

Mathematics Policy

Our Mathematics Curriculum Aims

It is our aim to develop in children:

- *a positive attitude towards mathematics and an awareness of the fascination of mathematics*
- *fluency 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*
- *mathematical reasoning skills, using mathematical language*
- *problem solving, by applying their mathematics to a variety of problems*
- *the opportunities and ability to apply their mathematical knowledge and understanding to other subjects*

Foundation Stage

• Curriculum

Children are taught in line with the new (currently pilot) Statutory Framework for the Early Years Foundation Stage, building towards the Early Learning Goals for Mathematics. Children develop a deep understanding of numbers up to 10 and the relationships and patterns between those numbers. The curriculum also provides rich opportunities to develop spatial reasoning skills across all areas of mathematics including shape, space and measure. A wide range of practical apparatus and activities are used to develop a curiosity and love of mathematics.

Teaching follows the White Rose approach, developing a depth of knowledge of the area taught. Children begin to develop a mathematical vocabulary, and oracy is a key feature of lessons, helping to develop children's reasoning skills so that they can respond to questions by saying, for example "I know... because...".

• Teaching Organisation

Each lesson begins with a 'Maths Meeting' which embeds key maths concepts. Lessons begin with a whole class input and children are given the opportunity to consolidate learning during discovery time.

• Inclusion

Additional support is provided for children where needed. During the Maths Meeting, a consolidation activity is carried out by the teaching assistant where children have been identified as needing to recap prior learning. Children are also supported through the use of mixed ability 'Chatty Partners'.

• Assessment

When children join the school, a school baseline assessment is carried out. Ongoing observations are recorded on Tapestry, a web based learning journal. Learning Milestones are tracked using the school's maths progress trackers as shown in *Appendix 5* and children's progress is monitored and pupils are identified as to whether or not they are on track.

• Home learning

Each child has a 'Doodle Maths' account. This is an online mathematics programme which can be accessed at home and promotes number fluency through regular use.

Key Stage One

• Curriculum

Children are taught in line with the Key Stage One mathematics National Curriculum.

In Year One, children learn to develop fluency with recognising, reading and writing numerals to 100. They develop fluency counting to, and over, 100 forwards and backwards, and counting in steps of 2, 5 and 10. Children will also learn concrete and pictorial approaches to add and subtract numbers to 20 and beyond.

In Year Two, children learn to develop fluency with recognising, reading and writing numbers to 100 in numerals and words. They develop fluency counting to 100 and beyond forwards and backwards, and counting in steps of 2, 3, 5 and 10. Children will also learn concrete, pictorial and abstract approaches to add and subtract numbers to 100. Children learn to solve multiplication and division problems drawing on their knowledge of known multiplication facts.

The 'mastery approach' to the curriculum is delivered through a learning is organised into topics, typically of 1, 2, or 3 weeks as outlined in the curriculum overview in *Appendix 1*. Tasks and activities develop children's fluency with number and calculations. They are designed to be accessible for all pupils to enter whilst containing challenging components to challenge thinking. For advanced learners, non-routine questions are used for pupils to develop their higher-order thinking skills. Problem-solving approaches are used to encourage pupils' higher-level thinking.

To develop children's mastery of the curriculum, new concepts are learned initially using concrete examples, such as counters, Numicon or base-ten cubes then progress to pictorial representations, such as the number line, before finally using more abstract symbols, such as the equals sign. Further details of these approaches can be found in *Appendix 2*.

• Teaching Organisation

There is a daily maths lesson of 50 minutes in Year One and 55 minutes in Year Two in mixed ability classes, supported by a teaching assistant. Our mathematics instructional programme sets out the features and expectations for a typical maths lesson, as shown in *Appendix 3*. The lessons include a mix of 'model and do', practice and independent learning. Children are encouraged to discuss and reason about problems.

Anchor charts are used to introduce and focus learning and to provide a reference point for previous learning. Examples of these can be found in *Appendix 4*.

• Inclusion

In Year One there are additional 'mini maths' sessions on Thursday and Friday to support key concepts at the appropriate level for different groups of children. Before the main maths lesson in Year Two, each teacher delivers a small introductory 'pre-teach' session in which key concepts are introduced to those children who have either found the previous day's learning difficult or who are slower to grasp concepts. Children may also be identified as benefitting from further maths support which may be delivered in

• Assessment

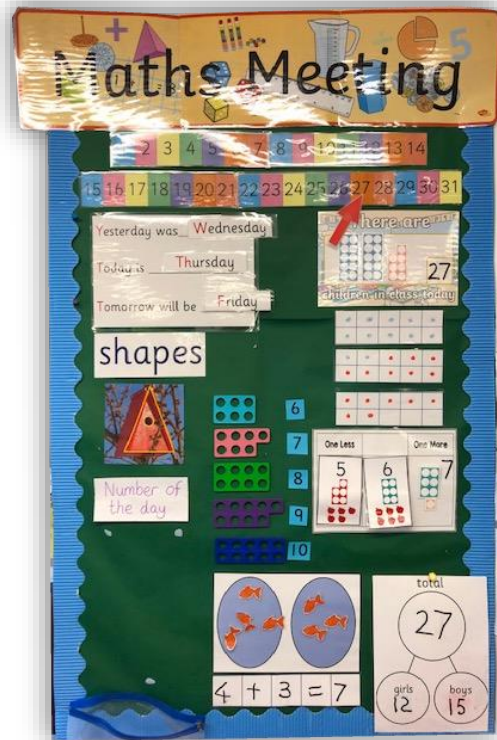
At the beginning of Year One, children undertake a baseline assessment to benchmark their attainment at the beginning of Key Stage 1. Children's ongoing learning is regularly assessed through their daily work and by regular informal assessments. Ongoing learning is tracked in each year group using the school's maths progress trackers as shown in *Appendix 5*. Additionally, half-termly assessments are carried out to review children's understanding. Children's progress is monitored termly by the teacher and senior leadership team. Summative assessments are recorded on the online assessment tool, BromCom. Children at risk of not achieving the expected standard for Key Stage 1 are targeted with additional support. At the end of Year Two, children undertake statutory Key Stage 1 assessment tests in mathematics.

• Home learning

Each week, parents are informed of their child's current maths learning by the weekly 'Maths Mash' video on the school's YouTube channel. Every child also has their own 'Doodle Maths' account. This is an online mathematics programme which can be accessed at home and promotes number fluency through regular use.

- Maths Meetings

Daily 'maths meeting' take place in which children revisit and reinforce key concepts, for example days of the week, shapes, representing numbers and calculation strategies such as use of Base Ten, number lines and the column method.



Pupil Progress

The Senior Leadership Team monitor teaching and learning regularly through book scrutiny, learning walks and lesson observations. Pupil progress meetings are held with teachers termly to monitor progress, check children are on track and to set pupil progress targets. Individual pupils are discussed at these meetings and in through the teacher's performance appraisal process, including reflecting on reasons for any pupils who did not meet their target.

Learning Environment

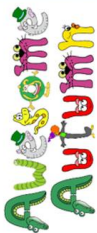
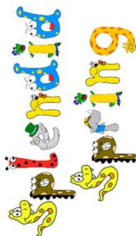
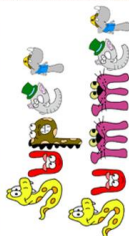
- Each classroom should have a maths working wall to display the current anchor charts to support learning
- All teachers should organise an area within the classroom dedicated to mathematics resources. This area is easily accessible to all children and allows them to become familiar with all resources. Resources should be tidy and well organised.
- Resources which are not used or required regularly are stored centrally in the maths cupboard in Year Two.

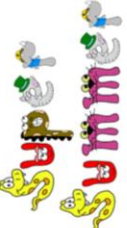
Maths Wizard

The school runs a home learning programme called 'The Maths Wizard' where children work on practicing and learning key maths number facts, such as the multiplication facts. When they are fluent in their target area they ask to visit the Maths Wizard who will check their fluency and move them onto their next target if appropriate.

Date adopted: May 2021

Review date: May 2022

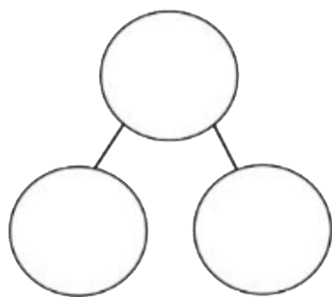
Year One	Upton Infant School			Our MATHEMATICS Curriculum		
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
	Number and Place Value (to 10)				Addition and Subtraction	
	Addition and Subtraction			Geometry Shape	Number and Place Value (to 20)	
	Number and Place Value (to 20)				Number and Place Value (to 50)	
	Number and Place Value (to 50)	Measurement Length and Height / Weight and Volume		Addition and Subtraction		Consolidation
	Multiplication and Division			Fractions		Geometry Position & Direction
	Number and Place Value (to 100)		Measurement Money	Measurement Time		Consolidation

Year Two	Upton Infant School			Our MATHEMATICS Curriculum		
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
	Number and Place Value			Addition and Subtraction		
	Addition and Subtraction		Measurement Money		Multiplication and Division	Consolidation
	Multiplication and Division				Statistics	Geometry Shape
	Addition and Subtraction		Fractions			
	Measurement Length and Height Mass, Capacity and Temperature		Geometry Position and Direction	Measurement Time		Consolidation
	Measurement Mass, Capacity and Temperature		Consolidation			

Appendix 2 – Key Models and Approaches Used

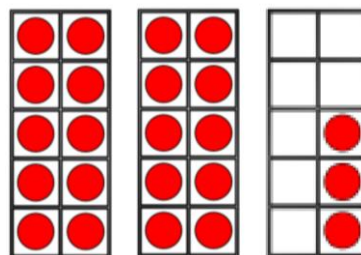
These are some of the key models and approaches used in the teaching of maths

Part – Part – Whole Diagrams



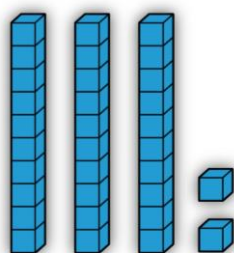
This model helps children understand the links and relationships between a whole number and its component parts. It helps them to interpret, visualise and solve a range of problems.

Tens frames



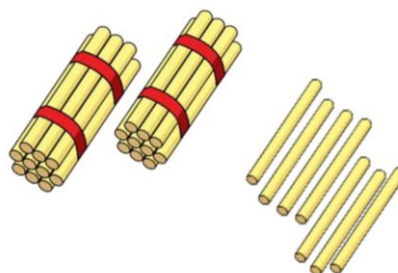
Ten frames may be used during number recognition, number bonds, addition and subtraction, place value and counting activities. They help the children to know that if filled, each frame is worth ten.

Dienes Cubes (Base Ten)



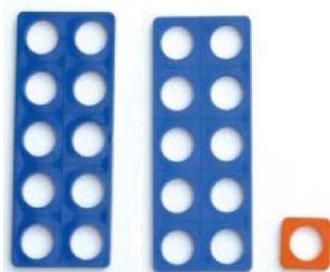
Dienes cubes is apparatus used for a range of activities. It helps with addition, subtraction and place value in particular. It is especially useful when adding or subtracting bridging 10 and exchanging tens for ones is required.

Lolly Sticks



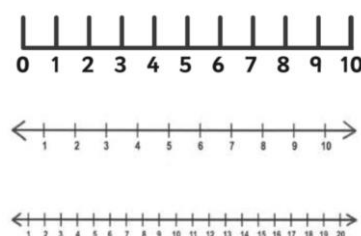
Lolly sticks or straws are used singly or in bunches of ten to help with addition and subtraction and for place value.

Numicon



The aim of Numicon is to make numbers real for children through them being able to see and touch them. It provides a concrete object to represent each number.

Number lines



Number lines are used as a visual aid during activities such as: number recognition, number ordering, counting on or back, finding one more or one less and adding and subtracting.

Bar Model



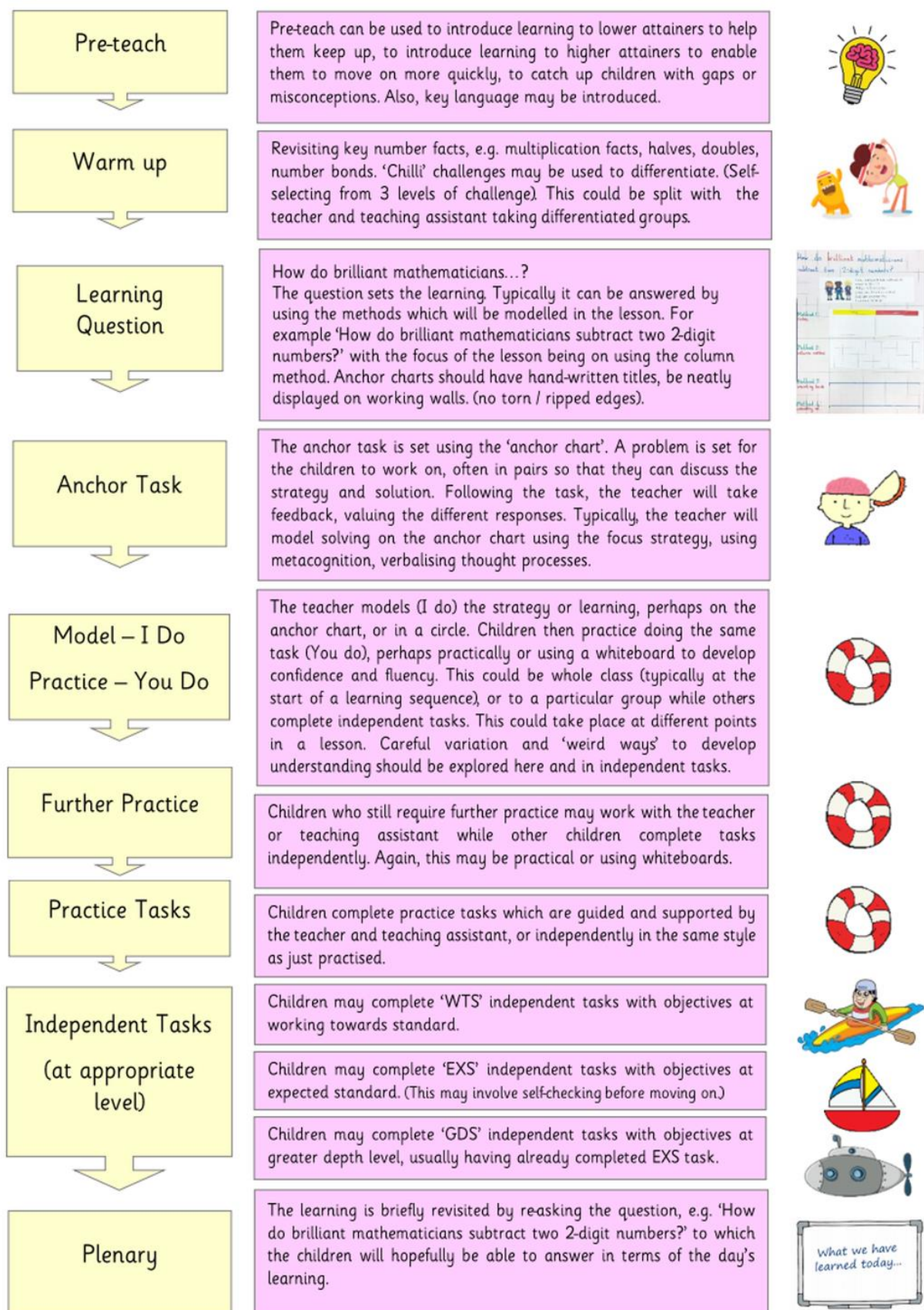
Bar models are a visual representation of a problem or idea that can be used for any of the four operations. In a word problem, bar models help children with how to visualise a problem.

Hundred Square

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Hundred squares are used for counting, ordering, addition, subtraction, multiplication and division skills. They can help children to discover number patterns and build maths confidence.

Mathematics Instructional Programme



How do brilliant mathematicians recognise non-unit fractions?

What fraction has been shaded?



$\frac{3}{4}$ $\frac{3}{4}$ $\frac{3}{4}$






$\frac{2}{3}$ $\frac{2}{5}$ $\frac{5}{6}$ $\frac{3}{8}$

✓ ✓ ✓ ✓

How do brilliant mathematicians add 2-digit numbers (using the column method)?

How would you solve these?

$26 + 33 = 59$

tens	ones
2	6
3	3
5	9

$26 + 34$

tens	ones
2	6
3	4
6	0
1	

How do "brilliant" mathematicians divide by sharing?

8 dots = 8

share the dots!

$20 \div 5 = 4$

'shared by'

Share the books in 5 bookbags




EYFS Maths Progression					
	Baseline	October Half Term	End of Autumn Term	End of Spring Half Term	End of Year
Number	<i>'Reception Baseline Assessment Sheet' to be completed for all children-Prime areas only</i>	- Counts objects to 5 with accurate 1:1 correspondence - Beginning to count beyond 10 - Can compare objects and amounts using the language of 'same', 'pair', 'match', 'more' and 'fewer'	- Beginning to count up to 20 - Counts objects to 10 with accurate 1:1 correspondence and cardinality - Says the number that is one more or one less than a given number (up to 5) - Selects the correct numeral to represent 1 to 5 objects - Children can write numbers to 5 - Can order numbers to 5 - Can combine two sets to find a total (up to 3) - Can take some objects away to find an amount (up to 3)	- Can count forwards to 20 accurately - Subitise up to at least 3 - Counts objects up to 20 with accurate 1:1 correspondence and cardinality - Says the number that is one more or one less than a given number (up to 10) - Selects the correct numeral to represent 1 to 10 objects - Children can write numbers to 10 - Can order numbers to 10 - Can combine two sets to find a total (up to 10) - Can take some objects away to find an amount (up to 5) - In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting	- Can count beyond 20 forwards and backwards - Count in multiples of 2 to 10 & 10 to 100. - Can count more than 20 objects - Say the number that is one more than a given number or one less within the range 1-20. - Children are beginning to read and write numbers to 20 - Can order numbers to 20 - Beginning to combine two sets to find a total (up to 20) - Can take some objects away to find an amount (up to 10) - In practical activities and discussion, can use some mathematical vocabulary e.g. more / less / equals/total/altogether
		<i>White Rose</i> Match and sort Compare amounts	<i>White Rose</i> Representing 1,2,3 Comparing 1,2,3 Composition of 1,2,3 Representing numbers to 5 One more and less	<i>White Rose</i> Addition and Subtraction (99s to 5) • Introducing zero • Number bonds to 5 Number and place value • Counting to 6,7,8 • Counting to 9 and 10 • Comparing groups up to 10 Addition and Subtraction (addition to 10) • Combining two groups to make a whole • Number bonds to 10-ten frame Number bonds to 10-part-whole model	<i>White Rose</i> Addition and subtraction (count on and back) • Adding by counting on • Take away by counting back Number and place value (99s to 20) • Counting to 20 Multiplication and division (numerical patterns) • Doubling • Halving and sharing • Odds and evens Maths ELGs 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.

EYFS Maths Progression					
	Baseline	October Half Term	End of Autumn Term	End of Spring Half Term	End of Year
Shape, Space and Measure	<i>'Reception Baseline Assessment Sheet' to be completed for all children-Prime areas only</i>	- Can create a simple repeating pattern e.g. stick, leaf, stick, leaf. - Talk about and identifies the patterns around them. - Notice and correct an error in a repeating pattern. - Uses a range of vocabulary to describe the size, mass and capacity of objects e.g. big/small, bigger/smaller, biggest/smallest, most / least	- Begin to describe a sequence of events using words such as 'first', 'then...' - Understand position through words alone e.g. using words like 'in front of' and 'behind'. - Make comparisons between objects relating to size, length, weight and capacity e.g. longest / tallest / shortest / heaviest / lightest - Uses an increasing range of language to describe shapes e.g. straight, round, pointy	- Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: 'sides', 'corners', 'straight', 'flat', 'round'. - Select shapes appropriately: flat surfaces for building, a triangular prism for a roof etc. Combine shapes to make new ones - an arch, a bigger triangle etc. - Can recognise and talk about the patterns they observe - From a selection of objects, identify and compare the longest / shortest, tallest/shortest, heaviest/lightest - Can use a widening vocabulary to describe their relative position such as 'in front of', 'opposite', 'on top of' and 'under' - Can use a range of vocabulary related to time to sequence the school day.	- Compare and order three items by length, height, weight and distance - Identify containers holding different amounts of liquids, using language such as 'full', 'half full', 'empty' and 'overflowing' - To use mathematical language to describe 3D shapes - Select, rotate and manipulate shapes in order to develop spatial reasoning skills. - Children can use language of o'clock, now, after, before, next, tomorrow, yesterday - Continue, copy and create repeating patterns.
		<i>White Rose</i> • Compare size, mass, capacity • Exploring pattern	<i>White Rose</i> • Circle and triangles • Positional language • Shapes with 4 sides • Time	<i>White Rose</i> • Spatial awareness • 3D shapes • 2D shapes	<i>White Rose</i> • Length, height and distance • Weight • Capacity

Year One Maths Progression

Baseline	October Half Term	End of Autumn Term	End of Spring Half Term	End of Year
- Can count beyond 20 forwards and backwards - Can order numbers to 20 - Can count more than 20 objects - Children can read and write numbers to 20 - Count up to 20 objects - Count in multiples of 2 to 10 & 10 to 100. - Say the number that is one more than a given number or one less within the range 1-20. - Use practical and pictorial representations to solve addition and subtraction number sentences up to 20 - To understand and solve addition and subtraction number sentences without bridging 10 - Can use some mathematical vocabulary e.g. more / less / equals/total/altogether - Recognise and find $\frac{1}{2}$ of an object <i>ELG</i> Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems including doubling, halving and sharing	- Read and write numbers to at least 20 - Order numbers within known range - Count beyond 20, forwards or backwards, beginning at 0 or 1 - Solve addition and subtraction facts using numbers up to 20 with increasing accuracy. - Know number bonds to 5 and related subtraction facts.	- Read and write numbers past 20 - Beginning to count to 100, forwards or backwards, beginning at 0 or 1 - Count in multiples of 10s to 100 forwards and backwards. - Know number bonds to 10 and related subtraction facts. - Solve addition and subtraction problems using practical or pictorial representations - In tens numbers understand that these are made up of a 10 and 1s. - Children place given numbers on a number line	- Read and write numbers to 100 - Children secure in using part-whole to represent addition and subtraction - Identify which digit is the tens and the ones. - Continue to learn to count to 100 and beyond, forwards or backwards, beginning at 0 or 1 - Count in multiples of 2 to at least 24, and 10 to 100 and back to 0s. - Use a number line or pictorial representations to solve addition and subtraction number sentences past 20. - Identify one more or one less than a given number - Find half a shape - Begin to know number bonds to 20 and related subtraction facts. - Use the language of measure to solve problems - Can recognize value of coins and notes - Children can compare and order numbers within a known range. - Children can draw own number line and place given numbers on it	Number and Place Value - Can fluently count to across 100, forwards or backwards, beginning with 0 or 1, or from any given number - Counts read and write numbers up to 100 - Count in multiples of 2s 5s and 10s to 100 - Identifies 1 more and 1 less than a number <i>Find numbers on a number line when solving problems with questions using equal to, more than, less than, most and least</i> - Can order numbers to 100 - Partition 2-digit numbers into tens and ones. Addition and Subtraction - Represents and uses number bonds and related subtraction facts within 20 - Add and subtract 1d and 2d numbers up to 20, including zero - Solve one step problems that involve addition and subtraction, including missing number problems, using concrete objects and pictorial representations Fractions - Recognises, finds and names half as one of two equal parts of an object, shape or quantity Measurement - Compares, describes and solves practical problems for lengths and heights, mass, weight, capacity and time - Tells time to the hour and half past the hour and draw hands on a clock to show these - Sequence events in chronological order using e.g., before & after, next, first, today, yesterday, tomorrow, morning, afternoon & evening. Shape - Recognise & name common 2-D & 3-D shapes

Year Two Maths Progression

Baseline	October Half Term	End of Autumn Term	End of Spring Half Term	End of Year
Number and Place Value - Can fluently count to across 100, forwards or backwards, beginning with 0 or 1, or from any given number - Counts read and write numbers up to 100 - Count in multiples of 2s 5s and 10s to 100 - Identifies 1 more and 1 less than a number <i>Find numbers on a number line when solving problems with questions using equal to, more than, less than, most and least</i> - Can order numbers to 100 - Partition 2-digit numbers into tens and ones. Addition and Subtraction - Represents and uses number bonds and related subtraction facts within 20 - Add and subtract 1d and 2d numbers up to 20, including zero - Solve one step problems that involve addition and subtraction, including missing number problems, using concrete objects and pictorial representations Fractions - Recognises, finds and names half as one of two equal parts of an object, shape or quantity Measurement - Compares, describes and solves practical problems for lengths and heights, mass, weight, capacity and time - Tells time to the hour and half past the hour and draw hands on a clock to show these - Sequence events in chronological order using e.g., before & after, next, first, today, yesterday, tomorrow, morning, afternoon & evening. Shape - Recognise & name common 2-D & 3-D shapes		- Can demonstrate an understanding of place value - Can partition 2-digit numbers using structural resources - Can read and write numbers correctly up to 100 (e.g. can write numbers 14 and 41 correctly) - Can count in 2s, 5s, 10s from 0 and use counting strategies to solve problems - Can use number bonds and related subtraction facts within 10 (e.g. $8=9-1$, $7=5+2$) - Can add and subtract a 2-digit number and ones, a 2-digit number and tens, and two 2-digit numbers where no regrouping is required - Can identify all coins and notes and solve addition and subtraction problems using them - Can use coins to make totals	- Can solve problems involving more than one step - Have developed reasoning skills to explain their answers - Can recall and use multiplication and division facts for the 2, 5 and 10 x tables to solve simple problems (e.g. knowing they can make 3 groups of 10 from 30, writing as $30 \div 10 = 3$, stating the total value of six 5p coins) - Can demonstrate an understanding of commutativity (involving x) - Can solve multiplication and division calculations using concrete apparatus or pictorial representations - Can use number bonds and related facts within 20 - Can identify $\frac{1}{4}$, $\frac{1}{2}$, $\frac{2}{4}$ and know that all parts must be equal parts of the whole - Can recall doubles and halves to 20 - Can recognise and name common 2D and 3D shapes - Can describe some properties of 2D and 3D shapes	Number and Place Value - partition any two-digit number into different combinations of tens and ones, explaining their thinking verbally, in pictures or using apparatus Addition and Subtraction - add and subtract any 2 two-digit numbers using an efficient strategy, explaining their method verbally, in pictures or using apparatus (e.g. $48 + 35$; $72 - 17$) - recall all number bonds to and within 10 and use these to reason with and calculate bonds to and within 20, recognising other associated additive relationships (e.g. If $7 + 3 = 10$, then $17 + 3 = 20$; if $7 - 3 = 4$, then $17 - 3 = 14$; leading to if $14 + 3 = 17$, then $3 + 14 = 17$, $17 - 14 = 3$ and $17 - 3 = 14$) Multiplication and Division - recall multiplication and division facts for 2, 5 and 10 and use them to solve simple problems, demonstrating an understanding of commutativity as necessary Fractions - identify $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{4}$, $\frac{3}{4}$, of a number or shape, and know that all parts must be equal parts of the whole Measurement - read the time on a clock to the nearest 15 minutes - use different coins to make the same amount Geometry - Shape - name and describe properties of 2-D and 3-D shapes, including number of sides, vertices, edges, faces and lines of symmetry. Statistics - read scales in divisions of ones, twos, fives and tens