, triangles, cuboids and pyramids are not always similar to one another.</p>	<p>many more...?"</p> <p>Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract only ones or only tens to/from a two-digit number.</p> <p>Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract any 2 two-digit numbers.</p> <p>Recognise repeated addition contexts, representing them with multiplication equations and calculating the product, within the 2, 5 and 10 multiplication tables.</p> <p>Relate grouping problems where the number of groups is unknown to multiplication</p>	<p>Secure fluency in addition and subtraction facts that bridge 10, through continued practice.</p> <p>Recall multiplication and division facts in the 10, 5, 2, 4 and 8 multiplication tables, and recognise products in these multiplication tables as multiples of the corresponding number.</p> <p>Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10).</p> <p>Calculate complements to 100.</p> <p>Add and subtract up to three-digit numbers using columnar methods.</p> <p>Understand the inverse relationship between addition and subtraction, and how both relate to the part-part-whole structure.</p> <p>Understand and use the commutative</p>	<p>multiples of the corresponding number. Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders, and interpret remainders appropriately according to the context.</p> <p>Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100)</p> <p>Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size.</p> <p>Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication</p> <p>Understand and apply the distributive property of multiplication.</p> <p>Reason about the location of mixed numbers in the linear number system.</p> <p>Convert mixed numbers to improper fractions and vice versa.</p>	<p>lines marked in units of 1 with 2, 4, 5 and 10 equal parts.</p> <p>Convert between units of measure, including using common decimals and fractions.</p> <p>Secure fluency in multiplication and division facts</p> <p>Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth).</p> <p>Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size</p> <p>Find factors and multiples of positive whole numbers, including common factors and common multiples, and express a given number as a product of 2 or 3 factors</p> <p>Multiply any whole number with up to 4 digits by any one-digit</p>	<p>Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.</p> <p>Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number).</p> <p>Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.</p> <p>Solve problems involving ratio relationships.</p> <p>Solve problems with 2 unknowns.</p> <p>Recognise when fractions can be</p>

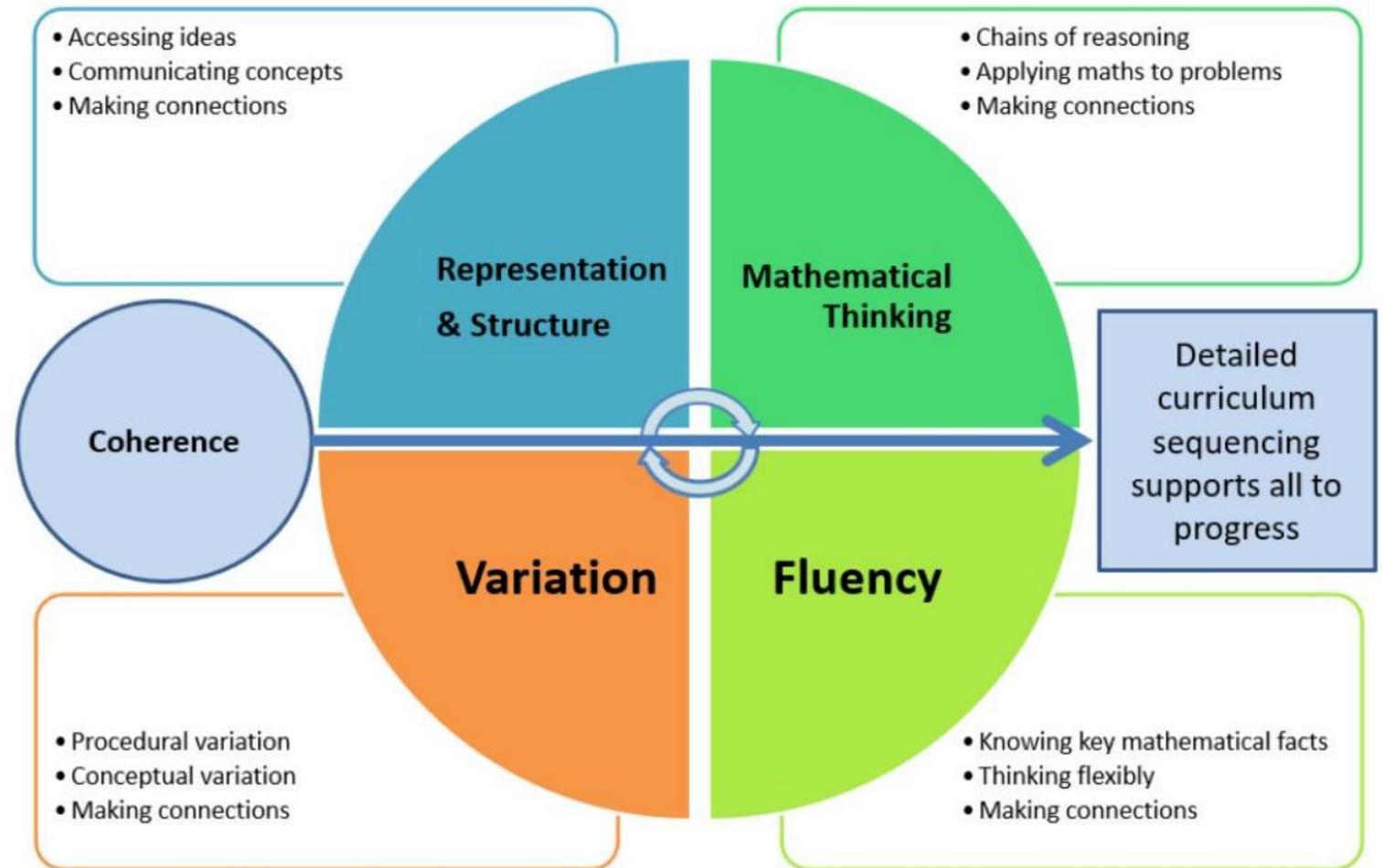
# Boughton Heath Academy Curriculum Road Map – Mathematics Endpoints

Mathematics End Points							
Expected Standard	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Children develop confidence and mental fluency at each stage in their mathematical learning. They are fluent in the fundamentals of mathematics, reason mathematically and solve problems by applying their mathematics to a variety of problems.						
			<p>equations with a missing factor, and to division equations (quotative division)</p> <p>Use precise language to describe the properties of 2D and 3D shapes, and compare shapes by reasoning about similarities and differences in properties.</p>	<p>property of addition, and understand the related property for subtraction.</p> <p>Apply known multiplication and division facts to solve contextual problems</p> <p>Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts</p> <p>Find unit fractions of quantities using known division facts (multiplication tables fluency).</p> <p>Reason about the location of any fraction within 1 in the linear number system.</p> <p>Add and subtract fractions with the same denominator, within 1.</p> <p>Recognise right angles as a property of shape or a description of a turn, and identify right angles in 2D shapes presented in different orientations.</p>	<p>Add and subtract improper and mixed fractions with the same denominator, including bridging whole numbers.</p> <p>Identify regular polygons, including equilateral triangles and squares, as those in which the side-lengths are equal and the angles are equal. Find the perimeter of regular and irregular polygons.</p> <p>Identify line symmetry in 2D shapes presented in different orientations. Reflect shapes in a line of symmetry and complete a symmetric figure or pattern with respect to a specified line of symmetry.</p>	<p>number using a formal written method.</p> <p>Divide a number with up to 4 digits by a one-digit number using a formal written method, and interpret remainders appropriately for the context</p> <p>Find non-unit fractions of quantities.</p> <p>Find equivalent fractions and understand that they have the same value and the same position in the linear number system.</p> <p>Recall decimal fraction equivalents for halves, quarters, fifths and tenths and for multiples of these proper fractions.</p> <p>Compare angles, estimate and measure angles in degrees (<math>^{\circ}</math>) and draw angles of a given size.</p> <p>Compare areas and calculate the area of rectangles (including squares) using standard units.</p>	<p>simplified, and use common factors to simplify fractions.</p> <p>Express fractions in a common denomination and use this to compare fractions that are similar in value.</p> <p>Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.</p> <p>Draw, compose, and decompose shapes according to given properties, including dimensions, angles and area, and solve related problems.</p>

# Mastery – The Five Big Ideas

To develop mastery in maths children need to be enabled to acquire a deep understanding of maths concepts, structures and procedures, step by step. Complex mathematical concepts are built on simpler conceptual components and when children understand every step in the learning sequence, maths becomes transparent and makes logical sense. Our interactive lessons establish deep understanding through the concepts seen in the five big ideas model opposite.

## Teaching for Mastery



# Mathematical Language

We use the following strategies to build children's mathematical understanding, vocabulary and confidence:

## Precise and consistent

Everyone in the classroom should use the correct mathematical terms in full, every time. For example, refer to 'equal parts', not 'parts'. Used consistently, precise maths language will be a familiar and non-threatening part of children's everyday experience.

## Full sentences

Teachers and children alike need to use full sentences to explain or respond. When children use complete sentences, it both reveals their understanding and embeds their knowledge.

## Stem sentences

These important sentences help children express mathematical concepts accurately, and are used throughout the *Power Maths* books. Encourage children to repeat them frequently, whether working independently or with others. Examples of stem sentences are:

'4 is a part, 5 is a part, 9 is the whole.'

'There are ... groups. There are ... in each group.'

## Key vocabulary

The unit starters highlight essential vocabulary for every lesson. In the Pupil Textbooks, characters flag new terminology and the Teacher Guide lists important mathematical language for every unit and lesson. New terms are never introduced without a clear explanation.

## Mathematical signs

Mathematical signs are used early on so that children quickly become familiar with them and their meaning. Often, the *Power Maths* characters will highlight the connection between language and particular signs.

## Lesson Structure

We endeavour for children to think for themselves in maths lessons. Journaling is a way of doing this and encourages children to have time to notice how mathematics works and reflect on their own understanding.

We encourage children to work collaboratively and provide structures to support this such as the questions posed and also a journaling framework in the form of M.I.C.E. This guides children through a concrete, pictorial and abstract process to lead to a mastery understanding of a concept.

# M.I.C.E.



### Manipulatives.

This could include place value counters, bead strings, ten frames, Numicon, Base ten, cubes or place value frames.



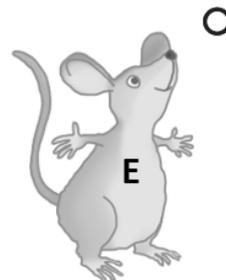
### Illustrations.

This could include number lines, bar models, ten frames, part whole models, arrays, place value charts....



### Calculate.

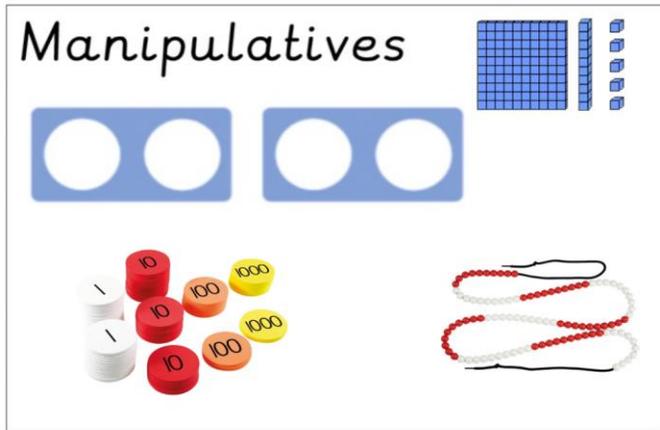
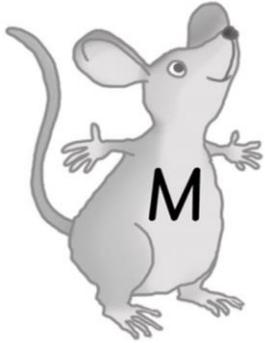
This is a formal method of calculation. Please use the Power Maths Calculation policy.



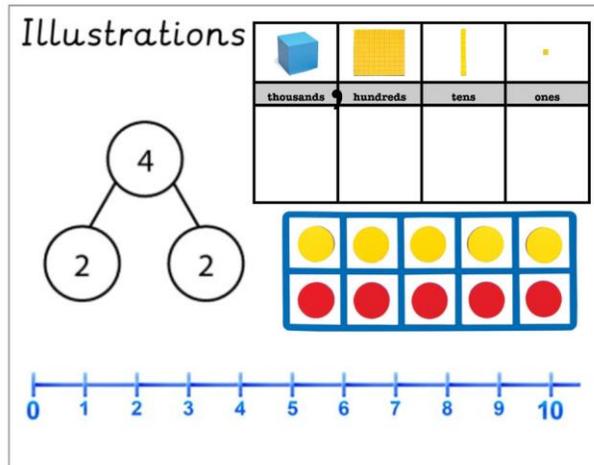
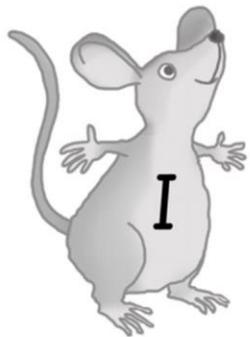
### Explanation.

This should be written in full sentences using maths vocabulary to the standard of literacy work.

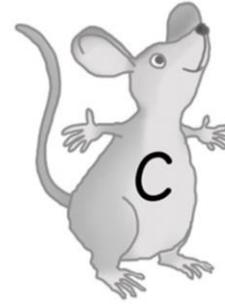
# M.I.C.E – Manipulatives, Illustrations, Calculations, Explanations



I can use equipment to help me show and explain my ideas and methods.



I can draw pictures to help me explain my maths ideas and work out answers.



Calculate

$$4 + 4 + 4 + 4 + 4 = 20$$

$$5 + 5 + 5 + 5 = 20$$

$$4 \times 5 = 20 \text{ and } 5 \times 4 = 20$$

$$2 + \square = 4$$

$$4 - 2 = \square$$

$$5 \times 28 = ?$$

T O	
28	
x 5	
40	5 × 8
100	5 × 20
140	

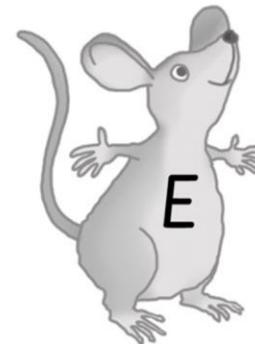
$$4 \times 13 = ?$$

$$4 \times 3 = 12 \quad 4 \times 10 = 40$$

$$12 + 40 = 52$$

$$4 \times 13 = 52$$

I can use + - x ÷ to show how I work out answers.



Explanation.

\_\_\_ plus \_\_\_ equals \_\_\_

Double \_\_\_ is \_\_\_

\_\_\_ is double \_\_\_

*I will split it into 30 and 12, so that I can divide by 3 more easily.*

I can use maths vocabulary and stem sentences to help me explain my methods and answers.

# Progression of knowledge and skills – Number and Place Value

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Number - Place Value</b>							
<b>Counting</b>	<p>Subitise (recognise quantities without counting) up to 5</p> <p>Verbally count beyond 20, recognising the pattern of the counting system</p>	<p>Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number</p> <p>Count in multiples of twos, fives and tens</p>	<p>Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward</p>	<p>Count from 0 in multiples of 4, 8, 50 and 100</p> <p>Count up and down in tenths</p>	<p>Count in multiples of 6, 7, 9, 25 and 1000</p> <p>Count backwards through zero to include negative numbers</p> <p>Count up and down in hundredths</p>	<p>Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000</p> <p>Count forwards and backwards in decimal steps</p>	<p>Count forwards or backwards in steps of integers, decimals or powers of 10 for any number</p>
<b>Place Value</b>	<p>Have a deep understanding of numbers to 10, including the composition of each number</p>	<p>Read and write numbers to 100 in numerals</p> <p>Read and write numbers from 1 to 20 in numerals and words</p> <p>Begin to recognise the place value of numbers beyond 20 (tens and ones)</p> <p>Identify and represent numbers using objects and pictorial representations including the number line</p>	<p>Read and write numbers to at least 100 in numerals and in words</p> <p>Recognise the place value of each digit in a two-digit number (tens, ones)</p> <p>Partition numbers in different ways (for example, <math>23 = 20 + 3</math> and <math>23 = 10 + 13</math>)</p> <p>Identify, represent and estimate numbers using different representations, including the number line.</p>	<p>Read and write numbers up to 1000 in numerals and in words</p> <p>Read and write numbers with one decimal place</p> <p>Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)</p> <p>Identify the value of each digit to one decimal place</p> <p>Partition numbers in different ways (for example, <math>146 = 100 + 40 + 6</math> &amp; <math>146 = 130 + 16</math>)</p> <p>Identify, represent and estimate numbers using different representations, including the number line</p>	<p>Read and write numbers to at least 10 000</p> <p>Read and write numbers with up to two decimal places</p> <p>Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)</p> <p>Identify the value of each digit to two decimal places</p> <p>Partition numbers in different ways (for example, <math>2.3 = 2 + 0.3</math> and <math>2.3 = 1 + 1.3</math>)</p> <p>Identify, represent and estimate numbers using different representations, including the number line</p>	<p>Read and write numbers to at least 1 000 000</p> <p>Read and write numbers with up to three decimal places</p> <p>Determine the value of each digit in numbers to at least 1 000 000</p> <p>Identify the value of each digit to three decimal places</p> <p>Identify, represent and estimate numbers using the number line</p>	<p>Read and write numbers up to 10 000 000</p> <p>Determine the value of each digit in numbers up to 10 000 000</p> <p>Identify the value of each digit to three decimal places</p> <p>Identify, represent and estimate numbers using the number line</p>

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b><u>Number - Place Value</u></b>							
<b>Comparing and Ordering</b>	Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity	Use the language of: equal to, more than, less than (fewer), most, least  Given a number, identify one more and one less	Compare and order numbers from 0 up to 100; use <, > and = signs  Find 1 or 10 more or less than a given number	Compare and order numbers up to 1000  Compare and order numbers with one decimal place  Find 1, 10 or 100 more or less than a given number	Order and compare numbers beyond 1000  Order and compare numbers with the same number of decimal places up to two decimal places  Find 0.1, 1, 10, 100 or 1000 more or less than a given number	Order and compare numbers to at least 1 000 000  Order and compare numbers with up to three decimal places  Find 0.01, 0.1, 1, 10, 100, 1000 and other powers of 10 more or less than a given number	Order and compare numbers up to 10 000 000  Order and compare numbers including integers, decimals and negative numbers  Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number
<b>Rounding, Approximation and estimation</b>			Round numbers to at least 100 to the nearest 10	Round numbers to at least 1000 to the nearest 10 or 100	Round any number to the nearest 10, 100 or 1000  Round decimals with one decimal place to the nearest whole number	Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000  Round decimals with two decimal places to the nearest whole number and to one decimal place	Round any whole number to a required degree of accuracy  Round decimals with three decimal places to the nearest whole number or one or two decimal places
<b>Multiplying by powers of 10</b>			Understand the connection between the 10 multiplication table and place value	Find the effect of multiplying a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer	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	Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Number - Place Value</b>							
<b>Negative Numbers</b>					Count backwards through zero to include negative numbers (see counting)	Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through zero	Use negative numbers in context, and calculate intervals across zero
<b>Sequences and Patterns</b>	Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.	Recognise and create repeating patterns with numbers, objects and shapes  Identify odd and even numbers linked to counting in twos from 0 and 1	Describe and extend simple sequences involving counting on or back in different steps	Describe and extend number sequences involving counting on or back in different steps	Describe and extend number sequences involving counting on or back in different steps, including sequences with multiplication and division steps	Describe and extend number sequences including those with multiplication and division steps and those where the step size is a decimal	Describe and extend number sequences including those with multiplication and division steps, inconsistent steps, alternating steps and those where the step size is a decimal
<b>Roman Numerals</b>				Read Roman numerals from I to XII (see time)	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	Read Roman numerals to 1000 (M) and recognise years written in Roman numerals	
<b>Solving problems</b>		Solve problems and practical problems involving all of the above	Use place value and number facts to solve problems	Solve number problems and practical problems involving these ideas	Solve number and practical problems that involve all of the above and with increasingly large positive numbers	Solve number problems and practical problems that involve all of the above	Solve number and practical problems that involve all of the above

# Progression of knowledge and skills – Addition and Subtraction

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b><u>Addition and Subtraction</u></b>							
<b>Understanding Addition and Subtraction</b>	Explore the composition of numbers to 10.	Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs	Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting)  Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot  Understand subtraction as take away and difference (how many more, how many less/fewer)	Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)  Understand and use take away and difference for subtraction, deciding on the most efficient method for the numbers involved, irrespective of context	Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)	Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)	Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)
<b>Addition and Subtraction facts</b>	Compare quantities up to 10 in different context Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.	Represent and use number bonds and related subtraction facts within 20	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100  Recall and use number bonds for multiples of 5 totalling 60 (to support telling time to nearest 5 minutes)	Recall and use addition and subtraction facts for 100 (multiples of 5 and 10)  Derive and use addition and subtraction facts for 100  Derive and use addition and subtraction facts for multiples of 100 totalling 1000	Recall and use addition and subtraction facts for 100  Recall and use addition and subtraction facts for multiples of 100 totalling 1000  Derive and use addition and subtraction facts for 1 and 10 (with decimal numbers to one decimal place)	Recall and use addition and subtraction facts for 1 and 10 (with decimal numbers to one decimal place)  Derive and use addition and subtraction facts for 1 (with decimal numbers to two decimal places)	Recall and use addition and subtraction facts for 1 (with decimal numbers to two decimal places)

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b><u>Addition and Subtraction</u></b>							
<b>Mental Methods</b>	Automatically recall number bonds for numbers 0–5 and some to 10	Add and subtract one- digit and two-digit numbers to 20, including zero (using concrete objects and pictorial representations)	<p>Select a mental strategy appropriate for the numbers involved in the calculation</p> <p>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</p>	<p>Select a mental strategy appropriate for the numbers involved in the calculation</p> <p>Add and subtract numbers mentally, including:            - a three-digit number and ones            - a three-digit number and tens            - a three-digit number and hundreds</p>	<p>Select a mental strategy appropriate for the numbers involved in the calculation</p> <p>Add and subtract mentally combinations of two- and three-digit numbers and decimals to one decimal place</p>	<p>Select a mental strategy appropriate for the numbers involved in the calculation</p> <p>Add and subtract numbers mentally with increasingly large numbers and decimals to two decimal places</p>	<p>Select a mental strategy appropriate for the numbers involved in the calculation</p> <p>Perform mental calculations, including with mixed operations and large numbers and decimals</p>
<b>Written Methods</b>		*Written methods are informal at this stage – see mental methods for expectation of calculations	*Written methods are informal at this stage – see mental methods for expectation of calculations	Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	Add and subtract numbers with up to 4 digits and decimals with one decimal place using the formal written methods of columnar addition and subtraction where appropriate	Add and subtract whole numbers with more than 4 digits and decimals with two decimal places, including using formal written methods (columnar addition and subtraction)	Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction)
<b>Estimating and checking calculations</b>			Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems	Estimate the answer to a calculation and use inverse operations to check answers	Estimate and use inverse operations to check answers to a calculation	Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

**Skills & Knowledge**

EYFS

Year 1

Year 2

Year 3

Year 4

Year 5

Year 6

**Addition and Subtraction**

**Order of Operations**

Use their knowledge of the order of operations to carry out calculations involving the four operations

**Addition and Subtraction Problems, including with missing numbers**

Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as  $7 = \underline{\quad} - 9$

Solve problems with addition and subtraction including those with missing numbers:  
 - using concrete objects and pictorial representations, including those involving numbers, quantities and measures  
 - applying their increasing knowledge of mental and written methods

Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why  
 Solve addition and subtraction problems involving missing numbers

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why  
 Solve addition and subtraction problems involving missing numbers

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, including those with missing numbers

# Progression of knowledge and skills – Multiplication and Division

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b><u>Multiplication and Division</u></b>							
<b>Understanding Multiplication and Division</b>			<p>Understand multiplication as repeated addition</p> <p>Understand division as sharing and grouping and that a division calculation can have a remainder</p> <p>Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot</p>	<p>Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known or related fact, calculate mentally, use a jotting, written method)</p> <p>Understand that division is the inverse of multiplication and vice versa.</p> <p>Understand how multiplication and division statements can be represented using arrays</p> <p>Understand division as sharing and grouping and use each appropriately</p>	<p>Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known or related fact, calculate mentally, use a jotting, written method)</p> <p>Recognise and use factor pairs and commutativity in mental calculations</p>	<p>Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known or related fact, calculate mentally, use a jotting, written method)</p> <p>Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers</p>	<p>Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known or related fact, calculate mentally, use a jotting, written method)</p>

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Multiplication and Division</b>							
<b>Multiplication and Division facts</b>		Recall and use doubles of all numbers to 10 and corresponding halves	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers  Derive and use doubles of simple two-digit numbers (numbers in which the ones total less than 10)  Derive and use halves of simple two-digit even numbers (numbers in which the tens are even)	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables  Derive and use doubles of all numbers to 100 and corresponding halves  Derive and use doubles of all multiples of 50 to 500	Recall multiplication and division facts for multiplication tables up to $12 \times 12$  Use partitioning to double or halve any number, including decimals to one decimal place	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)  Use partitioning to double or halve any number, including decimals to two decimal places	Identify common factors, common multiples and prime numbers  Use partitioning to double or halve any number
<b>Mental Methods</b>			Calculate mathematical statements for multiplication (using repeated addition) and division within the multiplication tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals ( $=$ ) signs	Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental methods	- 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	Multiply and divide numbers mentally drawing upon known facts  Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes	Perform mental calculations, including with mixed operations and large numbers

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Multiplication and Division</b>							
<b>Written Methods</b>		*Written methods are informal at this stage – see mental methods for expectation of calculations	*Written methods are informal at this stage – see mental methods for expectation of calculations	Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, progressing to formal written methods  Write and calculate mathematical statements for division using the multiplication tables that they know, including for two-digit numbers divided by one- digit numbers, progressing to formal written methods	Multiply two-digit and three-digit numbers by a one-digit number using formal written layout  Divide numbers up to 3 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context	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  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 multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication  Multiply one-digit numbers with up to two decimal places by whole numbers 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  Use written division methods in cases where the answer has up to two decimal places
<b>Estimating and checking strategies</b>				Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.	Use estimation and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy	Use estimation and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy	Use estimation and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b><u>Multiplication and Division</u></b>							
<b>Solving multiplication and division problems including those with missing numbers</b>		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	Solve problems involving multiplication and division (including those with remainders), using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts	Solve problems, including missing number problems, involving multiplication and division (and interpreting remainders), including positive integer scaling problems and correspondence problems in which n objects are connected to m objects	Solve problems involving multiplying and adding, including using the distributive law to multiply <u>two digit</u> numbers by one digit, division (including interpreting remainders), integer scaling problems and harder correspondence problems such as n objects are connected to m objects	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	Solve problems involving addition, subtraction, multiplication and division

# Progression of knowledge and skills – Fractions

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Fractions</b>							
<b>Understanding Fractions</b>		Understand that a fraction can describe part of a whole Understand that a unit fraction represents one equal part of a whole	Understand and use the terms numerator and denominator Understand that a fraction can describe part of a set  Understand that the larger the denominator is, the more pieces it is split into and therefore the smaller each part will be	Show practically or pictorially that a fraction is one whole number divided by another (for example, $\frac{3}{4}$ can be interpreted as $3 \div 4$ )  Understand that finding a fraction of an amount relates to division	Understand that a fraction is one whole number divided by another (for example, $\frac{3}{4}$ can be interpreted as $3 \div 4$ )		
<b>Fractions of objects, shapes and quantities</b>		Recognise, find and name a half as one of two equal parts of an object, shape or quantity (including measure)  Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity (including measure)	Recognise, find, name and write fractions $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{2}{4}$ , and $\frac{3}{4}$ of a length, shape, set of objects or quantity	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 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 including those with a range of numerators and denominators	Recognise mixed numbers and improper fractions and convert from one form to the other  Read and write decimal numbers as fractions (e.g. $0.71 = \frac{71}{100}$ )	
<b>Counting, comparing and ordering fractions</b>			Count on and back in steps of halves and quarters	Count on and back in steps of halves, quarters and thirds.  Compare and order unit fractions and fractions with the same denominators (including on a number line)	Count on and back in steps of unit fractions Compare and order unit fractions and fractions with the same denominators (including on a number line) (continued from Year 3)	Count on and back in mixed number steps such as 1 and $\frac{1}{2}$  Compare and order fractions whose denominators are all multiples of the same number (including on a number line)	Compare and order fractions, including fractions $>1$ (including on a number line)

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Fractions</b>							
<b>Equivalence</b>			Write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$	Recognise and show, using diagrams, equivalent fractions with small denominators	Recognise and show, using diagrams, families of common equivalent fractions  Recognise and write decimal equivalents of any number of tenths or hundredths.  Recognise and write decimal equivalents to $\frac{1}{4}$ , $\frac{1}{2}$ and $\frac{3}{4}$	Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths  Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination  Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts  Associate a fraction with division and calculate decimal fraction equivalents e.g. 0.375 for a simple fraction e.g. $\frac{3}{8}$
<b>Calculating with fractions</b>				Add and subtract fractions with the same denominator within one whole (for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$ )	Add and subtract fractions with the same denominator (using diagrams)	Add and subtract fractions with the same denominator and denominators that are multiples of the same number  Write mathematical statements $>1$ as a mixed number  Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	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 (using diagrams)  Divide proper fractions by whole numbers (using diagrams) $\frac{1}{3} \div 2 = \frac{1}{6}$

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Fractions</b>							
<b>Percentages</b>						Recognise the percent 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	Find simple percentages of amounts
<b>Solving problems involving fractions,</b>				Solve problems that involve all of the above	Solve problems involving increasingly harder fractions to calculate	Solve problems involving fractions	Solve problems involving fractions
<b>decimals and percentages</b>					quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number  Solve simple measure and money problems involving fractions and decimals to two decimal places	Solve problems involving numbers up to three decimal places  Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{1}{5}$ , $\frac{2}{5}$ , $\frac{3}{5}$ and those with a denominator of a multiple of 10 or 25	Solve problems which require answers to be rounded to specified degrees of accuracy  Solve problems involving the calculation of percentages (for example, of measures, and such as 15% of 360) and the use of percentages for comparison
<b>Ratio and Proportion</b>							Solve problems involving the relative sizes of two quantities where missing values can be found using integer multiplication and division facts  Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples Solve problems involving similar shapes where the scale factor is known or can be found

# Progression of knowledge and skills – Algebra

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Algebra</b>							
Note: Although algebraic notation is not formally introduced until Year 6, algebraic thinking starts much earlier as exemplified by the below missing number objectives.							
<b>Algebra</b>		Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$	Recognise and use the relationship between addition and subtraction and use this to check calculations and solve missing number problems	Solve problems, including missing number problems			Express missing number problems algebraically Use simple formulae  Generate and describe linear number sequences  Find pairs of numbers that satisfy an equation with two unknowns  Enumerate possibilities of combinations of two variables

# Progression of knowledge and skills – Measurement

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Measurement</b>							
<b>Height/Length</b>	Compare length, weight and capacity.	Measure and begin to record lengths and heights, using non-standard and then manageable standard units (m and cm) within children's range of counting competence  Compare and describe lengths and heights (for example, long/short, longer/shorter, tall/short, double/half)	Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm) to the nearest appropriate unit using rulers  Compare and order lengths and record the results using >, < and =	Measure, add and subtract lengths (m/cm/mm)  Compare lengths (m/cm/mm)	Estimate and calculate lengths  Compare lengths	Use, read and write standard units of length to a suitable degree of accuracy  Understand and use approximate equivalences between metric and common imperial units such as inches	Use, read and write standard units of length using decimal notation to three decimal places
<b>Perimeter</b>				Understand that perimeter is a measure of distance around the boundary of a shape Measure the perimeter of simple 2-D shapes	Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres	Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres	Recognise that shapes with the same areas can have different perimeters and vice versa
<b>Area</b>					Understand that area is a measure of surface within a given Boundary  Find the area of rectilinear shapes by counting squares	Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm <sup>2</sup> ) and square metres (m <sup>2</sup> ) and estimate the area of irregular shapes	Calculate the area of parallelograms and triangles  Recognise when it is possible to use the formulae for area and volume of shapes

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Measurement</b>							
<b>Mass</b>		<p>Measure and begin to record mass/weight, using non-standard and then standard units (kg and g) within children's range of counting Competence</p> <p>Compare and describe mass/weight (for example, heavy/light, heavier than, lighter than)</p>	<p>Choose and use appropriate standard units to estimate and measure mass (kg/g) to the nearest appropriate unit using scales</p> <p>Compare and order mass and record the results using &gt;, &lt; and =</p>	<p>Measure, add and subtract mass (kg/g)</p> <p>Compare mass (kg/g)</p>	<p>Estimate and calculate Mass</p> <p>Compare mass</p>	<p>Use, read and write standard units of mass to a suitable degree of Accuracy</p> <p>Understand and use approximate equivalences between metric and common imperial units such as pounds</p>	<p>Use, read and write standard units of mass using decimal notation to three decimal places</p>
<b>Capacity/Volume</b>	Compare length, weight and capacity.	<p>Measure and begin to record capacity and volume using non-standard and then standard units (litres and ml) within children's range of counting Competence</p> <p>Compare and describe capacity and volume (for example, full/empty, more than, less than, half, half full, quarter)</p>	<p>Choose and use appropriate standard units to estimate and measure capacity and volume (litres/ml) to the nearest appropriate unit using measuring vessels</p> <p>Compare and order volume/capacity and record the results using &gt;, &lt; and =</p>	<p>Measure, add and subtract volume/capacity (l/ml)</p> <p>Compare volume/capacity (l/ml)</p>	<p>Estimate and calculate volume/capacity</p> <p>Compare volume/capacity</p>	<p>Estimate (and calculate) volume (for example, using 1 cm<sup>3</sup> blocks to build cuboids (including cubes) and capacity (for example, using water) Understand the difference between liquid volume, including capacity and solid Volume</p> <p>Understand and use approximate equivalences between metric and common imperial units such as pints</p>	<p>Use, read and write standard units of volume using decimal notation to three decimal places</p> <p>Calculate and estimate volume of cubes and cuboids using standard units, including cubic centimetres (cm<sup>3</sup>) and cubic metres (m<sup>3</sup>) and extending to other units (for example, mm<sup>3</sup> and km<sup>3</sup>)</p> <p>Compare volume of cubes and cuboids using standard units, including cubic centimetres (cm<sup>3</sup>) and cubic metres (m<sup>3</sup>) and extending to other units (for example, mm<sup>3</sup> and km<sup>3</sup>)</p>

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b><u>Measurement</u></b>							
<b>Temperature</b>			Choose and use appropriate standard units to estimate and measure temperature to the nearest degree (°C) using thermometers	Continue to estimate and measure temperature to the nearest degree (°C) using thermometers	Order temperatures including those below 0°	Order temperatures including those below 0°	Calculate differences in temperature, including those that involve a positive and negative temperature
<b>Conversion</b>					Convert between different units of measure (e.g. kilometre to metre; hour to minute)	Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)	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 three decimal places Convert between miles and kilometres.

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b><u>Measurement</u></b>							
<b>Temperature</b>			Choose and use appropriate standard units to estimate and measure temperature to the nearest degree (°C) using thermometers	Continue to estimate and measure temperature to the nearest degree (°C) using thermometers	Order temperatures including those below 0°	Order temperatures including those below 0°	Calculate differences in temperature, including those that involve a positive and negative temperature
<b>Conversion</b>					Convert between different units of measure (e.g. kilometre to metre; hour to minute)	Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)	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 three decimal places Convert between miles and kilometres.

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Measurement</b>							
<b>Time</b>		<p>Recognise and use language relating to dates, including days of the week, weeks, months and years</p> <p>Compare and describe time (for example, quicker, slower, earlier, later)</p> <p>Sequence events in chronological order using language (for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening)</p> <p>Measure and begin to record time (hours, minutes, seconds)</p> <p>Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.</p>	<p>Compare and sequence intervals of time</p> <p>Know the number of minutes in an hour and the number of hours in a day</p> <p>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</p>	<p>Record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight</p> <p>Know the number of seconds in a minute, and the number of days in each month, year and leap year</p> <p>Know the number of seconds in a minute, and the number of days in each month, year and leap year</p> <p>Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks</p> <p>Estimate and read time with increasing accuracy to the nearest minute</p> <p>Compare durations of events (for example to calculate the time taken by particular events or tasks)</p>	<p>Convert between different units of time, e.g. hour to minute</p> <p>Read, write and convert time between analogue and digital 12 and 24-hour clocks</p>	<p>Convert between units of time in a problem-solving context</p> <p>Continue to read, write and convert time between analogue and digital 12 and 24-hour clocks</p>	<p>Use, read and write standard units of time</p>

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Measurement</b>							
<b>Money</b>		Recognise and know the value of different denominations of coins and notes	<p>Recognise and use symbols for pounds (£) and pence (p)</p> <p>Combine amounts to make a particular value</p> <p>Find different combinations of coins that equal the same amounts of money</p> <p>Add and subtract money of the same unit, including giving change</p>	<p>Continue to recognise and use symbols for pounds (£) and pence (p) and understand that the decimal point separates pounds and pence</p> <p>Recognise that ten 10p coins are equivalent to £1 and that each coin is of £1</p> <p>Add and subtract amounts of money to give change, using both £ and p in practical contexts</p>	<p>Write amounts of money using decimal notation</p> <p>Recognise that one hundred 1p coins are equivalent to £1 and that each coin is of £1</p> <p>Estimate, compare and calculate money in pounds and pence</p>		
<b>Problems involving money and measure</b>		<p>Solve practical problems for:</p> <ul style="list-style-type: none"> <li>- lengths and heights</li> <li>- mass/weight</li> <li>- capacity and volume</li> <li>- time</li> </ul>	<p>Solve simple problems in a practical context involving addition and subtraction of money <i>and measures (including time)</i></p>	<p><i>Solve problems involving money and measures and simple problems involving passage of time</i></p>	<p>Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days <i>and problems involving money and measures</i></p>	<p>Use all four operations to solve problems involving measure (for example, length, mass, volume, money) using decimal notation including scaling</p> <p>Solve problems involving converting between units of time.</p>	<p>Solve problems involving the calculation and conversion of units of measure <i>(including money and time)</i>, using decimal notation up to three decimal places where appropriate</p>

# Progression of knowledge and skills – Shape

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Properties of Shape</b>	Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can.	Recognise and name common 2-D shapes, including rectangles (including squares), circles and triangles	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, (for example, a circle on a cylinder and a triangle on a pyramid)  Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces	Draw 2-D shapes and describe them  Identify horizontal and vertical lines and pairs of perpendicular and parallel lines  Make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them	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  Complete a simple symmetric figure with respect to a specific line of symmetry  Continue to identify horizontal and vertical lines and pairs of perpendicular and parallel lines  Compare and classify geometric shapes based on their properties and sizes	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	Compare and classify geometric shapes based on their properties and sizes Draw 2-D shapes using given dimensions and Angles  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
<b>Angles and Rotation</b>		Describe movement, including whole, half, quarter and three-quarter turns	Use mathematical vocabulary to describe movement, including rotation as a turn  Understand the link between rotation and turns in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)	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 acute and obtuse angles and compare and order angles up to two right angles by size	Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles Draw given angles, and measure them in degrees (°) Identify: - angles at a point and one whole turn (total 360°) - angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°) other multiples of 90°	Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles  Find unknown angles in any triangles, quadrilaterals, and regular polygons

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Patterns</b>	Continue, copy and create repeating patterns.	Recognise and create repeating patterns with objects and shapes	Order and arrange combinations of mathematical objects in patterns and sequences				
<b>Position and Direction</b>	Select, rotate and manipulate shapes in order to develop spatial reasoning skills.	Describe position and direction	Use mathematical vocabulary to describe position, movement, including movement in a straight line				
<b>Coordinates (including reflection and translation)</b>				Describe positions on a square grid labelled with letters and numbers	Describe positions on a 2-D grid as coordinates in the first quadrant  Plot specified points and draw sides to complete a given Polygon  Describe movements between positions as translations of a given unit to the left/right and up/down	Describe positions on the first quadrant of a coordinate grid  Plot specified points and complete shapes  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	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

Skills & Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Sorting and Classifying</b>		Sort objects, numbers and shapes to a given criterion and their own	Compare and sort objects, numbers and common 2-D and 3-D shapes and everyday objects	Use sorting diagrams to compare and sort objects, numbers and common 2-D and 3-D shapes and everyday objects	Use a variety of sorting diagrams to compare and classify numbers and geometric shapes, including quadrilaterals and triangles, based on their properties and sizes	Complete and interpret information in a variety of sorting diagrams (including those used to sort properties of numbers and shapes)	Continue to complete and interpret information in a variety of sorting diagrams (including those used to sort properties of numbers and shapes)
<b>Present and Interpret Data</b>		Present and interpret data in block diagrams using practical equipment	Interpret and construct simple pictograms, tally charts, block diagrams and simple tables	Interpret and present data using bar charts, pictograms and tables	Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	Complete, read and interpret information in tables, including timetables	Interpret and construct pie charts and line graphs and use these to solve problems
<b>Problems involving data</b>		Ask and answer simple questions by counting the number of objects in each Category  Ask and answer questions by comparing categorical data	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	Solve one-step and two-step questions (for example, 'How many more?' and 'How many fewer?') using information presented in scaled bar charts and pictograms and tables	Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs	Solve comparison, sum and difference problems using information presented in all types of graph including a line graph	Solve comparison, sum and difference problems using information presented in all types of graph
<b>Averages</b>							Calculate and interpret the mean as an average

## Mastering Number: Reception and KS1

Cardinality is a fundamental concept in early mathematics. The cardinal value of a number refers to the quantity of things it represents: the numerosity, 'how-many-ness', or 'three-ness' of three. When children understand the cardinality of numbers, they know what the numbers mean in terms of knowing how many things they refer to.

A lack of understanding of cardinality can easily be hidden by a routine that a child has learned to perform without understanding the mathematics. Our skilled Early Years, Reception and KS1 teachers are able to spot this, and also to teach using methods that will expose the structure for children and help them to deeply understand it.

The NCETM's Mastering Number Programme aims to equip KS1 teachers with the skills and knowledge to ensure that all children leave KS1 with strong, deep and flexible understanding of the number system. Understanding cardinality is critical to this and children will need varied opportunities to make connections between the counting of numbers and the quantity each number represents.

Language is also important, and teachers are advised to encourage children to answer questions in full sentences to support the building of understanding and images. Answering the question 'How many teddies can you see?' with 'Two' is not reinforcing structure as strongly as the answer 'I can see two teddies'.



# Progression of knowledge and skills – Mastering Number – Reception

## Mastering Number: Overview of content – Reception

Strand/ Half-term	Subitising	Cardinality, ordinality and counting	Composition	Comparison
1  Children will:	<ul style="list-style-type: none"> <li>perceptually subitise within 3</li> <li>identify sub-groups in larger arrangements</li> <li>create their own patterns for numbers within 4</li> <li>practise using their fingers to represent quantities which they can subitise</li> <li>experience subitising in a range of contexts, including temporal patterns made by sounds.</li> </ul>	<ul style="list-style-type: none"> <li>relate the counting sequence to cardinality, seeing that the last number spoken gives the number in the entire set</li> <li>have a wide range of opportunities to develop their knowledge of the counting sequence, including through rhyme and song</li> <li>have a wide range of opportunities to develop 1:1 correspondence, including by coordinating movement and counting</li> <li>have opportunities to develop an understanding that anything can be counted, including actions and sounds</li> <li>explore a range of strategies which support accurate counting.</li> </ul>	<ul style="list-style-type: none"> <li>see that all numbers can be made of 1s</li> <li>compose their own collections within 4.</li> </ul>	<ul style="list-style-type: none"> <li>understand that sets can be compared according to a range of attributes, including by their numerosity</li> <li>use the language of comparison, including 'more than' and 'fewer than'</li> <li>compare sets 'just by looking'.</li> </ul>
2  Children will:	<ul style="list-style-type: none"> <li>continue from first half-term</li> <li>subitise within 5, perceptually and conceptually, depending on the arrangements.</li> </ul>	<ul style="list-style-type: none"> <li>continue to develop their counting skills</li> <li>explore the cardinality of 5, linking this to dice patterns and 5 fingers on 1 hand</li> <li>begin to count beyond 5</li> <li>begin to recognise numerals, relating these to quantities they can subitise and count.</li> </ul>	<ul style="list-style-type: none"> <li>explore the concept of 'wholes' and 'parts' by looking at a range of objects that are composed of parts, some of which can be taken apart and some of which cannot</li> <li>explore the composition of numbers within 5.</li> </ul>	<ul style="list-style-type: none"> <li>compare sets using a variety of strategies, including 'just by looking', by subitising and by matching</li> <li>compare sets by matching, seeing that when every object in a set can be matched to one in the other set, they contain the same number and are equal amounts.</li> </ul>
3  Children will:	<ul style="list-style-type: none"> <li>increase confidence in subitising by continuing to explore patterns within 5, including structured and random arrangements</li> </ul>	<ul style="list-style-type: none"> <li>continue to develop verbal counting to 20 and beyond</li> <li>continue to develop object counting skills, using a range of strategies to develop accuracy</li> </ul>	<ul style="list-style-type: none"> <li>continue to explore the composition of 5 and practise recalling 'missing' or 'hidden' parts for 5</li> </ul>	<ul style="list-style-type: none"> <li>continue to compare sets using the language of comparison, and play games which involve comparing sets</li> </ul>

# Progression of knowledge and skills – Mastering Number – Reception

	<ul style="list-style-type: none"> <li>• explore a range of patterns made by some numbers greater than 5, including structured patterns in which 5 is a clear part</li> <li>• experience patterns which show a small group and '1 more'</li> <li>• continue to match arrangements to finger patterns.</li> </ul>	<ul style="list-style-type: none"> <li>• continue to link counting to cardinality, including using their fingers to represent quantities between 5 and 10</li> <li>• order numbers, linking cardinal and ordinal representations of number.</li> </ul>	<ul style="list-style-type: none"> <li>• explore the composition of 6, linking this to familiar patterns, including symmetrical patterns</li> <li>• begin to see that numbers within 10 can be composed of '5 and a bit'.</li> </ul>	<ul style="list-style-type: none"> <li>• continue to compare sets by matching, identifying when sets are equal</li> <li>• explore ways of making unequal sets equal.</li> </ul>
<b>4</b> <b>Children will:</b>	<ul style="list-style-type: none"> <li>• explore symmetrical patterns, in which each side is a familiar pattern, linking this to 'doubles'.</li> </ul>	<ul style="list-style-type: none"> <li>• continue to consolidate their understanding of cardinality, working with larger numbers within 10</li> <li>• become more familiar with the counting pattern beyond 20.</li> </ul>	<ul style="list-style-type: none"> <li>• explore the composition of odd and even numbers, looking at the 'shape' of these numbers</li> <li>• begin to link even numbers to doubles</li> <li>• begin to explore the composition of numbers within 10.</li> </ul>	<ul style="list-style-type: none"> <li>• compare numbers, reasoning about which is more, using both an understanding of the 'howmanyness' of a number, and its position in the number system.</li> </ul>
<b>5</b> <b>Children will:</b>	<ul style="list-style-type: none"> <li>• continue to practise increasingly familiar subitising arrangements, including those which expose '1 more' or 'doubles' patterns</li> <li>• use subitising skills to enable them to identify when patterns show the same number but in a different arrangement, or when patterns are similar but have a different number</li> <li>• subitise structured and unstructured patterns, including those which show numbers within 10, in relation to 5 and 10</li> <li>• be encouraged to identify when it is appropriate to count and when groups can be subitised.</li> </ul>	<ul style="list-style-type: none"> <li>• continue to develop verbal counting to 20 and beyond, including counting from different starting numbers</li> <li>• continue to develop confidence and accuracy in both verbal and object counting.</li> </ul>	<ul style="list-style-type: none"> <li>• explore the composition of 10.</li> </ul>	<ul style="list-style-type: none"> <li>• order sets of objects, linking this to their understanding of the ordinal number system.</li> </ul>
<b>6</b>	In this half-term, the children will consolidate their understanding of concepts previously taught through working in a variety of contexts and with different numbers.			

# Progression of knowledge and skills – Mastering Number – Year One

## Mastering Number: Overview of content – Year 1

Strand/ Half-term	Subitising	Cardinality, ordinality and counting	Composition	Comparison	Addition and subtraction/ Number facts
1  Children will:	<ul style="list-style-type: none"> <li>revisit subitising within 5 using perceptual subitising</li> <li>practise conceptual subitising of bigger numbers as they become more familiar with patterns made by the numbers 5–10.</li> </ul>	<ul style="list-style-type: none"> <li>explore the linear number system within 10, looking at a range of ordinal representations</li> <li>explore the link between the 'staircase' pattern and a number track.</li> </ul>	<ul style="list-style-type: none"> <li>focus on the composition of numbers within 10, with a particular emphasis on the composition of numbers 6, 7, 8 and 9 as '5 and a bit', as well as exploring the composition of numbers 5 and 6 in-depth</li> <li>explore the composition of odd and even numbers, identifying that even numbers are made of 2s and odd numbers have 'an extra 1' – they will link this to the 'shape' of these numbers.</li> </ul>		Although children will not be looking at number bonds expressed as equations, their work on the composition of numbers within 10 will be developing their knowledge of number bonds.
2  Children will:	<ul style="list-style-type: none"> <li>continue to practise conceptually subitising numbers they have already explored the composition of.</li> </ul>	<ul style="list-style-type: none"> <li>review the linear number system to 10 as they compare numbers.</li> </ul>	<ul style="list-style-type: none"> <li>continue to explore the composition of the numbers 7–9 in-depth, linking this to their understanding of odd and even numbers</li> <li>explore the composition of 10, developing a systematic approach to finding pairs that sum to 10.</li> </ul>	<ul style="list-style-type: none"> <li>revisit what is meant by 'comparing' and see that quantities can be compared according to different attributes, including numerosity.</li> </ul>	As above.
3  Children will:	<ul style="list-style-type: none"> <li>continue to practise conceptually subitising numbers they have already explored the composition of.</li> </ul>		<ul style="list-style-type: none"> <li>review the composition of numbers within 10, linking these to part-part-whole representations</li> <li>practise recalling missing parts for numbers within 10.</li> </ul>	<ul style="list-style-type: none"> <li>compare numbers within 10, linking this to their understanding of the linear system</li> <li>use the inequality symbol to create expressions, e.g. <math>7 &gt; 2</math>, and use the language of 'greater than' and 'less than'</li> </ul>	<ul style="list-style-type: none"> <li>develop their recall of number bonds within 10, through the use of exercises which use written numerals but not the symbols +, −, or =.</li> </ul>

# Progression of knowledge and skills – Mastering Number – Year One

				<ul style="list-style-type: none"> <li>reason about inequalities, drawing on their knowledge of the composition of numbers, e.g. Is this true or false? 3 and 2 is less than 4.</li> </ul>	
<p><b>4</b></p> <p><b>Children will:</b></p>	<ul style="list-style-type: none"> <li>continue to practise conceptually subitising numbers they have already explored the composition of.</li> </ul>	<ul style="list-style-type: none"> <li>review the linear number system to 10, looking at a range of representations, including a number line</li> <li>explore the use of 'midpoints' to enable them to identify the location of other numbers.</li> </ul>	<ul style="list-style-type: none"> <li>review the composition of odd and even numbers, linking this to doubles and near doubles</li> <li>explore the composition of the numbers 11–20, seeing representations which show the structure of these numbers as 'ten and a bit'.</li> </ul>		<ul style="list-style-type: none"> <li>continue to develop their recall of bonds within 10, through the use of exercises which do NOT involve written equations, such as <math>4 + 3 = ?</math></li> <li>identify doubles and near doubles through visual representations of odd and even numbers.</li> </ul>
<p><b>5</b></p> <p><b>Children will:</b></p>	<ul style="list-style-type: none"> <li>continue to practise conceptually subitising numbers they have already explored the composition of.</li> <li>conceptually subitise numbers within 20 as they become more familiar with the composition of numbers within 20.</li> </ul>	<ul style="list-style-type: none"> <li>review the linear number system to 20, looking at a range of representations, including a number line</li> <li>explore the use of 'midpoints' to enable them to identify the location of other numbers.</li> </ul>	<ul style="list-style-type: none"> <li>continue to explore representations which expose the composition of numbers within 20.</li> </ul>	<ul style="list-style-type: none"> <li>compare numbers within 20, including questions which use the symbols +, &lt;, &gt;, or =, such as: True or false? <math>10 + 4 &lt; 14</math> <math>10 + 4 = 14</math> <math>10 + 4 &gt; 14</math></li> </ul>	<ul style="list-style-type: none"> <li>develop their fluency in additive relationships within 10, using a range of activities and games</li> <li>draw on their knowledge of the composition of numbers to complete written equations</li> <li>revisit strategies for addition and subtraction within 10 and apply these to a range of questions, including written equations.</li> </ul>
<p><b>6</b></p> <p><b>Children will:</b></p>	<ul style="list-style-type: none"> <li>continue to use conceptual subitising, especially when using a rekenrek.</li> </ul>		<ul style="list-style-type: none"> <li>apply their knowledge of the composition of numbers, to calculations within 10 and 20.</li> </ul>	<ul style="list-style-type: none"> <li>continue to draw on their knowledge of the relative size of numbers when answering questions using the inequality symbol.</li> </ul>	<ul style="list-style-type: none"> <li>continue to practise recalling additive facts within 20, applying their knowledge of the composition of numbers within 20 and strategies within 10.</li> </ul>

# Progression of knowledge and skills – Mastering Number – Year Two

## Mastering Number: Overview of content – Year 2

Strand/ Half-term	Subitising	Cardinality, ordinality and counting	Composition	Comparison	Addition and subtraction/ Number facts
1  <b>Children will:</b>	<ul style="list-style-type: none"> <li>develop conceptual subitising skills as they become more familiar with patterns made by numbers within 10 and understand their composition</li> <li>use perceptual and conceptual subitising when using a rekenrek.</li> </ul>	<ul style="list-style-type: none"> <li>explore the linear number system within 10, looking at a range of representations</li> <li>compare number tracks and number lines and explore the use of 'midpoints' to enable them to identify the location of other numbers.</li> </ul>	<ul style="list-style-type: none"> <li>focus on the composition of numbers within 10, with a particular emphasis on the composition of numbers 6, 7, 8 and 9 as '5 and a bit', as well as exploring the composition of numbers 5 and 6 in-depth</li> <li>explore the composition of odd and even numbers, identifying that even numbers are made of 2s and odd numbers have 'an extra 1' – they will link this to the 'shape' of these numbers.</li> </ul>		<ul style="list-style-type: none"> <li>link their growing understanding of the composition of numbers within 10 to the related additive facts, including adding 2 to an odd or even number</li> <li>practise recalling facts in a variety of ways, including through solving simple picture problems and completing equations with a missing sum or addend,</li> </ul>
2  <b>Children will:</b>	<ul style="list-style-type: none"> <li>continue to practise conceptually subitising numbers they have already explored the composition of.</li> </ul>	<ul style="list-style-type: none"> <li>review the linear number system as they compare numbers.</li> </ul>	<ul style="list-style-type: none"> <li>continue to explore the composition of the numbers 7–9 in-depth, linking this to their understanding of odd and even numbers</li> </ul>	<ul style="list-style-type: none"> <li>compare numbers within 10, linking this to their understanding of the linear number system</li> <li>use the inequality symbols to create expressions, e.g. <math>7 &gt; 2</math>, and use the language of 'greater than' and 'less than'</li> <li>draw on their knowledge of number bonds to answer questions in the form: True or false? <math>5 + 3 &gt; 7</math></li> </ul>	<ul style="list-style-type: none"> <li>continue to practise recalling additive facts for numbers within 10, using a range of equations, games and picture problems.</li> </ul>

## Progression of knowledge and skills – Mastering Number – Year Two

<p style="text-align: center;"><b>3</b></p> <p><b>Children will:</b></p>	<ul style="list-style-type: none"> <li>continue to practise conceptually subitising numbers they have already explored the composition of, including 'teen' numbers when they have reviewed the composition of 11–19.</li> </ul>		<ul style="list-style-type: none"> <li>review the composition of 11 to 19 as 'ten and a bit' and explore ways to represent this.</li> </ul>		<ul style="list-style-type: none"> <li>focus on number bonds within 10 presented in the part-part-whole structure, including identifying a missing 'part' and relating this to subtraction equations</li> <li>review strategies for adding 1 and 2 to odd and even numbers to subtraction facts presented in different ways</li> <li>apply their knowledge of the composition of 11–19 to calculations in which 10 is a part</li> <li>apply their knowledge of composition to facts involving 3 addends.</li> </ul>
<p style="text-align: center;"><b>4</b></p> <p><b>Children will:</b></p>	<ul style="list-style-type: none"> <li>continue to conceptually subitise the numbers 11–19 using a range of representations, which expose the structure of these numbers as 'ten and a bit'.</li> </ul>	<ul style="list-style-type: none"> <li>revisit the structure of the linear number system within 20, making links between the midpoints of 5 and 10, and 15.</li> </ul>	<ul style="list-style-type: none"> <li>review the composition of odd and even numbers, linking this to doubles and near doubles.</li> </ul>	<ul style="list-style-type: none"> <li>continue to compare numbers within 20, including questions which use the symbols +, &lt;, &gt;, or =, such as:  Write the correct symbol: 10 + 4 <input type="checkbox"/> 15  10 + 4 <input type="checkbox"/> 14  10 + 4 <input type="checkbox"/> 13</li> </ul>	<ul style="list-style-type: none"> <li>draw on their knowledge of the linear number system and apply this to calculations involving 1 more and 1 less, and pairs of numbers with a difference of 1</li> <li>use their understanding of the composition of odd and even numbers to find doubles and near doubles</li> <li>apply known facts to calculations involving larger numbers, e.g. 5 + 2, 15 + 2, 25 + 2.</li> </ul>

# Progression of knowledge and skills – Mastering Number – Year Two

<p><b>5</b></p> <p><b>Children will:</b></p>	<ul style="list-style-type: none"> <li>revisit previous activities which develop their subitising skills.</li> </ul>	<ul style="list-style-type: none"> <li>review the linear number system to 100, applying their knowledge of midpoints to place numbers on a structured number line – they will identify the multiples of 10 that come before and after a given number.</li> </ul>	<ul style="list-style-type: none"> <li>revisit previous activities which develop their understanding of the composition of numbers within 10 and 20.</li> </ul>	<ul style="list-style-type: none"> <li>reason about equalities and inequalities using equations and answering questions, such as: True or false? <math>5 + 3 = 6 + 2</math> <math>9 + 4 &gt; 9 + 5</math> <math>9 + 6 &lt; 10 + 5</math> This will help them become fluent in the use of the inequality symbol as well as practising their number bond knowledge.</li> </ul>	<ul style="list-style-type: none"> <li>become fluent in a range of strategies involving calculations within 20, using 'make 10' strategies to add, and subtracting through the tens boundary</li> <li>practise recalling number bonds through a range of activities and games which will encourage them to reason about sums and differences.</li> </ul>
<p><b>6</b></p> <p><b>Children will:</b></p>	<p>As above.</p>	<p style="background-color: #cccccc;"> </p>	<p>As above.</p>	<p> </p>	<ul style="list-style-type: none"> <li>develop their fluency in additive relationships within 20, using a range of activities and games and revisiting previously taught strategies where necessary.</li> </ul>

# Mastering Number: KS2

Knowledge of multiplication and division and its applications forms the single most important aspect of the KS2 curriculum, and is the gateway to success at secondary school. The NCETM's Mastering Number KS2 Programme enables pupils in Years 4 and 5 to develop fluency in multiplication and division facts, and a confidence and flexibility with number that exemplifies good number sense. Pupils in KS2 will develop automaticity in multiplication and division facts through regular practice. An example of a session is detailed below:

Session 2	<p>Pupils will:</p> <ul style="list-style-type: none"> <li>recap that a 'unit' can represent 'many as 1'</li> <li>see that 1 unit can be repeated</li> <li>represent 1 or more units using unitised counters and multiplication expressions.</li> </ul>
Revisit	<p>Display slide 16 of the presentation.  <i>Which unitised counter correctly represents the coin shown? Can you explain why?</i>            Animate slide 16 to match the coin to the correct counter.  <b>Use the stem sentence: There is 1 ____ . There is ____ , ____ time.</b>            [The word 'once' can also be used alongside '1 time'. Ensure pupils understand that 'once' and '1 time' have the same meaning.]</p>
Teach and practise	<p>Display slide 17 and discuss the question in the thought bubble.  <i>Why is Cal wondering how to represent more than 1 unit? How could we represent more than 1 unit?</i>            Discuss pupils' ideas, then animate slide 17 to reveal Mo's question: 'Could we use unitised counters?'            Display slide 18.  <i>What number will need to be on our stampers today, and why? (e.g. "50, because each coin has a value of 50 pence.")</i>            Encourage pupils to make imaginary stampers with their fists, and to picture 50 written on them, then animate slide 18 to reveal the question.  <i>How many times do you think we need to use our stampers to show 2 units of 50? (e.g. "Twice/2 times, to show two 50 pence coins.")</i>            Ask pupils to use their stampers as you animate slide 18.            Display slide 19 and provoke a discussion.  <i>Cal and Mo are describing the units of 50 represented by the 2 counters. Whose way is correct?</i>            Discuss pupils' thoughts. Ensure they understand that both sentences correctly describe the unitised counters on the slide.  <b>Use the stem sentence: There are ____ . There is ____ , ____ times.</b>            Display slide 20. Ask questions to provoke a discussion, animating the slide to reveal the expressions, as appropriate.  <i>Which multiplication expressions can we write to represent each picture of unitised counters? Does saying the stem sentence help you to think? Will either of the factors be the same? Why do you think that?</i></p>

Complete the table

Story	Counters	Expression
Mo has ____ coins. Each coin has a value of ____ pence.		$4 \times 20$
There are ____ pupils in each class. There are 5 classes.		
There are 100 cars on each level of a car park. There are ____ levels.		$3 \times 100$
There are ____ rooms on each floor of a hotel. There are 7 floors.		

## Assessment within Mathematics

We place great emphasis on the importance of assessing children's knowledge, understanding and skillset within Mathematics.

When assessing Maths, it is first essential to clearly articulate two important areas:

1. The specific endpoint for the unit being delivered,
2. The substantive and disciplinary knowledge to be taught to reach this endpoint.

At Boughton Heath Academy, we have clearly mapped out all endpoints for all the Mathematics units to be delivered, before specifying what substantive and disciplinary knowledge is to be taught within each unit to reach this endpoint. It is this knowledge and understanding that we assess children upon, believing accurate assessment can only be a reflection of what is taught to children .

End of unit checks within Power Maths are completed by children independently and a record of their performance is recorded on an excel spreadsheet that logs their scores for each area of maths.

**End of unit check**

Your teacher will ask you these questions.

1 Joey has 7 apples. He eats 2 apples. How many apples are left?  
 A 9 B 7 C 2 D 5

2 Which number sentence is correct?  
 A  $8 - 2 = 10$  C  $6 - 4 = 2$   
 B  $8 = 10 - 3$  D  $2 = 10 - 9$

3 Which number sentence does not match the diagram?  
 A  $5 - 3 = 8$  C  $8 - 3 = 5$   
 B  $8 + 3 = 5$  D  $3 = 8 - 5$

4 What subtraction is shown?  
 A  $8 - 1 = 7$  C  $5 - 8 = 3$   
 B  $8 - 3 = 5$  D  $9 - 3 = 5$

5 Work out  $7 - 3$ .  
 A 10 B 6 C 5 D 4

**Think!**  
 Izzy says she can see two facts.  
 $6 = 3 + 3$   $3 + 3 = 6$   
 Fred says he can see three facts.  
 $6 - 3 = 3$   $3 - 6 = 3$   $3 = 6 - 3$   
 Explain the mistake that Fred has made.

These words will help you. part whole odd subtract equals take away

## Making judgements – formative assessment

When delivering lessons; teachers record notes, comments and reflections they feel pertinent to the formative assessment of their teaching and learning of Maths, recording these in their feedback files (see right). Such feedback is then delivered at the start of the following lesson, in order for children to recap prior learning undertaken before building upon this; as well as to give them opportunities to address misconceptions develop greater understanding of concepts and what has been taught.

Date:	Lesson:
Notes:	
●	■
▲	

## Making judgements – summative assessment

With the unit endpoint in mind, teachers will form a summative assessment for each child within a particular unit. This will be either, working towards / working at / working above the expected standard.

White Rose Maths Autumn progress check  
**Year 1**

White Rose Maths Spring Progress Check  
**Year 1**

White Rose Maths Summer Progress check  
**Year 1**



Children will complete a White Rose assessment test at the end of each term. We use Smart Grade to input these results to give a standardised score. A triangulation of this result alongside end of unit checks and pupil's work in books is used by teachers to make a judgement at the end of each term for each child.