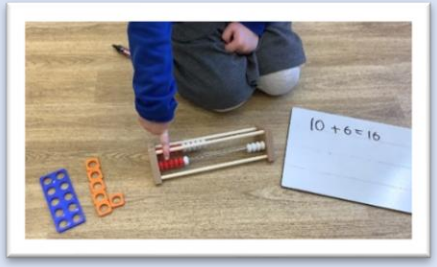
Mathematics



Mathematics

Mersey Park Primary School

Be Nice

Work Hard

Never Give Up

Mathematics at Mersey Park Primary School

What we teach

At Mersey Park we follow the Early Year Statutory Framework and National Curriculum for Maths in Key Stage 1 and 2, which aims to ensure that all children:

- Become fluent in the fundamentals of Mathematics
- Are able to reason mathematically
- Can solve problems by applying their Mathematics

At Mersey Park, these skills are embedded within Mathematics lessons and developed consistently over time. We are committed to ensuring that children understand the importance of Mathematics in the wider world and that they are able to use their mathematical skills and knowledge confidently in their lives in a range of different contexts. Mathematics is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and in future employment. We want all children to enjoy Mathematics and to experience success in the subject. We place a strong focus on ensuring our pupils are able to recall key mathematical facts, reason mathematically and explain their thinking.

Right from the start of Foundation Stage, we model and encourage a curiosity about Mathematics, as well as an appreciation of the beauty, power and enjoyment of the subject.

Our whole curriculum is shaped by our school vision, which aims to enable all children, regardless of background, ability and additional needs, to flourish in this subject.

How we teach it

At Mersey Park we foster positive can do attitudes through our Mersey Park Mindset and we promote the fact that 'We can all do maths!' We believe all children can achieve in mathematics, and teach for secure and deep understanding of mathematical concepts through manageable steps. We use mistakes and misconceptions as an essential part of learning and provide challenge through rich and sophisticated problems. At our school, the majority of pupils will spend time becoming true masters of content, applying and being creative with new knowledge in multiple ways. Teachers reinforce an expectation that all children are capable of achieving high standards in Mathematics.

Our curriculum provides a clear progression of knowledge and skills progression, as set out in our school's calculation policy. To ensure whole school consistency and progression, the school uses the DfE approved 'Power Maths' scheme. This ensures that knowledge and skills are built on year by year and sequenced appropriately. Teachers use the 'Power Maths' scheme to structure their planning, however lessons are adapted to meet the needs of our pupils at Mersey Park. Problem solving activities are often linked to real life situations to ensure our Mathematics curriculum takes pupils beyond their own experiences. Lessons are also enhanced using other high quality resources such as White Rose, Ready to Progress activities and NCETM Teaching for Mastery. Foundation Stage and Key Stage One teachers have also completed the NCETM Mastering Number programme and use these materials to enhance their lessons.

We ensure our pupils know how to make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly complex problems. Children's explanations and their proficiency in articulating reasoning using precise mathematical vocabulary, are supported through the use of stem sentences modelled by the teacher. We also provide opportunities for pupils to apply their mathematical knowledge to science and other subjects and these opportunities are highlighted on our medium term subject planning.

We encourage an inclusive environment and ensure all pupils, including those most vulnerable and those who are disadvantaged, have the opportunity to access the full and broad curriculum through carefully planned support as required. The expectation is that the majority of pupils move through the programmes of study at broadly the same pace, and it is this inclusive approach, which means pupils are provided with the models, and scaffolds that they need to access the mathematics curriculum. We ensure pupils develop secure knowledge and understanding before progressing on to the next concept. Those who are not sufficiently fluent with earlier material consolidate their understanding, through additional practice, before moving on. Teachers are trained in EEF approved interventions, such as First Class@Number and Success@Arithmetic, and these are used to support children with gaps in learning to help them catch up quickly. Pupils who grasp content rapidly are challenged through being offered activities, which consolidate and develop a deeper understanding of concepts and reasoning skills, in order to develop mastery in mathematics.

Each topic starts with an initial introduction lesson where teacher activates prior knowledge by asking a few questions – What did you do in the last topic that could help you? What did you do last year that could help you? What do you do in Maths Dictionary that could help you? And the children have opportunity to respond as a group and individually. During this lesson the teachers also discusses the mathematical vocabulary the children will be using in this topic and explain the meaning of any new vocabulary. The children also complete a short assessment which includes some questions from the previous year to recap key facts and concepts and some questions containing mathematical objectives they will be covering in the upcoming topic to gauge prior knowledge and inform future planning.

New mathematical concepts are shared within the context of an initial problem, which prompts discussion and reasoning, as well as promoting an awareness of maths in relatable real-life contexts that link to other areas of learning. Children are encouraged to solve problems each day through the use of concrete resources, pictorial representations, language and abstract thinking (CPLA approach). This helps children tackle concepts in a tangible and more comfortable way. Knowledge Organisers are used for each topic to revise key concepts and embed learning.

Teachers use careful questions to draw out children's discussions and their reasoning. The class teacher then leads children through strategies for solving the problem, with pupils being taught how to select the most efficient method. Children then progress to supported or individual carefully planned practice where questions vary one element at a time to move children on in their thinking. Children are then challenged through a variety of high-quality resources, including use of Mastery questions and Mild, Hot and Spicy challenges that allow children to choose their own level of challenge. This provides an opportunity for children to reveal the depth of their knowledge and understanding before moving on to more complex related problems. Teachers use carefully elected stem sentences to support children's ability to express their mathematical thinking and help to develop their reasoning skills.

At Mersey Park, children study mathematics in whole morning blocks covering a broad and balanced mathematical curriculum including elements of number, calculation, geometry, measure and statistics. Alongside mathematics sessions, an additional 10 minutes a day is spent practising Maths Dictionary (focussing on number fluency, counting skills, mathematical vocabulary, number facts, geometry and measure) to build fluency in these areas. Weekly lessons dedicated to number fluency have been introduced where children are encouraged to make links between known facts and new knowledge and practice number manipulation skills. As well as this, children in KS2 complete regular arithmetic checks embed key concepts, practice written methods and recap mental methods. Learn by Questions is also used in upper Key Stage Two to revise key mathematical facts, identify gaps in knowledge and address misconceptions.

From June 2022, schools in England were required to administer an online multiplication tables check to year 4 pupils. The purpose of the multiplication tables check is to determine whether pupils can recall their times tables fluently, which is essential for future success in mathematics. It helps schools to identify pupils who have not yet mastered their times tables, so that additional support can be provided. To support the children with their

multiplication practice we use Times Table Rockstars and Purple Mash as online and fun learning platforms, which also offer resources that can be used in the classroom.

SMSC through Maths

The study of mathematics enables students to make sense of the world around them and we strive to enable each of our pupils to explore the connections between their mathematics skills and every-day life. Developing deep thinking and an ability to question the way in which the world works promotes the spiritual growth.

Problem solving skills and teamwork are fundamental to mathematics through creative thinking, discussion, explaining and presenting ideas. Pupils are always encouraged to explain concepts to each other and support each other in their learning. During this discussion time, pupils realise their own strengths and feel a sense of achievement which often boosts confidence. Over time they become more independent and resilient learners.

Impact

The school has a supportive ethos and our approaches support the children in developing their collaborative and independent skills, as well as the importance to recognise the achievements of others. All children experience challenge and success in Mathematics by developing a Mersey Park Mindset.

Regular and ongoing assessment informs teaching, as well as intervention, to support and enable the success of each child. These factors ensure that we are able to maintain high standards, with achievement at the end of KS2 in line or above the national average, as well as a steady proportion of children demonstrating greater depth, at the end of each phase.

Throughout each lesson, formative assessment takes place and feedback is given to the children through marking and next step tasks to ensure they are meeting the specific learning objective. Teachers then use this assessment to influence their planning and ensure they are providing a mathematics curriculum that will allow each child to progress. Targets are used in children's books each lesson to document progress. These targets are taken from the National Curriculum and Ready to Progress Criteria for Years 1, 3, 4, 5 and 6 and from the End of Key Stage Framework for Year 2. The teaching of mathematics is monitored on a termly basis through book scrutinies, learning walks and lesson observations. Half termly, children in Key Stage 1 and 2 complete a summative Power Maths assessment and termly, complete a Number Facts and Multiplication Test, which are analysed by teachers and SLT and are used to inform future planning and interventions.

By the end of KS2, pupils will be fluent in the fundamentals of mathematics, with conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. They should have the skills to solve problems by applying their mathematics to a variety of situations with increasing sophistication, including in unfamiliar contexts and to model real-life scenarios. Children will be able to reason mathematically by following a line of enquiry, to develop and present a justification, argument or proof using mathematical language. Our whole school curriculum supports pupils to develop an enjoyment of mathematics and the confidence to apply their knowledge in their everyday lives.

Power Maths at Mersey Park
Power Maths teaching programme is fully embedded across the whole school. This teaching programme aims to help children deepen their knowledge of mathematical concepts and encourages them to explain their thinking. Each mathematical topic is approached in the same way with the same three steps: 1. Practical – the children are encouraged to use concrete manipulative (equipment) to practically solve a problem. They are encouraged at this time to explain what they have used and why and what this is showing. By using practical equipment, the children begin to create pictures in their mind which they will be able to use and draw upon this 'hands on' learning in the future. 2. Pictures – the children then begin to draw pictorial representations of a problem to help find a solution. They are shown a range of models which they could use to show their thinking and are encouraged to record their pictorial representations in whichever way makes sense to them. 3. Number sentences – the final stage is to record their problem as an abstract number sentence and solve the problem that way. We have been very impressed with the results and have seen a huge increase in the children's confidence and ability to explain their thinking and give reasons for their answers since starting this programme. Throughout school the use of apparatus is recognised as an important component to developing understanding of key concepts. Every child has free access to maths trays containing a range of equipment, including place value counters, dienes and place value charts. Teachers encourage children to identify the apparatus that will support their thinking as they tackle maths activities. Peer coaching is also used as an effective strategy to engage and encourage learning within maths.

Mathematics Subject Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
F1	Baseline assessment of mathematical language Mathematical language through continuous provision- place, number, position, shape, time	Numeral 1-3, 1:1 correspondence Fast recognition of number of objects up to 3 Ordering and comparing size and shapes Vocabulary relating to time Ordering size Mathematical problems	3 space number frames Ordering and comparing, size, weight Pattern Positional language More than, fewer than Representing number with pictures and marks Mathematical problems	Sorting and counting and combining shapes Fast number recognition up to 3. Subitising 1:1 counting up to 5 Mathematical problems	Comparing length Longer/shorter Tallest/ shortest Compare accurately Counting everyday objects Mathematical problems	5 Frames Strong grounding of number Ordering objects according to size Comparison of quantities to 5 Matching numerals to amounts Mathematical problems
F2	Place Value	Geometry / Addition and Subtraction / Geometry	Place Value / Addition and Subtraction / Measure	Addition and Subtraction / Geometry	Place Value / Geometry	Measure
Year 1	Place Value	Addition and Subtraction / Geometry	Addition and Subtraction / Place Value / Multiplication and Division / Geometry		Multiplication and Division / Fractions	Measure / Revision
Year 2	Place Value / Time/Money	Place Value / Addition and Subtraction	Multiplication and Division / Fractions / + and - / Statistics		Measure / SATs	Money / Geometry / Fractions / + and - / Time / Revision
Year 3	Place Value	Addition and Subtraction / Multiplication	Multiplication and Division / Measure - Money		Fractions / Statistics	Measure / Geometry / Revision
Year 4	Multiplication / Place Value	Addition and Subtraction	Measure - Area and Perimeter / Multiplication and Division	Fractions (am) Geometry (pm) / Decimals		Statistics / Measure / Revision
Year 5	Place Value	Addition and Subtraction / Statistics / Multiplication and Division	Measure - Area and Perimeter / Multiplication	Multiplication and Division / Fractions, Decimals and Percentages		Geometry / Measure
Year 6	Place Value	Four Operations and BIDMAS / Fractions	Decimals / Fraction, Decimals and Percentages	Measure / Algebra / Measure / Ratio, / Angles	Statistics / Revision / SATs	Word Problems and Reasoning

Mathematics - Early Years		
Development Matters		
Birth to Three	**Three and Four Year Olds (Foundation 1)**	**Children in Foundation 2**
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.

F2 Mathematical Development Overview					
Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer2**
Number					
• Numbers to 5 • Stable order counting. • Counting to and back from 5 • 1:1 correspondence to 5 • Cardinality to 5 • Link the skill of counting 5 concrete objects to the pictorial representation of 5, and then to the abstract numerals 1, 2, 3, 4 and 5 • Introduce the 5 frame • Order irrelevance to 5 • Comparing groups within 5 • Noticing inequality between 2 groups • Introduce language, 'more' and 'fewer' • Realise quantities can be equal	• One more – Learning the next number they count is 1 more than the previous number • One less - using concrete objects and pictures. • Introduce 'First', 'Then' and 'Now' story structure to explore one more and one less • Introduce the use of stem sentences... 'The whole is… The parts are...' • Number bonds within 5 • Introduce the vocabulary of whole and part, and practise the concept of breaking a whole into parts using a part-whole model.	• Learn to count up to 10 objects and show them using concrete representations, including the ten frame. • Introduce counters as a representation of an amount for the first time. • Compare numbers up to 10. • Compare groups of objects where the objects differ in size • Develop confidence in using the part-whole model, being able to identify the whole and the parts in different orientations and understanding that the combined parts make the whole. • Key vocabulary altogether introduced as a term to describe the combined parts.	• Explore number bonds to 10 using a variety of representations. • Progress from seeing concrete representations to pictorial representations (counters), finally using counters on a ten frame to show all number bonds to 10. • Begin to answer 'how many altogether 'and 'how many more' questions. • Continue to explore subtraction, specifically at the number bonds to 10, using counters and the part-whole model. • Begin to work with subtraction number bonds, following the 'missing part' structure.	• Learn how to count on and back from a given number in order to add/subtract • Use the first, then, now structure to identify what number they are counting on/back from, and how many they are counting on/back. • Counting forwards and backwards to and from 20. • Explore one more and one less than numbers to 20 • Represent numbers within 20. • Explore what is meant by doubling. • Recognise and represent doubles to double 5 in a range of contexts. • Halving quantities by sharing into two equal groups. • Make links to the fact that halving is the opposite, or inverse, of doubling. • Numerical patterns to explore odd and even numbers in familiar contexts. • Begin to use understanding of equal groups to identify odd and even numbers.	• Similarities and differences in sets of objects found in the classroom. • Sort objects into two groups based on size, colour and shape. • Begin to discover that groups can be sorted in different ways and into more than two groups.

Shape, Space and Measure					
• Properties of 3D shapes through hands on exploration and play • Describe 3D shapes based on common properties such as curved faces, flat, faces, will roll, will not roll, will stack, will not stack • Sorting 3D shapes according to their properties • 2D shapes • Introduce the names of 2D shapes and some of the words to describe their properties. • Children will see common 2D shapes shown in different orientations. • Identification of 2D shapes within 3D shapes • Look for examples of 2D shapes in the world around them	• Spatial awareness • Introduce positional and directional vocabulary: 'in', 'on', 'below', 'under', 'up', 'down', 'across'	• Introduce length, height and distance. • use the words longer, shorter and taller to compare length. • Focus on lining up objects to compare them and begin to explore non-standard units of measurement	• Introduce the concept of weight. • Begin to compare two items and learn how balance scales show which item is lighter or heavier. • Recognise, continue and build simple patterns. • Learn about AB patterns specifically. • Discover that patterns can be created using various shapes, colours, sizes, actions and sounds.	• Explore how shapes can be composed and decomposed. • Recognise that a shape can have other shapes within it, just as a number can. • Explore the attributes of shapes through hands-on activities	• Use simple everyday language to compare volume and capacity using the terms full, empty, nearly full and nearly empty in the context of liquids (water) and solids (sand). • Introduce the concept of times of the day and the order of events in a day. • Begin to order familiar events using clues from pictures. • Introduce the idea that the clock tells the time of the day, without having to read it.

Mathematics		SEND	Nursery	Reception
Number	Knowledge and Skills		➢ Develop fast recognition of up to 3 objects, without having to count them individually (subitising) ➢ Count accurately beyond 5 ➢ Touch-count accurately within 5 ➢ Know that the last number reached when counting a small set of objects tells you how many there are in total ➢ Represent numbers on fingers up to 5 ➢ Links numerals to amounts within 5 ➢ Solve real-world problems with numbers to 5 ➢ Compare quantities using 'more than', 'less than' ➢ Explore representing numbers through marks as well as numerals	➢ Count objects, actions and sounds ➢ Subitise to 5 and extend to 10 ➢ Link numerals to their cardinal value ➢ Accurately count beyond 10 ➢ Compare numbers within 10 using the language of 'more than', 'less than', 'fewer', 'the same as', 'equal to'. ➢ Find one more and one less than a given number within 10 ➢ Explore the composition of numbers to 10 ➢ Recall number bonds to 5 (including subtractions facts) ➢ Recall most number Bonds to 10 ➢ Recall doubles to double 5
	Vocabulary		count, number, more than, less than, total, altogether	number, numeral, number sentence, more, less, same, equal, add, plus, total, altogether, take away, subtract, fewer, double, number bond
	How it is covered at Mersey Park		**Autumn** ➢ Develop fast recognition of up to 3 objects ➢ Recognise numbers to 3 in different pictorial representations ➢ Count accurately to 5 ➢ Touch count 3 objects accurately including counting out from a larger group ➢ Link numerals to amounts to 3 **Spring** ➢ Develop fast recognition of up to 5 objects ➢ Recognise numbers to 5 in different pictorial representations ➢ Count accurately to 10 ➢ Touch count 5 objects accurately including counting out from a larger group ➢ Link numerals to amounts to 5 ➢ Represent numbers to 5 with fingers ➢ Compare two quantities within 5 recognising which has more and which has less **Summer** ➢ Solve real world problems using numbers to 5 ➢ Begin to represent numbers to 5 with pictorial representations and fingers ➢ Use key language – total, altogether when combining amounts within 5	**Autumn** ➢ Number (Place value within 5) ➢ Number (Addition and Subtraction within 5) **Spring** ➢ Number (Place value within 10) ➢ Number (Addition and Subtraction within 10) **Summer** ➢ Number (Addition and Subtraction within 10) ➢ Number (Place value within 20) ➢ Number (Multiplication and Division)

Shape, space and measure (Non statutory)	Knowledge and Skills		➢ Understand key words that can describe their position – prepositions (off, up, down, under, above, besides) ➢ Describe a short, familiar route using positional language ➢ Extend and create ABAB patterns ➢ Use some sequencing language to describe an event 'first, 'next', 'last' ➢ Combine shapes to create new ones – a rectangle and a semicircle to create an arch ➢ Make simple comparisons between objects relating to size, length, weight and capacity using key language to compare two or three items ➢ Recognise and name 2D shapes in different orientations – triangle, circle, square and rectangle ➢ Know how many corners they have ➢ Recognise that 3D shapes are solid	➢ Select, rotate and manipulate shapes in order to develop spatial reasoning skills recognising how several shapes can be combined ➢ Compose and decompose shapes ➢ Discuss the properties of common 2D shapes – circle, triangle, square, rectangle, pentagon, semi-circle ➢ Recognise and name common 3D shapes and begin to discuss their properties – pyramid, sphere, cube, cuboid, cylinder ➢ Continue, copy and recreate patterns with different rules (ABAB,ABBA, AABB, ABBC) ➢ Compare length, weight and capacity using ley language. ➢ Order 4 or more objects by length, weight or capacity
	Vocabulary		off, up, down, under, above, besides, direction, pattern, first, next, last, 2D shapes, circle, triangle, rectangle, square, corners, 3D, longest, shortest, heaviest, lightest, empty, full	Length, long(er/est), short, weight, heavy, light, capacity, full, empty, half full, nearly empty, nearly full pattern, repeating, 2D, flat, corners, sides, straight, curved, 3D, solid, face, edges, vertices
	How it is covered at Mersey Park		**Autumn** ➢ Explore shapes through play and combine shapes to make new shapes ➢ Explore length and compare two objects using key language **Spring** ➢ 2D shapes and their properties. Explore combining shapes to make new shapes ➢ Explore repeating patterns **Summer** ➢ Capacity – empty and full ➢ Weight – heaviest and lightest ➢ Using prepositional language ➢ Describe a familiar route	**Autumn** ➢ Geometry (Shape) **Spring** ➢ Measure (Length, height, distance, weight) ➢ Geometry (Shape) **Summer** ➢ Geometry (Shape) ➢ Measure (Volume and Capacity)

Mathematics National Curriculum Subject Content
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.
Lower 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.
Upper Key Stage 2
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.

Maths Vocabulary Progression

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Place Value	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, one, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, eighteen, nineteen, twenty, number, count, count forwards, count backwards, count on, count back, how many, total, altogether, five frame, same, different/difference, next, after, arrange, more, fewer, every count, represent, show, match, sort, compare, equal, less than, fewer than, greater than, more than, equal amount, ten frame, odd one out, collections, group, dice, fewest, greatest, smaller, smallest, large/largest, how many more, how many more, how many fewer, less than, ten frame, part-whole model, whole, part, missing number, one more, one less, add, number bond to 10, odd, even, odd number, even number	sort, groups, digits, count forwards, count back, more, fewer, one more, one less, less than, greater than, equal to, most, least, fewest, greatest, number line, pattern, part whole model, number sentence, plus, order, smallest, tens, ones, compare	tens, ones, place value grid, partition, more, fewer, fewest, greatest, smallest, order, greater than, less than	hundreds, tens, ones, place value grid, partition, more, less, greater than, less than, equal to, order, compare, estimate, exchange	thousands, hundreds, tens, ones, rounding, order, more than, less than, partition, numerals, nearest, distance, ascending, descending, negative, step, multiple	hundred thousands, million, ten thousands, thousands, hundreds, tens, ones, round, order, greater than, less than, partition, estimate, compare, equivalent, convert, sequence	ten million, hundred thousands, million, ten thousands, thousands, hundreds, tens, ones, partition, interval, estimate, compare, order, rounding, negative, positive
Addition and Subtraction	one, two, three, four, five, six, seven, eight, nine, ten, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, none, zero, count, forwards, backwards, how many first, then, now, one less, one more, order, fewer, take away, add, altogether, number story, represent, five frame, group, parts, whole, part-whole model, how many, count/counting, more than, same, different, count, part, whole, altogether, addition, adding together, counting, more, fewer, leave, left, total, subtract, break, number bond, recombine, make, count on/count back, move forwards, go back, jump forwards, jump back, less, before, after, direction, moves, jumps, start, stop, finish, number track, dice, largest, smallest, possibilities	plus, total, sum, altogether, add, addition, more, subtract, subtraction, minus, take away, difference, fewer, equals, ones, tens	plus, total, sum, altogether, add, addition, more, subtract, subtraction, minus, take away, difference, fewer, equals, exchange, ones, tens	plus, total, sum, altogether, add, addition, increase, more, subtract, subtraction, minus, take away, equals, difference, reduce, fewer, exchange, estimate, approximate	plus, total, sum, altogether, add, addition, increase, subtract, subtraction, minus, take away, equals, difference, reduce, exchange, estimate, exact	plus, total, sum, altogether, add, addition, increase, subtract, subtraction, minus, take away, equals, difference, reduce, exchange, estimate, exact, round	plus, total, sum, altogether, add, addition, increase, subtract, subtraction, minus, take away, equals, difference, reduce, multiply, multiplication, times, product, multiple, divide, share, factor, division, remainder, prime, squared, cubed, brackets
Multiplication and Division	double, equal groups, double facts, doubling, half, halving, share, fair share, equal, each, uneven, unequal, fair, solution	times, multiply, multiplication, lots of, double, share, divide, division, half, row, column, equals	times, product, multiply, multiplication, lots of, times tables, array, share, divide, division, equal groups, equals, odd, even	times, product, multiply, multiplication, lots of, times tables, array, multiple, share, divide, division, equal groups, equals, remainder, most, least, partition, compare	times, product, multiply, multiplication, lots of, times tables, array, multiple, share, divide, division, equal groups, factor, equals, remainder, related facts, partition, commutative	times, product, multiply, multiplication, lots of, times tables, array, multiple, share, divide, division, equal groups, factor, equals, remainder, related facts, prime number, composite number, square number, cube number	

Fractions	double, equal groups, double facts, doubling, half, halving, share, fair share, equal, each, uneven, unequal, fair, solution	whole, half, quarter, equal parts, share	whole, half, quarter, third, equal parts, share, equivalent, numerator, denominator	whole, half, quarter, third, equal parts, share, equivalent, numerator, denominator, equation, integer, represent, mixed number, whole number, divide, multiply, tenth, interval, compare, greater than, less than, equal to, difference, inequality statement	tenths, hundredths, equivalent, simplify, numerator, denominator, mixed number, improper fraction, simplest fraction	equivalent, simplify, numerator, denominator, whole, expand, division, mixed number, improper fraction, proper fraction, simplest fraction, convert, sequence, order, greater than, less than, equal to, equivalent fraction, efficient, common denominator, operator	equivalent, simplify, numerator, denominator, common denominator, common factor, simplest form, factor, compare, order, ascending, descending, mixed number, improper fraction, proper fraction, convert, equivalent, simplify
Geometry	roll, stack, push, curved, straight, round, corners, face, edge, sides, square, rectangle, circle, triangle, sphere, cube, cuboid, cylinder, cone, big, little, flat, like a box, like a can, slides, pointy odd one out, same, difference, different properties, characteristics, puzzle fold/open, count, how many, build, turn same/different	2D shape, flat, sides, vertices, 3D shape, solid, faces, edges, curved, straight	2D shape, flat, sides, vertices, 3D shape, solid, faces, edges, curved, straight, properties, vertex, symmetry, symmetrical, right angle	2D shape, flat, sides, vertices, 3D shape, solid, faces, edges, curved, straight, properties, vertex, symmetry, symmetrical, right angle, acute, obtuse, parallel, perpendicular, clockwise, anti-clockwise	2D shape, sides, vertices, 3D shape, faces, edges, properties, vertex, symmetry, symmetrical, right angle, acute, obtuse, parallel, perpendicular, clockwise, anti-clockwise, regular, irregular, reflect, isosceles, scalene	2D shape, sides, vertices, 3D shape, faces, edges, properties, vertex, symmetry, symmetrical, right angle, acute, obtuse, reflex, parallel, perpendicular, clockwise, anti-clockwise, regular, irregular, reflect, orientation	2D shape, sides, vertices, 3D shape, faces, edges, properties, vertex, symmetry, symmetrical, degree, right angle, acute, obtuse, reflex, protractor, diameter, radius, circumference, concentric, perimeter, net, parallel, perpendicular, clockwise, anti-clockwise, regular, irregular, reflect, reflection, orientation, quadrant, translate, translation, axis
Time	first, next, later, then before, after, every day time, clock face, o'clock order, timetable, sequence	before, after, yesterday, today, tomorrow, day, week, slower, faster, month, year, calendar, date, minute hand, hour hand, o'clock, half past, second, minute, hour	minute hand, hour hand, o'clock, half past, quarter past, quarter to, duration, second, minute, hour	month, year, midnight, midday, am, pm, estimate, consecutive, minute hand, hour hand, o'clock, half past, quarter past, quarter to, duration, second, minute, hour, digital clock, analogue clock	convert, compare, units of time, duration, second, minute, hour, days, weeks, months, years, 12 hour, 24 hour, digital clock, analogue clock, am, pm		

Measure	shorter/shortest, large/larger/largest, bigger, small/smaller longer/longest, shorter/shortest, tall/taller/tallest, further/furthest heavy/heavier/heaviest, light/lighter/lightest same, different, amount, widest, thinnest, length, width, height, weight equal, the same, balanced, balance scale estimate, predict, check, measure, compare, order, full, nearly full, not full, half full, empty, nearly empty, half empty, more, most less, least, nothing, none amount, fill, pour, wide, wider, widest narrow, narrower, narrowest tall, thin, short, fat estimate, predict measure, check compare	long, longer, longest, short, shorter, shortest, length, height, distance, compare, centimetres, meters, heavy, heavier, heaviest, light, lighter, lightest, grams, kilograms, capacity, balance scales, full, empty, litres, millilitres, compare, weight, weigh, estimate	mass, balance, weighing scales, grams, kilograms, litres, millilitres, volume, capacity, temperature, thermometer, degree Celsius, estimate, approximation, distance, length, centimetres, meters, longer, shorter, height, width, compare	length, height, width, perimeter, distance, centimetres, millimetres, meters, equivalent, convert, greater than, less than, mass, weigh, scale, interval, gram, kilogram, capacity, litre, millilitre, convert	length, width, perimeter, distance, rectilinear shape, centimetres, meters, kilometres, equivalent to, area, space, unit, least, greatest, quadrilateral, reflection, rotation	perimeter, distance, area, space, length, width, centimetres, meters, square centimetres, square meters, scale, compare, estimate, formula, brackets, convert, metric units, imperial units, kilo, kilogram, millimetre, kilometre, litre, millilitre, pound, ounce, inch, foot, yard, pint, gallon, stone, approximately, timetable, volume, solid, capacity, calculate, estimate, unit, least, greatest	convert, metric units, imperial units, kilo, kilogram, millimetre, kilometre, centimetre, meters, litre, millilitre, pound, ounce, inch, foot, feet, yard, mile, pint, gallon, stone, approximately, grams, kilograms, mass, conversion table, conversion graph, parallelogram, height, enclosed, width, length, square centimetres, square meters, base, estimate, formula, compound shape, cubic centimetres, cubic meters
Money		pound, pence, coins, notes	pound, pence, coins, notes, change	pound, pence, change, difference, convert, total	pound, pence, change, difference, convert, total, round to the nearest, order, cheaper, more expensive, estimate, notation		
Position and Direction	in, on, below, under, above, in front of, behind, next to, up, down, across, forwards, backwards	turn, half turn, quarter turn, three-quarter turn, whole turn, left, right, forwards, backwards, above, below, top, middle, bottom, up down, in between	clockwise, anti-clockwise, forwards, backwards, left, right, middle, turn, half turn, quarter turn, three-quarter turn		horizontal, vertical, up, down, left, right, coordinate, square, rectangle, plot, vertex, vertices, point, grid	horizontal axis, vertical axis, reflection, translation, vertex, vertices, coordinates, mirror line	
Statistics			tally chart, pictogram, key	tally chart, pictogram, key, bar chart, scale, table, row, column, vertical axis, represent	data, line graph, pictogram, bar chart, table, altogether, more than, greatest, smallest, continuous data, compare	graph, line graph, table, dual line graph, horizontal, vertical, two-way table, scale, axis, data, kilometres, kilograms, plot, tally, digits	mean, average, pie chart, segment, line graph, bar chart, percentage, fraction, data

Decimals and Percentages					tens, ones, decimal point, tenths, hundredths, greater than, less than, equivalent, decimal, centimetre, millimetre, whole number, rounding, order, compare, convert, ascending, descending	decimal point, tenths, hundredths, thousandths, equivalent, decimal, place value, digits, fractions, per cent, percentages, whole, column, exchange	decimal point, decimal place, recurring decimal, placeholder, tenths, hundredths, thousandths, product, fraction, per cent, percentage, parts, whole, convert, compare, simplify
Ration and Proportion							ratio, proportion, part, whole, scale, scale factor, similar, notation
Algebra	next, continue repeat/repeats, unit of repeat, core, cube, round pattern/patterns complex, size, shape, colour, action, elements bigger, smaller, same, different, tall, short, stripes, squares, sort, group, object same, different, odd one out size, shape, colour, pattern, triangle, square, bigger, smaller, counter, cube how many, more than, describe, explain						sequence, rule, term, algebra, expression, calculation, formula, substitute, generalise, operation, calculate, equation, inverse, solution

Mathematics Progression of Knowledge and Skills

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number and Place Value	• Numbers to 5 • Stable order counting. • Counting to and back from 5 • 1:1 correspondence to 5 • Cardinality to 5 • Link the skill of counting 5 concrete objects to the pictorial representation of 5, and then to the abstract numerals 1, 2, 3, 4 and 5 • Introduce the 5 frame • Order irrelevance to 5 • Comparing groups within 5 • Noticing inequality between 2 groups • Introduce language, 'more' and 'fewer' • Realise quantities can be equal • One more – Learning the next number they count is 1 more than the previous number • One less - using concrete objects and pictures. • Learn to count up to 10 objects and show them using concrete representations, including the ten frame. • Introduce counters as a representation of an amount for the first time. • Compare numbers up to 10. • Compare groups of objects where the objects differ in size • Counting forwards and backwards to and from 20. • Explore one more and one less than numbers to 20 • Represent numbers within 20. • Similarities and differences in sets of objects found in the classroom. • Sort objects into two groups based on size, colour and shape. • Begin to discover that groups can be sorted in different ways and into more than two groups.	• Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens • Given a number, identify one more and one less • Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least • Read and write numbers from 1 to 20 in numerals and words.	• Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward • Recognise the place value of each digit in a two-digit number (tens, ones) • Identify, represent and estimate numbers using different representations, including the number line • Compare and order numbers from 0 up to 100; use <, > and = signs • Read and write numbers to at least 100 in numerals and in words • Use place value and number facts to solve problems.	• Count from 0 in multiples of 4, 8, 50 and 100 • Find 10 or 100 more or less than a given number • Recognise the place value of each digit in a three-digit number (hundreds, tens, ones) • Compare and order numbers up to 1000 • Identify, represent and estimate numbers using different representations • Read and write numbers up to 1000 in numerals and in words • Solve number problems and practical problems involving these ideas.	• Count in multiples of 6, 7, 9, 25 and 1000 • Find 1000 more or less than a given number • Count backwards through zero to include negative numbers • Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) • Order and compare numbers beyond 1000 • Identify, represent and estimate numbers using different representations • Round any number to the nearest 10, 100 or 1000 • Solve number and practical problems that involve all of the above and with increasingly large positive numbers • Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.	• Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit • Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 • Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero • Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 • Solve number problems and practical problems that involve all of the above • Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	• Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit • Round any whole number to a required degree of accuracy • Use negative numbers in context, and calculate intervals across zero • Solve number and practical problems that involve all of the above.

Mathematics Progression of Knowledge and Skills

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition and Subtraction	• Introduce 'First', 'Then' and 'Now' story structure to explore one more and one less • Introduce the use of stem sentences... 'The whole is… The parts are...' • Number bonds within 5 • Introduce the vocabulary of whole and part, and practise the concept of breaking a whole into parts using a part-whole model. • Develop confidence in using the part-whole model, being able to identify the whole and the parts in different orientations and understanding that the combined parts make the whole. • Key vocabulary altogether introduced as a term to describe the combined parts. • Explore number bonds to 10 using a variety of representations. • Progress from seeing concrete representations to pictorial representations (counters), finally using counters on a ten frame to show all number bonds to 10. • Begin to answer 'how many altogether 'and 'how many more' questions. • Continue to explore subtraction, specifically at the number bonds to 10, using counters and the part-whole model. • Begin to work with subtraction number bonds, following the 'missing part' structure. • Learn how to count on and back from a given number in order to add/subtract • Use the first, then, now structure to identify what number they are counting on/back from, and how many they are counting on/back.	• Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs • Represent and use number bonds and related subtraction facts within 20 • Add and subtract one-digit and two-digit numbers to 20, including zero • Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? – 9.	• Solve problems with addition and subtraction: - using concrete objects and pictorial representations, including those involving numbers, quantities and measures - applying their increasing knowledge of mental and written methods • Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 • Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: -a two-digit number and ones -a two-digit number and tens -two two-digit numbers -adding three one-digit numbers • Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot • Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	• Add and subtract numbers mentally, including: -a three-digit number and ones -a three-digit number and tens -a three-digit number and hundreds • Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction • Estimate the answer to a calculation and use inverse operations to check answers • Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	• Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • Estimate and use inverse operations to check answers to a calculation • Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	• Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • Add and subtract numbers mentally with increasingly large numbers • Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.	• Perform mental calculations, including with mixed operations and large 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 • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Mathematics Progression of Knowledge and Skills

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Multiplication and Division	• Explore what is meant by doubling. • Recognise and represent doubles to double 5 in a range of contexts. • Halving quantities by sharing into two equal groups. • Make links to the fact that halving is the opposite, or inverse, of doubling. • Numerical patterns to explore odd and even numbers in familiar contexts. • Begin to use understanding of equal groups to identify odd and even numbers.	• 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.	• Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs • Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot • Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	• Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables • Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods • Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.	• Recall multiplication and division facts for multiplication tables up to 12 × 12 • Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers • Recognise and use factor pairs and commutativity in mental calculations • Multiply two-digit and three-digit numbers by a one-digit number using formal written layout • Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.	• Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers • Know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers • Establish whether a number up to 100 is prime and recall prime numbers up to 19 • Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers • Multiply and divide numbers mentally drawing upon known facts • Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context • Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 • Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) • Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes • Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign • Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	• Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication • Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context • Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context • Identify common factors, common multiples and prime numbers • Use their knowledge of the order of operations to carry out calculations involving the four operations

Mathematics Progression of Knowledge and Skills

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fractions		• Recognise, find and name a half as one of two equal parts of an object, shape or quantity • Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.	• Recognise, find, name and write fractions 1/3 , 1/2 , 2/4 and 3/4 of a length, shape, set of objects or quantity • Write simple fractions for example, 1/2 of 6 = 3 and recognise the equivalence of 2/4 and 1/2 .	• 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 • Recognise, find and write fractions of a discrete set of objects: unit fractions and nonunit fractions with small denominators • Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators • Recognise and show, using diagrams, equivalent fractions with small denominators • Add and subtract fractions with the same denominator within one whole [for example, 5/7 + 1/7 = 6/7] • Compare and order unit fractions, and fractions with the same denominators • Solve problems that involve all of the above.	• Recognise and show, using diagrams, families of common equivalent fractions • Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. • Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number • Add and subtract fractions with the same denominator • Recognise and write decimal equivalents of any number of tenths or hundredths • Recognise and write decimal equivalents to 1/4 , 1/2 , 3/4 • Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths • Round decimals with one decimal place to the nearest whole number • Compare numbers with the same number of decimal places up to two decimal places • Solve simple measure and money problems involving fractions and decimals to two decimal places.	• Compare and order fractions whose denominators are all multiples of the same number • Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths • Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, 2/5 + 4/5 = 6/5 = 1 1/5] • Add and subtract fractions with the same denominator and denominators that are multiples of the same number • Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams • Read and write decimal numbers as fractions [for example, 0.71 = 71/100] • Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents • Round decimals with two decimal places to the nearest whole number and to one decimal place • Read, write, order and compare numbers with up to three decimal places • Solve problems involving number up to three decimal places • Recognise the per cent 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 • 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.	• Use common factors to simplify fractions; use common multiples to express fractions in the same denomination • Compare and order fractions, including fractions > 1 • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions • Multiply simple pairs of proper fractions, writing the answer in its simplest form, for example, 1/4 × 1/2 = 1/8 • Divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 1/6] • Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8] • 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 • Multiply one-digit numbers with up to two decimal places by whole numbers • Use written division methods in cases where the answer has up to two decimal places • Solve problems which require answers to be rounded to specified degrees of accuracy recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

Mathematics Progression of Knowledge and Skills

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Measurement	• Introduce length, height and distance. • Use the words longer, shorter and taller to compare length. • Focus on lining up objects to compare them and begin to explore non-standard units of measurement • Introduce the concept of weight. • Begin to compare two items and learn how balance scales show which item is lighter or heavier. • Use simple everyday language to compare volume and capacity using the terms full, empty, nearly full and nearly empty in the context of liquids (water) and solids (sand). • Introduce the concept of times of the day and the order of events in a day. • Begin to order familiar events using clues from pictures. • Introduce the idea that the clock tells the time of the day, without having to read it.	• Compare, describe and solve practical problems for: -Lengths and heights [for example, long/short, longer/shorter, tall/short, double/half] -Mass/weight [for example, heavy/light, heavier than, lighter than] -Capacity and volume [for example, full/empty, more than, less than, half, half full, quarter] -Time [for example, quicker, slower, earlier, later] • Measure and begin to record the following: -lengths and heights -mass/weight -capacity and volume -time (hours, minutes, seconds) • Recognise and know the value of different denominations of coins and notes • Sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening] • Recognise and use language relating to dates, including days of the week, weeks, months and years • Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.	• Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels • Compare and order lengths, mass, volume/capacity and record the results using >, < and = • Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value • Find different combinations of coins that equal the same amounts of money • Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change Compare and sequence intervals of time • Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times • Know the number of minutes in an hour and the number of hours in a day.	• Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) • Measure the perimeter of simple 2-D shapes • Add and subtract amounts of money to give change, using both £ and p in practical contexts • Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks • Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight • Know the number of seconds in a minute and the number of days in each month, year and leap year • Compare durations of events [for example to calculate the time taken by particular events or tasks].	• Convert between different units of measure [for example, kilometre to metre; hour to minute] • Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres • Find the area of rectilinear shapes by counting squares • Estimate, compare and calculate different measures, including money in pounds and pence • Read, write and convert time between analogue and digital 12- and 24-hour clocks • Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	• Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) • Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes • Estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water] • Solve problems involving converting between units of time • Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.	• Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate • Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places • Convert between miles and kilometres • Recognise that shapes with the same areas can have different perimeters and vice versa • Recognise when it is possible to use formulae for area and volume of shapes • Calculate the area of parallelograms and triangles • Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].

Mathematics Progression of Knowledge and Skills

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Geometry	• Properties of 3D shapes through hands on exploration and play • Describe 3D shapes based on common properties such as curved faces, flat, faces, will roll, will not roll, will stack, will not stack • Sorting 3D shapes according to their properties • 2D shapes • Introduce the names of 2D shapes and some of the words to describe their properties. • Children will see common 2D shapes shown in different orientations. • Identification of 2D shapes within 3D shapes • Look for examples of 2D shapes in the world around them • Spatial awareness • Introduce positional and directional vocabulary: 'in', 'on', 'below', 'under', 'up', 'down', 'across' • Recognise, continue and build simple patterns. • Learn about AB patterns specifically. • Discover that patterns can be created using various shapes, colours, sizes, actions and sounds. • Explore how shapes can be composed and decomposed. • Recognise that a shape can have other shapes within it, just as a number can. • Explore the attributes of shapes through hands-on activities	• Recognise and name common 2-D and 3-D shapes, including: -2-D shapes [for example, rectangles (including squares), circles and triangles] -3-D shapes [for example, cuboids (including cubes), pyramids and spheres]. • Describe position, direction and movement, including whole, half, quarter and three quarter turns.	• Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line • Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces • Identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] • Compare and sort common 2-D and 3-D shapes and everyday objects • order and arrange combinations of mathematical objects in patterns and sequences • Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise).	• Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them • Recognise angles as a property of shape or a description of a turn • Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle • Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.	• Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes • Identify acute and obtuse angles and compare and order angles up to two right angles by size • Identify lines of symmetry in 2-D shapes presented in different orientations • Complete a simple symmetric figure with respect to a specific line of symmetry. • Describe positions on a 2-D grid as coordinates in the first quadrant • Describe movements between positions as translations of a given unit to the left/right and up/down • Plot specified points and draw sides to complete a given polygon.	• Identify 3-D shapes, including cubes and other cuboids, from 2-D representations • Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles • Draw given angles, and measure them in degrees (o) • Identify: -angles at a point and one whole turn (total 360o) -angles at a point on a straight line and 2 1 a turn (total 180o) -other multiples of 90o • Use the properties of rectangles to deduce related facts and find missing lengths and angles • Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. • Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.	• Draw 2-D shapes using given dimensions and angles • Recognise, describe and build simple 3-D shapes, including making nets • Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius • Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. • Describe positions on the full coordinate grid (all four quadrants) • Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.

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Statistics			• Interpret and construct simple pictograms, tally charts, block diagrams and simple tables • Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity • Ask and answer questions about totalling and comparing categorical data.	• Interpret and present data using bar charts, pictograms and tables • 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.	• Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. • Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	• Solve comparison, sum and difference problems using information presented in a line graph • Complete, read and interpret information in tables, including timetables.	• Interpret and construct pie charts and line graphs and use these to solve problems • Calculate and interpret the mean as an average.

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Ratio and Proportion							• Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts • Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison • Solve problems involving similar shapes where the scale factor is known or can be found • Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

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Algebra							• Use simple formulae • Generate and describe linear number sequences • Express missing number problems algebraically • Find pairs of numbers that satisfy an equation with two unknowns • Enumerate possibilities of combinations of two variables.