Mathematics

at Liscard Primary School

Dream Believe Achieve
Liscard Primary School

Mathematics

Intent

At Liscard Primary School, we aim to provide a curriculum that caters for the needs of all individuals and prepares them with the necessary skills and knowledge to become independent and confident lifelong learners. Relevant research is considered and used to inform planning and adapt pedagogy. We focus on fluency, reasoning and problem solving through varied and high quality activities. A range of mathematical resources are used in lessons and children are encouraged to use concrete, pictorial and abstract methods to support their learning. We develop fluency for all pupils with number skills through varied and frequent practice so that children develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. We aim for children to develop reasoning skills, make generalisations and justify an argument using mathematical language.

All children, from EYFS to Year 6, are expected to make progress closing gaps highlighted in baseline assessments on entry. Within our maths curriculum all will have opportunities to identify patterns and make connections with other subjects and real life situations. Due to the application of skills with financial education we have gained the Young Money award becoming a recognized Centre of Excellence. Oracy is a powerful tool for learning and we intend to create a language rich environment with maths vocabulary used effectively by both staff and children. We aim to develop resilience and embrace challenge through highly engaging activities. Our curriculum considers how children learn as well as what they learn.

Implementation

Every class from EYFS to Y6 follows the White Rose scheme of learning. Resources are supplemented from the Tara Loughlin Toolkit, NRICH and NCETM to ensure a range of activities are used to challenge and deepen understanding. The agreed maths lesson structure from Y1 to Y6 ensures children have daily practice to ensure fluency is developed and maintained. Keeping Skills activities are used daily to support consolidation and pre-teaching ensuring children are confident with skills required for their next learning steps.

Throughout lessons we continuously monitor progress with formative assessment which is used to inform our teaching. Staff offer a flexible curriculum with lessons adapted according to assessment for learning. Summative assessments are completed with their results informing the update of our summative tracker and are discussed at regular pupil progress meetings to ensure the provision is correct for all children.

Throughout school online maths tools are utilised such as Numbots, Number Gym, Busy Things, Times Tables Rock Star, Sumdog and Learning by Questions. Children are encouraged to continue learning beyond the classroom at home for consolidation and practice.

Staff training is ongoing with Maths Consultant Tara Loughlin and Cheshire and Wirral Maths Hub ensuring that we share practice with others and attend regional updates. This is then cascaded to staff at staff meetings and targeted workshops from the Maths Subject Team.

Impact

Through discussion and feedback children talk enthusiastically about their maths lessons and their love of maths. They are confident in their ability and believe in themselves as mathematicians. They understand why maths is used in the outside world and the part it will play in their future. Most children demonstrate rapid recall of facts and procedures using what they know to recognize relationships and connections when exploring new concepts. Children use mathematical vocabulary during lessons and journaling demonstrates they are able to use a variety of methods independently, showing resilience when tackling challenging problems.

Some children are able to demonstrate they have mastered mathematical skills as they can confidently use mathematical language to explain and justify their ideas and apply the concept to new problems and in a variety of unfamiliar situations.

As children leave their Primary education we expect all children to achieve Age Related Expectations (ARE) with some children achieving greater depth (GD). Some SEND children, even with extra support and intervention, may not achieve ARE but will achieve to their full potential demonstrating appropriate progress.

DEVELOPMENT MATTERS		
Birth to Three	Three and Four-Year-Olds	Children in Reception

Number/ Numerical Patterns:
- Combines objects like stacking blocks and cups. Puts objects inside others and takes them out again.
- Takes part in finger rhymes with numbers.
- Reacts to changes of amounts in a group of up to three items.
- Compares amounts saying 'lots', 'more' or 'same'.
- Displays counting- like behaviour, such as making sounds, pointing or saying some numbers in sequence.
- Counts in every day contexts, sometimes skipping numbers; 1-2-3-5.
- Climbs and squeezes him/ herself in to different types of spaces.
- Builds with a range of resources.
- Completes inset puzzles.
- Is able to compare sizes, weights etc. Using gesture and language such as bigger/ little/ smaller.
- Notices patterns and arranges things in patterns.

Number:
- Displays fast recognition of up to 3 objects, without having to count them individually (subitising).
- Recites numbers to 5.
- Can say one number for each item in order- 1,2,3,4,5.
- Knows that the last number reached when counting a small set of objects tells you how many there are in total (cardinal principle)
- Can show finger numbers up to 5.
- Can link numerals and amounts e.g. showing the right number of objects to match the numeral, up to 5.
- Is experimenting with their own symbols and marks as well as numerals.
- Is able to solve real world mathematical problems with numbers up to 5.
- Can compare quantities using language such as more than, fewer than.

Numerical Patterns:
- Can talk about and explore 2D and 3D shapes (e.g. circles, triangles, rectangles and cuboids) using informal and mathematical language, sides, corners, straights, flat, round.
- Understands position through words alone, e.g. ' The bag is under the table' with no pointing.
- Can describe a familiar route.
- Is able to discuss routes and locations, using words like 'in front of' and 'behind'.
- Can make comparisons between objects relating to size, length, weight and capacity.
- Select shapes appropriately, flat surfaces for building, a triangular prism for a roof.
- Combines shapes to make new ones; an arch, a bigger triangle etc.
- Talks about and identifies patterns around him/ her e.g. stripes on clothes, designs on rugs and wallpaper. Uses informal language like 'spotty' 'pointy'.
- Is able to extend and create ABAB patterns e.g. leaf, stick, leaf, stick.
- Notice and corrects an error in a repeating pattern.
- Is beginning to describe a sequence of events, real or fictional, using words such as 'first', 'then'.

Number:
- Counts objects and actions.
- Is able to subitise (recognise how many objects there are in a small group without counting)
- Is able to link the number symbol (numeral) with its cardinal number value.
- Can count beyond 10
- Is able to compare numbers.
- Understands the 'one more/ one less than' relationship between consecutive numbers.
- Is able to explore the composition of numbers to 10.
- Automatically recalls number bonds 0-5 amd some to 10.

Numerical Patterns:
- Can select, rotate and manipulate shapes in order to develop spatial reasoning skills.
- Investigates composing and decomposing shapes and recognises a shape could have other shapes within it, just as numbers can.
- Is able to continue copy and create repeating patterns.
- Can compare length, weight and capacity.

Early Learning Goals

Number:
- Automatically recalls (without reference to rhymes, counting or other aids) number bonds to 5 (including subtraction facts) and some number bonds to 10, including double facts.
- Has a deep understanding of number to 10, including the composition of each number.
- Is able to subitise (recognise quantities without counting) up to 5.

Numerical Patterns:

- Can compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
- Is able to explore and represent patterns within numbers to 10, including evens and odds, double facts and how quantities can be distributed evenly.
- Verbally counts beyond 20, recognising the pattern of the counting system.

Key Stage 1

- The principal focus of mathematics teaching in **key stage 1** is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools]. At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

- By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Key Stage 2

- The principal focus of mathematics teaching in **lower key stage 2** is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number. By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work. Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

- The principal focus of mathematics teaching in **upper key stage 2** is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages. Pupils should read, spell and pronounce mathematical vocabulary correctly.

Mathematics: Number - Number and Place Value

Pre 3	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Demonstrate an understanding of the concept of transaction (e.g. by exchanging a coin for an item, or one item for another, during a role-play activity). (Mathematics: Number - Number and Place Value)	Say the number names to 5 in the correct order (e.g. in a song or by joining in with the teacher). (Mathematics: Number - Number and Place Value)	Identify how many objects there are in a group of up to 10 objects, recognising smaller groups on sight and counting the objects in larger groups up to 10. (Mathematics: Number - Number and Place Value)	Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number. (Number and Place Value) 1	Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward. (Number and Place Value) 2	Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number. (Number and Place Value) 3	Count in multiples of 6, 7, 9, 25 and 1000. (Number and Place Value) 4	Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit e.g. what is the value of the '7' in 276,541? Find the difference between the largest and smallest whole numbers that can be made from using three digits. (Number and Place Value) 5	Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit. (Number and Place Value) 6
Distinguish between 'one' and 'lots', when shown an example of a single object and a group of objects. (Mathematics: Number - Number and Place Value)	Demonstrate an understanding of the concept of numbers up to 5 by putting together the right number of objects when asked. (Mathematics: Number - Number and Place Value)	Demonstrate an understanding that the last number counted represents the total number of the count. (Mathematics: Number - Number and Place Value)	Count and read numbers to 100 in numerals. (Number and Place Value) 1	Recognise the place value of each digit in a two-digit number (tens, ones). (Number and Place Value) 2	Recognise the place value of each digit in a three-digit number (hundreds, tens, ones). (Number and Place Value) 3	Find 1000 more or less than a given number. (Number and Place Value) 4	Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000. (Number and Place Value) 5	Round any whole number to a required degree of accuracy. (Number and Place Value) 6
Demonstrate an understanding of the concept of 1:1 correspondence (e.g. giving one cup to each pupil). (Mathematics: Number - Number and Place Value)		Represent numbers in numerals from 0 to 9. (Mathematics: Number - Number and Place Value)	Count and write numbers to 100 in numerals. (Number and Place Value) 1	Identify, represent and estimate numbers using different representations, including the number line. (Number and Place Value) 2	Compare and order numbers up to 1000. (Number and Place Value) 3	Count backwards through zero to include negative numbers. (Number and Place Value) 4	Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero. (Number and Place Value) 5	Use negative numbers in context, and calculate intervals across zero. (Number and Place Value) 6
		Count to 20, demonstrating that the next number in the count is one more and the previous number is one less. (Mathematics: Number - Number and Place Value)	Count in multiples of twos, fives and tens from 0. (Number and Place Value) 1	Compare and order numbers from 0 up to 100; use <, > and = signs. (Number and Place Value) 2	Identify, represent and estimate numbers using different representations. (Number and Place Value) 3	Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones). (Number and Place Value) 4	Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000. (Number and Place Value) 5	Solve number and practical problems that involve ordering and comparing numbers to 10 000 000, rounding to a required degree of accuracy, using negative numbers and calculating intervals across zero. (Number and Place Value) 6
		Use real-life materials (e.g. apples or crayons) to add and subtract 1 from a group of objects and indicate how many are now present. (Mathematics: Number - Addition and Subtraction)	Identify one more and one less of a given number. (Number and Place Value) 1	Read and write numbers to at least 100 in numerals. (Number and Place Value) 2	Read and write numbers up to 1000 in numerals. (Number and Place Value) 3	Order and compare numbers beyond 1000. (Number and Place Value) 4	Solve number problems and practical problems that involve ordering and comparing numbers to 1 000 000, counting forwards or backwards in steps, interpreting negative numbers and rounding. (Number and Place Value) 5	Demonstrate an understanding of place value including decimals e.g. 28.13 = 28 + ? + 0.03. (Number and Place Value) 6
			Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least. (Number and Place Value) 1	Read and write numbers to at least 100 in words. (Number and Place Value) 2	Read and write numbers up to 1000 in words. (Number and Place Value) 3	Identify, represent and estimate numbers using different representations including measures. (Number and Place Value) 4	Read Roman numerals to 1000 (M) and recognise years written in Roman numerals. (Number and Place Value) 5	
			Read and write numbers from 1 to 20 in numerals. (Number and Place Value) 1	Use place value and number facts to solve problems. (Number and Place Value) 2	Solve number problems and practical problems involving these ideas. (Number and Place Value) 3	Round any number to the nearest 10, 100 or 1000. (Number and Place Value) 4		
			Read and write numbers from 1 to 20 in words. (Number and Place Value) 1	Partition two-digit numbers into different combinations of tens and ones using apparatus if needed e.g. 23 is the same as 2 tens and 3 ones which is the same as 1 ten and 13 ones. (Number and Place Value) 2		Solve number and practical problems that involve all of the above and with increasingly large positive numbers. (Number and Place Value) 4		
			Count in twos, fives and tens to solve problems e.g. count the number of chairs in a diagram when the chairs are organised in 7 rows of 5 by counting in fives. (Number and Place Value) 1	Use reasoning about numbers and relationships to solve more complex problems and explain his/her thinking e.g. 29 + 17 = 15 + 4 + ?; 'Together Jack and Sam have £14. Jack has £2 more than Sam. How much money does Sam have?' etc. (Number and Place Value) 2		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. (Number and Place Value) 4		
			Partition and combine numbers using apparatus if required e.g. partition 76 into tens and ones; combine 6 tens and 4 ones. (Number and Place Value) 1	Recall the multiples of 10 below and above any given 2 digit number e.g. say that for 67 the multiples are 60 and 70. (Number and Place Value) 2				

Mathematics: Number - Addition and Subtraction						
Reception	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Demonstrate an understanding that the total number of objects changes when objects are added or taken away. (Mathematics: Number - Addition and Subtraction)	Read and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs. (Addition and Subtraction) 1	Solve problems with addition and subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures. (Addition and Subtraction) 2	Add and subtract numbers mentally, including a three-digit number and ones. (Addition and Subtraction) 3	Add numbers with up to four digits using the formal method of columnar addition. (Addition and Subtraction) 4	Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction). (Addition and Subtraction) 5	Perform mental calculations with mixed operations to carry out calculations involving the four operations. (Addition and Subtraction) 6
Demonstrate an understanding that the number of objects remains the same when they are rearranged, providing nothing has been added or taken away. (Mathematics: Number - Addition and Subtraction)	Write mathematical statements involving addition (+), subtraction (-) and equals (=) signs. (Addition and Subtraction) 1	Solve problems with addition and subtraction applying his/her increasing knowledge of written methods and mental methods where regrouping may be required. (Addition and Subtraction) 2	Add numbers with up to three digits using the formal method of columnar addition. (Addition and Subtraction) 3	Estimate and use inverse operations to check answers to a calculation. (Addition and Subtraction) 4	Add and subtract numbers mentally with increasingly large numbers. (Addition and Subtraction) 5	Solve multi-step problems in contexts, deciding which operations and methods to use and why e.g. find the change from £20 for three items that cost £1.24, £7.92 and £2.55; a roll of material is 6m long: how much is left when 5 pieces of 1.15m are cut from the roll?; a bottle of drink is 1.5 litres, how many cups of 175ml can be filled from the bottle, and how much drink is left?. (Addition and Subtraction) 6
Solve number problems involving the addition and subtraction of single-digit numbers up to 10. (Mathematics: Number - Addition and Subtraction)	Demonstrate an understanding of the commutative law (e.g. 3 + 2 = 5, therefore 2 + 3 = 5). (Addition and Subtraction) 1	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). (Addition and Subtraction) 2	Add and subtract numbers mentally, including a three-digit number and tens. (Addition and Subtraction) 3	Subtract numbers with up to four digits using the formal method of columnar subtraction. (Addition and Subtraction) 4	Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy. (Addition and Subtraction) 5	Solve problems involving addition and subtraction. (Addition and Subtraction) 6
Demonstrate an understanding of the composition of numbers to 5 and a developing ability to recall number bonds to and within 5 (e.g. 2 + 2 = 4 and 3 + 1 = 4). (Mathematics: Number - Addition and Subtraction)	Demonstrate an understanding of inverse relationships involving addition and subtraction (e.g. if 3 + 2 = 5, then 5 - 2 = 3). (Addition and Subtraction) 1	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100. (Addition and Subtraction) 2	Subtract numbers with up to three digits using the formal method of columnar subtraction. (Addition and Subtraction) 3	Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why. (Addition and Subtraction) 4	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. (Addition and Subtraction) 5	Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. (Addition and Subtraction) 6
	Recall at least four of the six number bonds for 10 and reason about associated facts (e.g. 6 + 4 = 10 , therefore 4 + 6 = 10 and 10 - 6 = 4). (Addition and Subtraction) 1	Add and subtract numbers where no regrouping is required, using concrete objects, pictorial representations, and mentally, including a two-digit number and ones. (Addition and Subtraction) 2	Add and subtract numbers mentally, including a three-digit number and hundreds. (Addition and Subtraction) 3			
	Represent and use number bonds within 20. (Addition and Subtraction) 1	Add and subtract numbers using concrete objects, pictorial representations, and mentally, including a two-digit number and tens. (Addition and Subtraction) 2	Estimate the answer to a calculation and use inverse operations to check answers. (Addition and Subtraction) 3			
	Represent and use subtraction facts within 20. (Addition and Subtraction) 1	Add and subtract numbers using concrete objects, pictorial representations, and mentally, including two two-digit numbers. (Addition and Subtraction) 2	Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction. (Addition and Subtraction) 3			
	Add one-digit and two-digit numbers to 20, including zero. (Addition and Subtraction) 1	Add and subtract numbers using concrete objects, pictorial representations, and mentally, including adding three one-digit numbers. (Addition and Subtraction) 2				
	Subtract one-digit and two-digit numbers to 20, including zero. (Addition and Subtraction) 1	Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot. (Addition and Subtraction) 2				
	Solve one-step problems that involve addition, subtraction and missing numbers using concrete objects and pictorial representations. (Addition and Subtraction) 1	Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. (Addition and Subtraction) 2				
		Recall doubles and halves to 20 e.g. knowing that double 2 is 4, double 5 is 10 and half of 18 is 9. (Addition and Subtraction) 2				
		Use estimation to check that his/her answers to a calculation are reasonable e.g. knowing that 48 + 35 will be less than 100. (Addition and Subtraction) 2				
		Solve missing number problems using addition and subtraction. (Addition and Subtraction) 2				

Mathematics: Number - Multiplication and Division					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. (Multiplication and Division) 1	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers. (Multiplication and Division) 2	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. (Multiplication and Division) 3	Recall multiplication and division facts for multiplication tables up to 12 × 12. (Multiplication and Division) 4	Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. (Multiplication and Division) 5	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. (Multiplication and Division) 6
Solve one-step problems involving division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. (Multiplication and Division) 1	Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs. (Multiplication and Division) 2	Write and calculate mathematical statements for multiplication and division using the multiplication tables that he/she knows, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods. (Multiplication and Division) 3	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. (Multiplication and Division) 4	Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. (Multiplication and Division) 5	Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. (Multiplication and Division) 6
	Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. (Multiplication and Division) 2	Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects. (Multiplication and Division) 3	Recognise and use factor pairs and commutativity in mental calculations. (Multiplication and Division) 4	Establish whether a number up to 100 is prime and recall prime numbers up to 19. (Multiplication and Division) 5	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. (Multiplication and Division) 6
	Solve problems involving multiplication and division, using concrete materials and mental methods. (Multiplication and Division) 2		Multiply two-digit and three-digit numbers by a one-digit number using formal written layout. (Multiplication and Division) 4	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. (Multiplication and Division) 5	Perform mental calculations, including with mixed operations and large numbers. (Multiplication and Division) 6
	Solve problems involving multiplication and division, using arrays, repeated addition and multiplication and division facts, including problems in contexts e.g. knowing that 2 × 7 = 14 and 2 × 8 = 16, explains that making pairs of socks from 15 identical socks will give 7 pairs and one sock will be left. (Multiplication and Division) 2		Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects. (Multiplication and Division) 4	Multiply and divide numbers mentally drawing upon known facts. (Multiplication and Division) 5	Identify common factors, common multiples and prime numbers. (Multiplication and Division) 6
	Use multiplication and division facts for 2, 5 and 10 to make deductions outside known multiplication facts e.g. know that multiples of 5 have one digit of 0 or 5 and use this to reason that 18 × 5 cannot be 92 as it is not a multiple of 5. (Multiplication and Division) 2			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. (Multiplication and Division) 5	Use his/her knowledge of the order of operations to carry out calculations involving the four operations. (Multiplication and Division) 6
	Solve word problems involving multiplication and division with more than one step e.g. which has the most biscuits, 4 packets of biscuits with 5 in each packet or 3 packets of biscuits with 10 in each packet. (Multiplication and Division) 2			Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000. (Multiplication and Division) 5	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. (Multiplication and Division) 6
	Recognise the relationships between addition and subtraction and rewrite addition statements as simplified multiplication statements e.g. 10 + 10 + 10 + 5 + 5 = 3 × 10 + 2 × 5 = 4 × 10. (Multiplication and Division) 2			Recognise and use square numbers and the notation for squared (2). (Multiplication and Division) 5	Solve problems involving addition, subtraction, multiplication and division. (Multiplication and Division) 6
				Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes. (Multiplication and Division) 5	Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. (Multiplication and Division) 6
				Recognise and use cube numbers and the notation for cubed (3). (Multiplication and Division) 5	
				Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign. (Multiplication and Division) 5	
				Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates. (Multiplication and Division) 5	

Mathematics: Number - Fractions					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Recognise, find and name a half as one of two equal parts of an object, shape or quantity. (Fractions) 1	Recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity and demonstrate understanding that all parts must be equal parts of the whole. (Fractions) 2	Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10. (Fractions) 3	Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number. (Fractions) 4	Compare and order fractions whose denominators are all multiples of the same number. (Fractions) 5	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. (Fractions) 6
Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity. (Fractions) 1	Write simple fractions for example, 1/2 of 6 = 3 and recognise the equivalence of 2/4 and 1/2. (Fractions) 2	Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators. (Fractions) 3	Add and subtract fractions with the same denominator. (Fractions) 4	Identify and name equivalent fractions of a given fraction, represented visually, including tenths and hundredths. (Fractions) 5	Compare and order fractions, including fractions > 1. (Fractions) 6
		Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators. (Fractions) 3	Recognise and write decimal equivalents of any number of tenths or hundredths. (Fractions) 4	Write equivalent fractions of a given fraction, represented visually, including tenths and hundredths. (Fractions) 5	Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. (Fractions) 6
		Recognise and show, using diagrams, equivalent fractions with small denominators. (Fractions) 3	Recognise and write decimal equivalents to 1/4, 1/2, 3/4. (Fractions) 4	Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number e.g. 2/5 + 4/5 = 6/5 = 1 1/5. (Fractions) 5	Multiply simple pairs of proper fractions, writing the answer in its simplest form e.g. 1/4 × 1/2 = 1/8. (Fractions) 6
		Add fractions with the same denominator within one whole e.g. 5/7 + 1/7 = 6/7. (Fractions) 3	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. (Fractions) 4	Add and subtract fractions with the same denominator and denominators that are multiples of the same number. (Fractions) 5	Divide proper fractions by whole numbers e.g. 1/3 ÷ 2 = 1/6. (Fractions) 6
		Subtract fractions with the same denominator within one whole e.g. 6/7 - 1/7 = 5/7. (Fractions) 3	Round decimals with one decimal place to the nearest whole number. (Fractions) 4	Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. (Fractions) 5	Associate a fraction with division and calculate decimal fraction equivalents e.g. know that 7 divided by 21 is the same as 7/21 and that this is equal to 1/3 and e.g. 0.375 is equivalent to 3/8. (Fractions) 6
		Compare and order unit fractions, and fractions with the same denominators. (Fractions) 3	Compare numbers with the same number of decimal places up to two decimal places. (Fractions) 4	Read and write decimal numbers as fractions e.g. 0.71 = 71/100, 8.09 = 8 + 9/?. (Fractions) 5	Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places. (Fractions) 6
		Solve fraction problems. (Fractions) 3	Solve simple measure and money problems involving fractions and decimals to two decimal places. (Fractions) 4	Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. (Fractions)	Multiply one-digit numbers with up to two decimal places by whole numbers. (Fractions) 6
		Record 1/10 as 0.1, 3/10 as 0.3 etc. (Fractions) 3		Round decimals with two decimal places to the nearest whole number and to one decimal place. (Fractions) 5	Use written division methods in cases where the answer has up to two decimal places. (Fractions) 6
				Read, write, order and compare numbers with up to three decimal places. (Fractions) 5	Solve problems which require answers to be rounded to specified degrees of accuracy. (Fractions) 6
				Solve problems involving number up to three decimal places. (Fractions) 5	Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts e.g. one piece of cake that has been cut into 5 equal slices can be expressed as 1/5 or 0.2 or 20% of the whole cake. (Fractions) 6
				Recognise the percent symbol (%) and understand that percent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal. (Fractions) 5	
				Solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25. (Fractions) 5	

	Mathematics: Measures				
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Compare, describe and solve practical problems for lengths and heights e.g. long/short, longer/shorter, tall/short, double/half. (Measurement) 1	Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels. (Measurement) 2	Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml). (Measurement) 3	Convert between different units of measure e.g. kilometre to metre; hour to minute. (Measurement) 4	Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre). (Measurement) 5	Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate. (Measurement)
Compare, describe and solve practical problems for mass/weight e.g. heavy/light, heavier than, lighter than. (Measurement) 1	Compare and order lengths, mass, volume/capacity and record the results using >, < and =. (Measurement) 2	Measure the perimeter of simple 2-D shapes. (Measurement) 3	Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres. (Measurement) 4	Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints. (Measurement) 5	Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places. (Measurement) 6
	Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value. (Measurement) 2	Add and subtract amounts of money to give change, using both £ and p in practical contexts. (Measurement) 3	Find the area of rectilinear shapes by counting squares. (Measurement) 4	Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres. (Measurement) 5	Convert between miles and kilometres. (Measurement) 6
Compare, describe and solve practical problems for capacity and volume e.g. full/empty, more than, less than, half, half full, quarter. (Measurement) 1	Find different combinations of coins that equal the same amounts of money. (Measurement) 2	Tell the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks. (Measurement)	Estimate, compare and calculate different measures, including money in pounds and pence. (Measurement) 4	Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes. (Measurement) 5	Recognise that shapes with the same areas can have different perimeters and vice versa. (Measurement) 6
Compare, describe and solve practical problems for time e.g. quicker, slower, earlier, later. (Measurement) 1	Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change. (Measurement) 2	Write the time using an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks. (Measurement) 3	Read, write and convert time between analogue and digital 12- and 24-hour clocks. (Measurement) 4	Estimate volume e.g. using 1 cm³ blocks to build cuboids (including cubes) and capacity e.g. using water. (Measurement) 5	Recognise when it is possible to use formulae for area and volume of shapes. (Measurement) 6
Measure and begin to record mass/weight. (Measurement) 1	Compare and sequence intervals of time. (Measurement) 2	Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight. (Measurement) 3	Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days. (Measurement) 4	Solve problems involving converting between units of time. (Measurement) 5	Calculate the area of parallelograms and triangles. (Measurement) 6
Measure and begin to record capacity and volume. (Measurement)	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. (Measurement) 2	Know the number of seconds in a minute and the number of days in each month, year and leap year. (Measurement) 3		Use all four operations to solve problems involving measure e.g. length, mass, volume, money using decimal notation, including scaling. (Measurement) 5	Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³), and extending to other units e.g. mm³ and km³. (Measurement) 6
Measure and begin to record time (hours, minutes, seconds). (Measurement) 1	Remember the number of minutes in an hour and the number of hours in a day. (Measurement) 2	Compare durations of events e.g. to calculate the time taken by particular events or tasks. (Measurement) 3			
Recognise and know the value of different denominations of coins and notes. (Measurement) 1	Read scales in divisions of ones, twos, fives and tens. (Measurement) 2				
Sequence events in chronological order using language e.g. before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening. (Measurement) 1	Read scales where not all numbers on the scale are given and estimate points in between. (Measurement) 2				
Recognise and use language relating to dates, including days of the week, weeks, months and years. (Measurement) 1	Read the time on a clock to the nearest 15 minutes. (Measurement) 2				
Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times. (Measurement) 1					
Measure and begin to record length/height. (Measurement) 1					

Mathematics: Properties of Shape							
Nursery	**Reception**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Identify the big or small object from a selection of two. (Mathematics: Geometry - Properties of Shape)	Copy and continue more advanced patterns using real-life materials (e.g. apple, apple, orange, apple, apple, orange, etc.). (Mathematics: Geometry - Position and Direction)	Recognise and name common 2-D shapes e.g. rectangles (including squares), circles and triangles. (Properties of Shape) 1	Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line. (Properties of Shape) 2	Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them. (Properties of Shape) 3	Identify acute and obtuse angles and compare and order angles up to two right angles by size. (Properties of Shape) 4	Identify 3-D shapes, including cubes and other cuboids, from 2-D representations. (Properties of Shape) 5	Draw 2-D shapes using given dimensions and angles. (Properties of Shape) 6
Sort objects according to a stated characteristic e.g. group all the small balls together, sort the shapes into triangles and circles. (Mathematics: Geometry - Properties of Shape)		Recognise and name common 3-D shapes e.g. cuboids (including cubes), pyramids and spheres. (Properties of Shape) 1	Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces. (Properties of Shape) 2	Recognise angles as a property of shape or a description of a turn. (Properties of Shape) 3	Identify lines of symmetry in 2-D shapes presented in different orientations. (Properties of Shape) 4	Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. (Properties of Shape) 5	Recognise, describe and build simple 3-D shapes, including making nets. (Properties of Shape) 6
Copy and continue simple patterns using real-life materials (e.g. apple, orange, apple, orange, etc.). (Mathematics: Geometry - Position and Direction)		Describe position, direction and movement, including whole, half, quarter and three-quarter turns. (Position and Direction)	Name some common 2-D and 3-D shapes from a group of shapes or from pictures of the shapes and describe some of their properties (e.g. triangles, rectangles, squares, circles, cuboids, cubes, pyramids and spheres). (Properties of Shape) 2	Identify right angles and identify whether other angles are greater or less than a right angle. (Properties of Shape) 3	Complete a simple symmetric figure with respect to a specific line of symmetry. (Properties of Shape) 4	Draw given angles, and measure them in degrees (°). (Properties of Shape) 5	Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons. (Properties of Shape) 6
			Identify 2-D shapes on the surface of 3-D shapes e.g. a circle on a cylinder and a triangle on a pyramid. (Properties of Shape) 2	Recognise that two right angles make a half turn, three make three quarters of a turn and four a complete turn. (Properties of Shape) 3	Begin to recognise where angles are greater than two right angles. Know the term straight angle referring to two right angles together. (Properties of Shape) 4	Identify angles at a point and one whole turn (total 360°). (Properties of Shape) 5	Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius. (Properties of Shape) 6
			Compare and sort common 2-D and 3-D shapes and everyday objects describing similarities and differences e.g. find 2 different 2-D shapes that only have one line of symmetry; that a cube and a cuboid have the same number of edges, faces and vertices and describe what is different about them. (Properties of Shape) 2	Identify horizontal and vertical lines and pairs of perpendicular and parallel lines. (Properties of Shape) 3	Describe positions on a 2-D grid as coordinates in the first quadrant. (Position and Direction) 4	Identify angles at a point on a straight line and 1/2 a turn (total 180°). (Properties of Shape) 5	Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. (Properties of Shape) 6
			Order and arrange combinations of mathematical objects in patterns and sequences. (Position and Direction) 2		Describe movements between positions as translations of a given unit to the left/right and up/down. (Position and Direction) 4	Identify other multiples of 90°. (Properties of Shape) 5	Describe positions on the full coordinate grid (all four quadrants). (Position and Direction) 6
			Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise). (Position and Direction) 2		Plot specified points and draw sides to complete a given polygon. (Position and Direction) 4	Use the properties of rectangles to deduce related facts and find missing lengths and angles. (Properties of Shape) 5	Draw and translate simple shapes on the coordinate plane, and reflect them in the axis. (Position and Direction) 6
						Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. (Properties of Shape) 5	
						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. (Position and Direction) 5	

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Mathematics: Statistics				
Year 2	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Interpret and construct simple pictograms, tally charts, block diagrams and simple tables. (Statistics) 2	Interpret and present data using bar charts, pictograms and tables. (Statistics) 3	Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. (Statistics) 4	Solve comparison, sum and difference problems using information presented in a line graph. (Statistics) 5	Interpret and construct pie charts and line graphs and use these to solve problems. (Statistics) 6
Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity. (Statistics) 2	Solve one-step and two-step questions e.g. 'How many more?' and 'How many fewer?' using information presented in scaled bar charts and pictograms and tables. (Statistics)	Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs. (Statistics)	Complete, read and interpret information in tables, including timetables. (Statistics)	Calculate and interpret the mean as an average. (Statistics) 6
Ask and answer questions about totalling and comparing categorical data. (Statistics)				

Mathematics: Ratio and Proportion	Mathematics: Algebra
Year 6	**Year 6**
Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts e.g. find 7/9 of 108. (Ratio and Proportion) 6	Use simple formulae e.g. perimeter of a rectangle or area of a triangle. (Algebra) 6
Solve problems involving the calculation of percentages e.g. of measures, and such as 15% of 360 and the use of percentages for comparison. (Ratio and Proportion) 6	Generate and describe linear number sequences. (Algebra) 6
Solve problems involving similar shapes where the scale factor is known or can be found. (Ratio and Proportion) 6	Express missing number problems algebraically. (Algebra) 6
Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples. (Ratio and Proportion) 6	Find pairs of numbers that satisfy an equation with two unknowns. (Algebra) 6
	Enumerate possibilities of combinations of two variables. (Algebra)