

"We believe, we achieve, we succeed in God's family"

THANKFULNESS • COMMUNITY • COMPASSION • TRUTHFULNESS • COURAGE • FORGIVENESS

Mathematics Knowledge and Skills Progression Overview

"Nature is written in mathematical language." Galileo Galilei

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| <p>Intent</p> | <p>Pupils work towards the national expectations at the end of each key stage (EYFS, KS1 and KS2). The intent of our mathematics curriculum is to provide children with a foundation for understanding number, reasoning, thinking logically and problem solving with resilience so that they are fully prepared for the future.</p> <ul style="list-style-type: none"> • We want all our pupils at St Mary's C of E Primary School to be enthusiastic and passionate Mathematicians who leave our school with a lifelong positive relationship with numbers • We want to instil the mind-set in every child and staff member that everyone can do maths and that maths is for everyone. • We want all our children to adopt a concrete, pictorial, abstract (CPA) approach to learning to provide children with a clear structure in which they can develop their depth of understanding of mathematical concepts. • We want key knowledge and skills to be revisited regularly allowing repetition to embed learning. • We want children to be able to use Mathematical vocabulary correctly and to articulate their understanding and reasoning of Mathematics confidently. • We want children to make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. • We want all our teaching staff to adopt a mastery approach during every lesson they teach to maximise the children's academic achievement. • We aim to embed a curriculum, which allows children to better make sense of the world around them by making connections between mathematics and everyday life. • We expect children to clearly articulate their ideas, thoughts and reasoning processes, enabling deeper learning. • We expect children to make mistakes, analyse them and learn from them, justifying and explaining as they do this. <p>It is our intention that our pupils will enjoy Mathematics and appreciate its value in everyday life. We want them to have an appreciate of the beauty and power of mathematics and a sense of enjoyment and curiosity about the subject. The school is committed to ensuring the active participation and progress of all children in</p> |
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| | <p>their learning. All children will be given equal opportunities to achieve their best possible standard, whatever their current attainment and irrespective of gender, ethnic, social or cultural background, home language or any other aspect that could affect their participation or the progress of which they are capable.</p> |
| <p>Implementation</p> | <p>At St Mary's C of E Primary School, we use the National Curriculum in Key stage 1 and 2 to support our long term planning of Mathematics and the EYFS framework in the Early Years. All lessons are carefully and creatively planned, catering for all pupils' needs and abilities, to ensure that every child has the opportunity to succeed in this area of the curriculum. The White Rose Maths Hub resources underpin and predominately support medium and short term planning for the mixed age classes. We do however give teachers the autonomy to supplement this and make changes based on the needs of their students. By using the White Rose maths scheme, we know that we are providing our pupils with an ambitious, connected curriculum accessible to all of our pupils from Reception to year six which covers all of the content of the National Curriculum. The use of Mathematical vocabulary reinforces our Mathematics teaching and is consistently modelled to children in lessons, the meanings discussed and pupils are encouraged to use this language to support their Mathematical thinking and reasoning. We also use the National Centre for Excellence in the Teaching of Mathematics to support reasoning and problem solving opportunities for pupils.</p> <p>Teachers check understanding and correct misunderstandings through the use of assessment for learning which takes place continuously through the marking of written work, verbal answers given in class and group discussion and summative assessments. Any gaps in learning, common misconceptions and misunderstandings are identified and addressed appropriately through plenaries and mini plenaries or at the start of the next lesson through oral feedback sessions where children can respond and make corrections. This gives all of our children the opportunity to learn from their mistakes.</p> <p>Maths days and inter-school competitions help encourage our pupils' enthusiasm and excitement for Mathematics. Taking part in these sessions provides children with the opportunity to have some real fun with Maths whilst also further developing their Mathematical thinking and understanding.</p> |
| <p>Impact</p> | <p>The school has a supportive ethos and our approaches supports the children in developing their collaborative and independent skills, as well as empathy and the need to recognise the achievement of others. Assessment for Learning is fundamental to raising standards and enabling children to reach their potential. Assessment in Mathematics takes place daily using a range of strategies such as live feedback of work within lessons together with verbal discussions with children. Assessment of learning is formally completed through a termly assessment tool called PIXL. These assessments review the whole term's objectives. Teachers use assessment information to inform their future planning. Statutory testing results and the MTC are also used to assess our pupils.</p> |

National Curriculum Requirements

EYFS

Number

Numerical Patterns

Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

KS1

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.

KS2

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.

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.

Enrichment Opportunities

NSPCC Number day – dress up as a digit

Fibonacci day

Maths Trust Competitions

Enterprise opportunities – pupils made Forest School Christmas decorations and sold them for profit

Fiver Challenge

Kids Zone – kids rock at Metro Bank

More Able Maths Day with SWF School partnership

Teaching Through Topics

Statistics - using graphs in Science, collecting data in Computing, comparing statistics over time in History, drawing graphs to collect weather data in Geography.

Roman Numerals - taught through the topic of Romans within History

Geometry (shape and symmetry) - using shapes within tessellations when looking at Islamic Art (R.E), using shapes within Art (Kandinsky), symmetry within Art


Measurement - reading scales (science, design technology).

Co-ordinates - using co-ordinates with maps in Geography and orienteering.


Written methods of the four operations- finding the time difference between years in History, adding or finding the difference of populations in Geography, calculating and changing recipes in food technology.

Position and direction - Programming in ICT, Forest Schools


EYFS

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| <p>Mathematics</p> <p><i>We follow the White Rose Maths Scheme of Learning</i></p>  | Phase | <p>Getting to know you <i>Opportunities for settling in, introducing the areas of provision and getting to know the children. Key times of the day, class routines. Exploring the continuous provision, inside and out. Where do things belong? Positional language.</i></p> | Just like me! | It's Me 1, 2, 3! | Light & Dark | Alive in 5! | Growing 6, 7, 8 | Building 9 & 10 | To 20 and beyond | First Then Now | Find my Pattern | On the Move |
| | Number | | Match & sort Compare amounts | Representing, comparing & composition of 1, 2, 3 | Representing numbers to 5 One more & one less | Introducing zero Comparing numbers to 5 Composition of 4 & 5 | 6, 7 & 8 Combining two amounts Making pairs | Counting to 9 & 10 Comparing numbers to 10 Bonds to 10 | Building numbers beyond 10 Counting patterns beyond 10 | Adding more Taking away | Doubling Sharing & grouping Even & odd | Deepening understanding Patterns & relationships |
| | Measure, Shape & Spatial Thinking | | Compare size, mass & capacity Exploring pattern | Circles & triangles Positional language | Shapes with 4 sides Time | Compare mass (2) Compare capacity (2) | Length & height Time | 3-d shapes Spatial Awareness Patterns | Spatial reasoning (1) Match, rotate and manipulate | Spatial reasoning (2) Compose & decompose | Spatial reasoning (3) Visualise & build | Spatial reasoning (4) Mapping |


YEAR 1 & 2

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|---|--|---|--|---|---|---|
| <p>Mathematics</p>  | AUT 1 | AUT 2 | SPR 1 | SPR 2 | SUM 1 | SUM 2 |
| | <p>Number Place value within 10</p> | <p>Number Addition and subtraction - within 10 Geometry Shape</p> | <p>Number Place value within 20 – using money as a context Addition and Subtraction - within 20 – using money as a context Measures Money</p> | <p>Number Place value within 50 – using measures as a context Measures Length & height Mass & volume</p> | <p>Number Multiplication & division Fractions Geometry Position and direction – retrieval practise in Forest School sessions</p> | <p>Number Place Value within 100 – using money as a context Measures Time Consolidations and investigations</p> |

YEAR 3 & 4

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|---|---|--|---|---|--|---|
| <p>Mathematics</p>  | AUT 1 | AUT 2 | SPR 1 | SPR 2 | SUM 1 | SUM 2 |
| | <p>Number Place value Addition and subtraction Use measures as a context Measures Area</p> | <p>Number Multiplication & division</p> | <p>Number Multiplication & division – using perimeter & area as a context where appropriate Measures Length & perimeter Mass & capacity</p> | <p>Number Fractions & decimals</p> | <p>Number Decimals (inc money) Measures Time</p> | <p>Geometry Properties of shape Position and direction – retrieval practise in Forest School sessions Consolidations and investigations</p> |

YEAR 5 & 6

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| <p>Mathematics</p>  | AUT 1 | AUT 2 | SPR 1 | SPR 2 | SUM 1 | SUM 2 |
| | <p>Number Place value – inc negative numbers Addition and subtraction Four operations</p> | <p>Number Fractions, decimals & percentages Measures Converting units</p> | <p>Number Multiplication & division – using perimeter & area as a context where appropriate Statistics</p> | <p>Measures Area, perimeter & volume Number Ratio & proportion</p> | <p>Geometry Shape Position and direction – retrieval practise in Forest School sessions</p> | <p>Number Fractions, decimals & percentages Measures Converting units Consolidations and investigations</p> |

Progression in Mathematics

Number & Place Value

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| <p>Number Have a deep understanding of number to 10, including the composition of each number</p> <p>Subitise (recognise quantities without counting) up to 5</p> <p>Numerical patterns Verbally count beyond 20, recognising the pattern of the counting system</p> | <p>count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number</p> <p>count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens</p> <p>given a number, identify one more and one less</p> <p>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</p> <p>read and write numbers from 1 to 20 in numerals and words</p> | <p>count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward</p> <p>recognise the place value of each digit in a two-digit number (tens, ones)</p> <p>identify, represent and estimate numbers using different representations, including the number line</p> <p>compare and order numbers from 0 up to 100; use and = signs</p> <p>read and write numbers to at least 100 in numerals and in words</p> <p>use place value and number facts to solve problems</p> | <p>count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number</p> <p>recognise the place value of each digit in a three-digit number (hundreds, tens, ones)</p> <p>compare and order numbers up to 1000</p> <p>identify, represent and estimate numbers using different representations</p> <p>read and write numbers up to 1000 in numerals and in words</p> <p>solve number problems and practical problems involving these ideas</p> | <p>count in multiples of 6, 7, 9, 25 and 1000</p> <p>find 1000 more or less than a given number</p> <p>count backwards through zero to include negative numbers</p> <p>recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)</p> <p>order and compare numbers beyond 1000</p> <p>identify, represent and estimate numbers using different representations</p> <p>round any number to the nearest 10, 100 or 1000</p> | <p>read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit</p> <p>count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000</p> <p>interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero</p> <p>round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000</p> <p>solve number problems and practical problems that involve all of the above</p> | <p>read, write, order and compare numbers up to 10 000 000 and determine the value of each digit</p> <p>round any whole number to a required degree of accuracy</p> <p>use negative numbers in context, and calculate intervals across zero</p> <p>solve number and practical problems that involve all of the above</p> |

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| | | | | <p>solve number and practical problems that involve all of the above and with increasingly large positive numbers</p> <p>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</p> | <p>read Roman numerals to 1000 (M) and recognise years written in Roman numerals</p> | |
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Addition and subtraction

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| <p>Number Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.</p> <p>Numerical patterns Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity</p> | <p>read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs</p> <p>represent and use number bonds and related subtraction facts within 20</p> <p>add and subtract one-digit and two digit numbers to 20, including zero</p> <p>solve one-step problems that involve addition and</p> | <p>solve problems with addition and subtraction:</p> <ul style="list-style-type: none"> • using concrete objects and pictorial representations, including those involving numbers, quantities and measures • applying their increasing knowledge of mental and written methods <p>recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to</p> | <p>add and subtract numbers mentally, including:</p> <ul style="list-style-type: none"> • a three-digit number and ones • a three-digit number and tens • a three-digit number and hundreds <p>add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction</p> <p>estimate the answer to a calculation and use inverse</p> | <p>add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate</p> <p>estimate and use inverse operations to check answers to a calculation</p> <p>solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why</p> | <p>add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</p> <p>add and subtract numbers mentally with increasingly large numbers</p> <p>use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy</p> | <p>4 Operations multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication</p> <p>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</p> |

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| | subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \bigcirc - 9$ | <p>100 add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <ul style="list-style-type: none"> • 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 <p>recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems</p> | <p>operations to check answers</p> <p>solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction</p> | | <p>solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</p> | <p>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</p> <p>perform mental calculations, including with mixed operations and large numbers</p> <p>identify common factors, common multiples and prime numbers</p> <p>use their knowledge of the order of operations to carry out calculations involving the four operations</p> |
| Multiplication & division | | | | | | |
| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | |
| Numerical patterns Explore and represent patterns within numbers up to 10, including | solve one-step problems involving multiplication and division, by calculating the | recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, | recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables | recall multiplication and division facts for multiplication tables up to 12×12 | identify multiples and factors, including finding all factor pairs of a number, and | solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why |

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| <p>evens and odds, double facts and how quantities can be distributed equally</p> | <p>answer using concrete objects, pictorial representations and arrays with the support of the teacher</p> | <p>including recognising odd and even numbers</p> <p>calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs</p> <p>show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot</p> <p>solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts</p> | <p>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</p> <p>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</p> | <p>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</p> <p>recognise and use factor pairs and commutativity in mental calculations</p> <p>multiply two-digit and three digit numbers by a one-digit number using formal written layout</p> <p>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</p> | <p>common factors of two numbers</p> <p>know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers</p> <p>establish whether a number up to 100 is prime and recall prime numbers up to 19</p> <p>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</p> <p>multiply and divide numbers mentally drawing upon known facts</p> <p>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</p> | <p>solve problems involving addition, subtraction, multiplication and division</p> <p>use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy</p> |
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| | | | | | <p>multiply and divide whole numbers and those involving decimals by 10, 100 and 1000</p> <p>recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)</p> <p>solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes</p> <p>solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign</p> <p>solve problems involving multiplication and division, including scaling by simple</p> | |
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fractions and problems involving simple rates

Fractions (decimals and percentages)

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| | 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 $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$ | 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 non -unit fractions with small denominators recognise and use fractions as numbers: unit fractions and non -unit fractions with small denominators recognise and show, using diagrams, equivalent fractions with small denominators add and subtract fractions with the same denominator | 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 | 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, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1 \frac{1}{5}$] add and subtract fractions with the same denominator and denominators that are multiples of the same number | 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, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$] divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] |

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| | | | <p>within one whole [for example, $5/7 + 1/7 = 6/7$]</p> <p>compare and order unit fractions, and fractions with the same denominators solve problems that involve all of the above</p> | <p>of any number of tenths or hundredths</p> <p>recognise and write decimal equivalents to $1/4, 1/2, 3/4$</p> <p>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</p> <p>round decimals with one decimal place to the nearest whole number</p> <p>compare numbers with the same number of decimal places up to two decimal places</p> <p>solve simple measure and money problems involving fractions and decimals to two decimal places</p> | <p>multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams</p> <p>read and write decimal numbers as fractions [for example, $0.71 = 71/100$]</p> <p>recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents</p> <p>round decimals with two decimal places to the nearest whole number and to one decimal place</p> <p>read, write, order and compare numbers with up to three decimal places</p> <p>solve problems involving number up to three decimal places</p> <p>recognise the per cent symbol (%) and understand that per</p> | <p>associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $3/8$]</p> <p>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</p> <p>multiply one -digit numbers with up to two decimal places by whole numbers</p> <p>use written division methods in cases where the answer has up to two decimal places</p> <p>solve problems which require answers to be rounded to specified degrees of accuracy</p> <p>recall and use equivalences between simple fractions, decimals</p> |
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| | | | | | <p>cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal</p> <p>solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25</p> | and percentages, including in different contexts |
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Ratio & proportion

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| | | | | <p><i>Use the language of ratio and Proportion</i></p> <p><i>Understand the relationship between ratio, proportion and fractions</i></p> <p><i>Understand the relationship between scaling and multiplication</i></p> <p><i>Create coloured strips, identifying the ratio and proportion of colours</i></p> <p><i>Solve recipe problems</i></p> | <p><i>Use the language of ratio and proportion</i></p> <p><i>Understand the relationship between ratio, proportion and fractions</i></p> <p><i>Understand the relationship between scaling and multiplication</i></p> <p><i>Create coloured strips, identifying the ratio and proportion of colours</i></p> | <p>solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts</p> <p>solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison</p> |

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| | | | | <i>involving ratio and proportion, and scaling</i> | <i>Solve recipe problems involving ratio and proportion, and scaling</i> | <p>solve problems involving similar shapes where the scale factor is known or can be found</p> <p>solve problems involving unequal sharing and grouping using knowledge of fractions and multiples</p> |
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Algebra

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| | <p><i>Understand the power of the = sign</i></p> <p><i>Solve balancing calculations</i></p> <p><i>Recognise and use number sentences written in different ways</i></p> <p><i>Solve missing number calculations</i></p> <p><i>What's the same? What's the difference? questions</i></p> | <p><i>Understand < and ></i></p> <p><i>Understand the power of the = sign</i></p> <p><i>Solve balancing calculations</i></p> <p><i>Recognise and use number sentences written in different ways</i></p> <p><i>Solve missing number calculations</i></p> <p><i>What's the same? What's the difference? questions</i></p> | <p><i>Understand < and ></i></p> <p><i>Understand the power of the = sign</i></p> <p><i>Solve balancing calculations</i></p> <p><i>Recognise and use number sentences written in different ways</i></p> <p><i>Solve missing number calculations</i></p> <p><i>What's the same? What's the difference? questions</i></p> | <p><i>Understand < and ></i></p> <p><i>Understand the power of the = sign</i></p> <p><i>Solve balancing calculations</i></p> <p><i>Recognise and use number sentences written in different ways</i></p> <p><i>Solve missing number calculations</i></p> <p><i>What's the same? What's the difference? questions</i></p> | <p><i>Understand < and ></i></p> <p><i>Understand the power of the = sign</i></p> <p><i>Solve balancing calculations</i></p> <p><i>Recognise and use number sentences written in different ways</i></p> <p><i>Solve missing number calculations</i></p> <p><i>What's the same? What's the difference? questions</i></p> | <p>use simple formulae</p> <p>generate and describe linear number sequences</p> <p>express missing number problems algebraically</p> <p>find pairs of numbers that satisfy an equation with two unknowns</p> <p>enumerate possibilities of combinations of two variables</p> |

Measurement

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|-------------|---------------|---------------|---------------|---------------|---------------|---------------|
|-------------|---------------|---------------|---------------|---------------|---------------|---------------|

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|--|---|--|--|---|--|---|
| | <p>compare, describe and solve practical problems for:</p> <ul style="list-style-type: none"> 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] <p>measure and begin to record the following:</p> <ul style="list-style-type: none"> lengths and heights mass/weight capacity and volume time (hours, minutes, seconds) <p>recognise and know the value of different denominations of coins and notes</p> <p>sequence events in chronological order</p> | <p>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</p> <p>compare and order lengths, mass, volume/capacity and record the results using >, < and =</p> <p>recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value</p> <p>find different combinations of coins that equal the same amounts of money</p> <p>solve simple problems in a practical context involving addition and subtraction of money of the same unit,</p> | <p>measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)</p> <p>measure the perimeter of simple 2-D shapes</p> <p>add and subtract amounts of money to give change, using both £ and p in practical contexts</p> <p>tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks</p> <p>estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight</p> | <p>Convert between different units of measure [for example, kilometre to metre; hour to minute]</p> <p>measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres</p> <p>find the area of rectilinear shapes by counting squares</p> <p>estimate, compare and calculate different measures, including money in pounds and pence</p> <p>read, write and convert time between analogue and digital 12- and 24-hour clocks</p> <p>solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days</p> | <p>convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)</p> <p>understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints</p> <p>measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres</p> <p>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</p> | <p>solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate</p> <p>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</p> <p>convert between miles and kilometres</p> <p>recognise that shapes with the same areas can have different perimeters and vice versa</p> <p>recognise when it is possible to use formulae for area and volume of shapes</p> |
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| | <p>using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]</p> <p>recognise and use language relating to dates, including days of the week, weeks, months and years</p> <p>tell the time to the hour and half past the hour and draw the hands on a clock face to show these times</p> | <p>including giving change</p> <p>compare and sequence intervals of time</p> <p>tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times</p> <p>know the number of minutes in an hour and the number of hours in a day</p> | <p>know the number of seconds in a minute and the number of days in each month, year and leap year</p> <p>compare durations of events [for example to calculate the time taken by particular events or tasks]</p> | | <p>estimate volume [for example, using 1 cm³ blocks to build cuboids (including cubes)] and capacity [for example, using water]</p> <p>solve problems involving converting between units of time</p> <p>use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling</p> | <p>calculate the area of parallelograms and triangles</p> <p>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]</p> |
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Properties of shape

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|--|--|--|---|--|--|
| <p>Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can</p> <p>Select, rotate and manipulate shapes to develop spatial reasoning skills</p> | <p>recognise and name common 2-D and 3-D shapes, including:</p> <ul style="list-style-type: none"> • 2-D shapes [for example, rectangles (including squares), circles and triangles] • 3-D shapes [for example, cuboids (including cubes), pyramids and spheres] | <p>identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line</p> <p>identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces</p> | <p>draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them</p> <p>recognise angles as a property of shape or a description of a turn</p> | <p>compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes</p> <p>identify acute and obtuse angles and compare and order angles up to two right angles by size</p> | <p>identify 3-D shapes, including cubes and other cuboids, from 2-D representations</p> <p>know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles</p> | <p>draw 2-D shapes using given dimensions and angles</p> <p>recognise, describe and build simple 3-D shapes, including making nets</p> <p>compare and classify geometric shapes based on their</p> |

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| | | <p>identify 2-D shapes on the surface of 3-D shapes [for example, a circle on a cylinder and a triangle on a pyramid]</p> <p>compare and sort common 2-D and 3-D shapes and everyday objects</p> | <p>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</p> <p>identify horizontal and vertical lines and pairs of perpendicular and parallel lines</p> | <p>identify lines of symmetry in 2-D shapes presented in different orientations</p> <p>complete a simple symmetric figure with respect to a specific line of symmetry</p> | <p>draw given angles, and measure them in degrees ($^{\circ}$)</p> <p>identify:</p> <ul style="list-style-type: none"> • angles at a point and one whole turn (total 360°) • angles at a point on a straight line and $1/2$ a turn (total 180°) • other multiples of 90° <p>use the properties of rectangles to deduce related facts and find missing lengths and angles</p> <p>distinguish between regular and irregular polygons based on reasoning about equal sides and angles</p> | <p>properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons</p> <p>illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius</p> <p>recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles</p> |
|--|--|--|---|---|---|---|

Position & direction

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|------|---|--|---|---|--|---|
| | <p>describe position, direction and movement, including whole, half, quarter and three-quarter turns.</p> | <p>order and arrange combinations of mathematical objects in patterns and sequences</p> <p>use mathematical vocabulary to describe position,</p> | <p>Recap Y2 objectives and prepare for Y4 objectives</p> | <p>describe positions on a 2-D grid as coordinates in the first quadrant</p> <p>describe movements between positions as translations of a given</p> | <p>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</p> | <p>describe positions on the full coordinate grid (all four quadrants)</p> <p>draw and translate simple shapes on the coordinate plane, and</p> |

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| | | 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) | | unit to the left/right and up/down plot specified points and draw sides to complete a given polygon | | reflect them in the axes |
|--|--|--|--|--|--|--------------------------|

Statistics

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|------|----------------------------------|---|---|--|---|--|
| | Prepare for Y2 objectives | 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 |

Vocabulary

Number & Place Value

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|--|--|---|--|--|--------------------------|
| Count Subtise Oder Compare Forwards Backwards Numerals Digit One more One less Equal to More than Less than | Sort Represent Multiples Partitioning Ones Tens | Count in steps Count in multiples Place value Estimate Compare | Ascending Descending 10 or 100 more 10 or 100 less Hundreds | Negative numbers Roman numerals 1000 more 1000 less Thousands Round | Ten thousands One hundred thousands Powers of Integer | Millions Ten Millions |

Addition & Subtraction

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|--|--------------------------------------|---|---|--------|--------|
| Add Plus Altogether Total Take away – minus Number bonds Part Whole Digit | Addition/add Subtraction Difference Equals Fact Problems Missing number problems 2-digit number Inverse | Sum 3-digit number Commutative | Column addition Column subtraction exchange estimate | 4-digit number Operations Methods | | |

Multiplication & Division

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|--|--------------------------------------|---|--|---|---|--------------------------------------|
| Double Half Twice as many Equal Unequal Share | Multiplication Division Arrays | Multiplication tables Commutative Repeated addition | Exchange Mathematical statements Missing number problems Integer scaling problems | Factor pairs Formal written layout Distributive law Remainders | Multiples Factors Prime numbers Square numbers Cube numbers Short division | Multi-digit numbers Long division |

| | | | | | | |
|----------------------|--|--|---|--|--|--|
| Group Odd Even | | | Correspondence problems Derived facts | | Product Dividend Divisor Quotient Operations | |
|----------------------|--|--|---|--|--|--|

Fractions/decimals/percentages

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|------|---|--|--------|---|--|---|
| | Whole Half Quarter Equal parts | Three quarters Third Equivalent fractions Unit fractions Non unit fractions Numerator Denominator One whole | Tenths | Decimal equivalence Hundredths Convert Proper fractions Improper fractions Decimal point | Fifth Thousandths Mixed numbers Per cent % Factors Integer Complements | Ratio & Proportion Relative size Missing values Integer multiplication Percentages Scale factor Unequal sharing & grouping |

Algebra – Year 6

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|------|--------|--------|--------|--------|--------|--|
| | | | | | | Formulae Linear number sequences Algebraically Equation Unknowns Combinations Variables |

Measurement (measure & length)

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---------|---|----------------------------|---|---|--|
| Measure Wide(er) Narrow(er) Compare Long(er)(est) Short(er)(est) Length | Compare | Standard units Estimate Order Record results Centimetre cm Metre m | Millimetre mm Perimeter | Kilometres km Rectilinear figure Area | Decimal notation Scaling Metric units Imperial units Inches Compound shape Irregular shapes Square centimetres | Conversion Miles Formulae Parallelograms Triangles Feet |

| | | | | | | Square metres |
|---|--|--|---|--------|-------------------------------------|---|
| Measurement (height / weight / capacity) | | | | | | |
| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Height Long(er)/short(er) Tall(er)/short(er) Weight Capacity Heavy/light Heavier than Lighter than Big/bigger/biggest Full/empty More than Less than Half/half full | Mass Volume | Kilogram kg Gram g Quarter full Three quarters full Litres l Millilitres ml Temperature Celsius | | | Cubic centimetre Pounds Pints | Cubic metre Cubic millimetre Cubic kilometre Gallons Stones Ounces |
| Measurement (Time) | | | | | | |
| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Time Quicker Slower Earlier Later Before After First Next Today Yesterday Tomorrow Morning Afternoon Evening Day Week Hour Minutes | Chronological order Days of the week Months of the year Month Year O'clock Half past Second | Intervals of time Quarter past/to Duration | Analogue clock Roman numerals 12-hour clock 24-hour clock A.m./p.m. Noon Midnight Leap year Digital | | | |
| Measurement (Money) | | | | | | |

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|------|--|-----------------|--------|--------|--------|--------|
| | Money Coins Notes Pounds £ Pence p | Value Change | | | | |

Geometry – properties of shape

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|--|---|--|--------------------------------------|---|
| 2-d shapes Rectangle Square Circle Triangle Characteristics 3-d shapes Cuboids Cubes Cone Spheres curved Straight Flat | Sides Corners Properties Pyramids Faces | Pentagon Hexagon Line of symmetry Properties Cylinder Edges Vertices Vertex | Right-angle triangle Heptagon Octagon Polygon Properties Prism | Isosceles Equilateral Scalene Trapezium Rhombus Parallelogram Kite Geometric shapes Quadrilaterals | Regular polygon Irregular polygon | Radius Diameter Circumference Dimensions |

Geometry – properties of shape (2)

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|------|--------|--------|--|--------|---|--------|
| | | | orientations angles acute angle obtuse angle turn right angles half turn three quarters of a turn greater than right angle less than right angle horizontal lines vertical lines perpendicular lines parallel lines | | reflex angles degrees one whole turn angles on straight line angles around a point vertically opposite missing angles | |

Geometry – position and direction

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|--|---|--------|--|------------|-------------------------------------|
| Over Under Between Around Through On Into Next to Behind Beneath Order Repeat Patterns On top of | Position Direction Movement Whole turn Quarter turn Half turn Three-quarter turn | Clockwise/anti-clockwise Straight line Rotation Arrange Sequences | | Co-ordinates First quadrant Grid Translation Plot Polygon Axis | Reflection | Four quadrants Co-ordinate plane |

Statistics

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|------|--------|---|--|---|----------------------------|-------------------|
| | | Pictograms Tally chart Block diagram Category Sorting Totalling Comparing Horizontal Vertical | Table Bar chart One-step problem Two-step problem | Time graph Discrete data Continuous data Line graph Comparison problem Sum problem Difference problem Calculate Interpret | Timetable Two-way table | Pie chart Mean |