

## Early Years

encouraging children planning and guiding what children learn, practitioners must reflect on the different rates at which children are developing and adjust their practice appropriately. Three characteristics of effective teaching and learning are:

- playing and exploring - children investigate and experience things, and 'have a go'
  - active learning - children concentrate and keep on trying if they encounter difficulties, and enjoy achievements
  - creating and thinking critically - children have and develop their own ideas, make links between ideas, and develop strategies for doing things
- In addition, the Prime Areas of Learning (Personal, Social and Emotional Development, Communication and Language and Physical Development) underpin and are an integral part of children's learning in all areas.

### EYFS Mathematics (Statutory)

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.

### EYFS Mathematics

Number	Number facts	Numerical Patterns	Measure, Shape and Space	Key vocabulary
<ul style="list-style-type: none"> <li>• <b>Have a deep understanding</b> of number to 10, including the composition of each number;</li> <li>• <b>Subitise</b> (recognise quantities without counting) up to 5</li> </ul>	<ul style="list-style-type: none"> <li>• Automatically <b>recall</b> (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.</li> </ul>	<ul style="list-style-type: none"> <li>• Verbally <b>count</b> beyond 20, <b>recognising</b> the pattern of the counting system;</li> <li>• <b>Compare</b> quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;</li> <li>• <b>Explore and represent</b> patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.</li> </ul>	<ul style="list-style-type: none"> <li>• Safely <b>use</b> and <b>explore</b> a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function; including measuring.</li> <li>• <b>Recognise</b> a range of shapes and link items that have the same shape.</li> </ul>	<p><b>Use</b> enriching and widening children's vocabulary that will support later reading comprehension</p> <p>See vocabulary sheets.</p>
<ul style="list-style-type: none"> <li>• Count</li> <li>• Read and write</li> <li>• Identify</li> <li>• Represent</li> </ul>	<ul style="list-style-type: none"> <li>• Recall</li> <li>• Count</li> <li>• Add</li> <li>• Subtract</li> </ul>	<ul style="list-style-type: none"> <li>• Count</li> <li>• Compare</li> <li>• Explore</li> <li>• Represent</li> </ul>	<ul style="list-style-type: none"> <li>• Use</li> <li>• Explore</li> <li>• Recognise</li> </ul>	<ul style="list-style-type: none"> <li>• Use</li> <li>• Explore</li> </ul>

## National Curriculum

### Key Stage 1

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools]. At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

### Key Stage 2

**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 4 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 4 operations, including long multiplication and division, and in working with fractions, decimals and percentages.

Pupils should read, spell and pronounce mathematical vocabulary correctly.

## Progression of knowledge of skills – Number and Place Value

Strand	1	2	3	4	5	6
<b><u>Number and place value</u></b>	<ul style="list-style-type: none"> <li>• <b>count</b> to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number</li> <li>• <b>count, read and write</b> numbers to 100 in numerals; <b>count</b> in multiples of 2s, 5s and 10s</li> <li>• given a number, <b>identify</b> 1 more and 1 less</li> <li>• <b>identify and represent</b> numbers using objects and pictorial representations including the number line, and <b>use</b> the language of: equal to, more than, less than (fewer), most, least</li> <li>• <b>read and write</b> numbers from 1 to 20 in numerals and words</li> </ul>	<ul style="list-style-type: none"> <li>• <b>count</b> in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward</li> <li>• <b>recognise</b> the place value of each digit in a two-digit number (10s, 1s)</li> <li>• <b>identify, represent and estimate</b> numbers using different representations, including the number line</li> <li>• <b>compare and order</b> numbers from 0 up to 100; use &lt;, &gt; and = signs</li> <li>• <b>read and write</b> numbers to at least 100 in numerals and in words</li> <li>• <b>use</b> place value and number facts to solve problems</li> </ul>	<ul style="list-style-type: none"> <li>• <b>count</b> from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number.</li> <li>• <b>recognise</b> the place value of each digit in a 3-digit number (100s, 10s, 1s)</li> <li>• <b>compare and order</b> numbers up to 1,000</li> <li>• <b>identify, represent and estimate</b> numbers using different representations</li> <li>• <b>read and write</b> numbers up to 1,000 in numerals and in words</li> <li>• <b>solve</b> number problems and practical problems involving these ideas</li> </ul>	<ul style="list-style-type: none"> <li>• <b>count</b> in multiples of 6, 7, 9, 25 and 1,000</li> <li>• <b>identify</b> 1,000 more or less than a given number</li> <li>• <b>count backwards</b> through 0 to include negative numbers</li> <li>• <b>recognise</b> the place value of each digit in a four-digit number (1,000s, 100s, 10s, and 1s)</li> <li>• <b>order and compare</b> numbers beyond 1,000</li> <li>• <b>identify, represent and estimate</b> numbers using different representations</li> <li>• <b>round</b> any number to the nearest 10, 100 or 1,000</li> <li>• <b>solve</b> number and practical problems that involve all of the above and with increasingly large positive numbers</li> <li>• <b>read</b> Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of 0 and place value</li> </ul>	<ul style="list-style-type: none"> <li>• <b>read, write, order and compare</b> numbers to at least 1,000,000 and <b>determine the value</b> of each digit</li> <li>• <b>count forwards or backwards</b> in steps of powers of 10 for any given number up to 1,000,000</li> <li>• <b>interpret</b> negative numbers in context, <b>count forwards and backwards</b> with positive and negative whole numbers, including through 0</li> <li>• <b>round</b> any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000</li> <li>• <b>solve</b> number problems and practical problems that involve all of the above</li> <li>• <b>read</b> Roman numerals to 1,000 (M) and recognise years written in Roman numerals</li> </ul>	<ul style="list-style-type: none"> <li>• <b>read, write, order and compare</b> numbers up to 10,000,000 and <b>determine the value</b> of each digit</li> <li>• <b>round</b> any whole number to a required degree of accuracy</li> <li>• <b>use</b> negative numbers in context, and <b>calculate</b> intervals across 0</li> <li>• <b>solve</b> number and practical problems that involve all of the above</li> </ul>
Skills	<ul style="list-style-type: none"> <li>○ Count</li> <li>○ Read and write</li> <li>○ Identify</li> <li>○ Represent</li> <li>○ Use</li> </ul>	<ul style="list-style-type: none"> <li>○ Count</li> <li>○ Read and write</li> <li>○ Identify</li> <li>○ Recognise</li> <li>○ Represent</li> <li>○ Use</li> <li>○ Compare and order</li> </ul>	<ul style="list-style-type: none"> <li>○ Count</li> <li>○ Read and write</li> <li>○ Identify</li> <li>○ Recognise</li> <li>○ Represent</li> <li>○ Use</li> <li>○ Compare and order</li> <li>○ Estimate</li> <li>○ Solve</li> </ul>	<ul style="list-style-type: none"> <li>○ Count</li> <li>○ Read and write</li> <li>○ Identify</li> <li>○ Recognise</li> <li>○ Represent</li> <li>○ Compare and order</li> <li>○ Estimate</li> <li>○ Solve</li> <li>○ Round</li> </ul>	<ul style="list-style-type: none"> <li>○ Count</li> <li>○ Read and write</li> <li>○ Identify</li> <li>○ Recognise</li> <li>○ Represent</li> <li>○ Compare and order</li> <li>○ Estimate</li> <li>○ Solve</li> <li>○ Round</li> <li>○ Determine</li> <li>○ Interpret</li> </ul>	<ul style="list-style-type: none"> <li>○ Read and write</li> <li>○ Identify</li> <li>○ Recognise</li> <li>○ Calculate</li> <li>○ Compare and order</li> <li>○ Estimate</li> <li>○ Solve</li> <li>○ Round</li> <li>○ Determine</li> <li>○ Use</li> </ul>

## Progression of knowledge of skills – Addition and Subtraction

Strand	1	2	3	4	5	6
<b>Addition and Subtraction</b>	<ul style="list-style-type: none"> <li>• <b>read, write and interpret</b> mathematical statements involving addition (+), subtraction (-) and equals (=) signs</li> <li>• <b>represent and use</b> number bonds and related subtraction facts within 20</li> <li>• <b>add and subtract</b> one-digit and two-digit numbers to 20, including 0</li> <li>• <b>solve</b> one-step problems that involve <b>addition</b> and <b>subtraction</b>, using concrete objects and pictorial <b>representations</b>, and missing number problems such as <math>7 = ? - 9</math></li> </ul>	<ul style="list-style-type: none"> <li>• <b>solve</b> problems with <b>addition</b> and <b>subtraction</b>:                             <ul style="list-style-type: none"> <li>○ <b>using</b> concrete objects and pictorial <b>representations</b>, including those involving numbers, quantities and measures</li> <li>○ <b>applying</b> their increasing knowledge of <b>mental</b> and <b>written</b> methods</li> </ul> </li> <li>• <b>recall</b> and <b>use addition</b> and <b>subtraction</b> facts to 20 <b>fluently</b>, and <b>derive</b> and <b>use</b> related facts up to 100</li> <li>• <b>add and subtract</b> numbers using concrete objects, pictorial <b>representations</b>, and <b>mentally</b>, including:                             <ul style="list-style-type: none"> <li>○ a two-digit number and 1s</li> <li>○ a two-digit number and 10s</li> <li>○ 2 two-digit numbers</li> <li>○ adding 3 one-digit numbers</li> </ul> </li> <li>• <b>show</b> that <b>addition</b> of 2 numbers can be done in any order (commutative) and <b>subtraction</b> of 1 number from another cannot</li> <li>• <b>recognise</b> and <b>use</b> the <b>inverse</b> relationship between <b>addition</b> and <b>subtraction</b> and use this to <b>check</b> calculations and <b>solve</b> missing number problems</li> </ul>	<ul style="list-style-type: none"> <li>• <b>add and subtract</b> numbers <b>mentally</b>, including:                             <ul style="list-style-type: none"> <li>○ a three-digit number and 1s</li> <li>○ a three-digit number and 10s</li> <li>○ a three-digit number and 100s</li> </ul> </li> <li>• <b>add and subtract</b> numbers with up to 3 digits, <b>using formal written</b> methods of columnar addition and <b>subtraction</b></li> <li>• <b>estimate</b> the answer to a <b>calculation</b> and <b>use inverse</b> operations to <b>check</b> answers</li> <li>• <b>solve</b> problems, including missing number problems, <b>using</b> number facts, place value, and more complex <b>addition</b> and <b>subtraction</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>add and subtract</b> numbers with up to 4 digits <b>using the formal written</b> methods of columnar <b>addition</b> and <b>subtraction</b> where appropriate</li> <li>• <b>estimate</b> and <b>use inverse</b> operations to <b>check</b> answers to a <b>calculation</b></li> <li>• <b>solve addition</b> and <b>subtraction</b> two-step problems in contexts, <b>deciding</b> which operations and methods to <b>use</b> and why</li> </ul>	<ul style="list-style-type: none"> <li>• <b>add and subtract</b> whole numbers with more than 4 digits, including <b>using formal written</b> methods (columnar <b>addition</b> and <b>subtraction</b>)</li> <li>• <b>add and subtract</b> numbers <b>mentally</b> with increasingly large numbers</li> <li>• <b>use rounding</b> to <b>check</b> answers to <b>calculations</b> and <b>determine</b>, in the context of a <b>problem</b>, levels of accuracy</li> <li>• <b>solve addition</b> and <b>subtraction multi-step problems</b> in contexts, <b>deciding</b> which operations and methods to <b>use</b> and why</li> </ul>	<ul style="list-style-type: none"> <li>• <b>perform mental calculations</b>, including with mixed operations and large numbers</li> <li>• <b>use</b> their knowledge of the <b>order of operations</b> to carry out <b>calculations</b> involving the 4 operations</li> <li>• <b>solve addition and subtraction</b> multi-step problems in contexts, <b>deciding</b> which operations and methods to <b>use</b> and why</li> <li>• <b>solve</b> problems involving <b>addition and subtraction</b></li> <li>• <b>use estimation</b> to <b>check</b> answers to <b>calculations</b> and <b>determine</b>, in the context of a problem, an appropriate degree of accuracy</li> </ul>
Skills	<ul style="list-style-type: none"> <li>○ Read and write</li> <li>○ Interpret</li> <li>○ Represent</li> <li>○ Use</li> <li>○ Add</li> <li>○ Subtract</li> </ul>	<ul style="list-style-type: none"> <li>○ Recall</li> <li>○ Check</li> <li>○ Represent</li> <li>○ Use</li> <li>○ Add</li> <li>○ Subtract</li> <li>○ Solve</li> <li>○ Apply</li> <li>○ Mental methods</li> <li>○ Prove (show)</li> <li>○ Inverse</li> </ul>	<ul style="list-style-type: none"> <li>○ Add</li> <li>○ Subtract</li> <li>○ Use</li> <li>○ Solve</li> <li>○ Apply</li> <li>○ Mental methods</li> <li>○ Formal methods</li> <li>○ Prove (show)</li> <li>○ Inverse</li> <li>○ Estimate</li> <li>○ Calculate</li> </ul>	<ul style="list-style-type: none"> <li>○ Add</li> <li>○ Subtract</li> <li>○ Use</li> <li>○ Solve</li> <li>○ Apply</li> <li>○ Mental methods</li> <li>○ Formal methods</li> <li>○ Prove/explain (why)</li> <li>○ Inverse</li> <li>○ Estimate</li> <li>○ Calculate</li> <li>○ Determine/decide</li> </ul>	<ul style="list-style-type: none"> <li>○ Add</li> <li>○ Subtract</li> <li>○ Use</li> <li>○ Solve</li> <li>○ Apply</li> <li>○ Mental methods</li> <li>○ Formal methods</li> <li>○ Prove/explain (why)</li> <li>○ Inverse</li> <li>○ Estimate</li> <li>○ Calculate</li> <li>○ Determine/decide</li> </ul>	<ul style="list-style-type: none"> <li>○ Add</li> <li>○ Subtract</li> <li>○ Use</li> <li>○ Solve</li> <li>○ Apply</li> <li>○ Mental methods</li> <li>○ Formal methods</li> <li>○ Prove/explain (why)</li> <li>○ Inverse</li> <li>○ Estimate</li> <li>○ Calculate</li> <li>○ Determine/decide</li> </ul>

## Progression of knowledge of skills – Multiplication and Division

Strand	1	2	3	4	5	6
<b>Multiplication and Division</b>	<p>solve one-step problems involving <b>multiplication</b> and <b>division</b>, by <b>calculating</b> the answer using concrete objects, pictorial <b>representations</b> and <b>arrays</b> with the support of the teacher</p>	<ul style="list-style-type: none"> <li>recall and use <b>multiplication</b> and <b>division</b> facts for the 2, 5 and 10 <b>multiplication</b> tables, including <b>recognising</b> odd and even numbers</li> <li>calculate mathematical statements for <b>multiplication</b> and <b>division</b> within the <b>multiplication</b> tables and <b>write</b> them using the <b>multiplication</b> (<math>\times</math>), <b>division</b> (<math>\div</math>) and equals (=) signs</li> <li>show that <b>multiplication</b> of 2 numbers can be done in any order (commutative) and <b>division</b> of 1 number by another cannot</li> <li>solve problems involving <b>multiplication</b> and <b>division</b>, using materials, <b>arrays</b>, <b>repeated addition</b>, <b>mental methods</b>, and <b>multiplication</b> and <b>division</b> facts, including <b>problems</b> in contexts</li> </ul>	<ul style="list-style-type: none"> <li>recall and use <b>multiplication</b> and <b>division</b> facts for the 3, 4 and 8 <b>multiplication</b> tables</li> <li>write and <b>calculate</b> mathematical statements for <b>multiplication</b> and <b>division</b> using the <b>multiplication</b> tables that they know, including for two-digit numbers times one-digit numbers, <b>using mental</b> and progressing to <b>formal written methods</b></li> <li>solve problems, including missing number problems, involving <b>multiplication</b> and <b>division</b>, including positive integer <b>scaling</b> problems and correspondence problems in which n objects are connected to m objects</li> </ul>	<ul style="list-style-type: none"> <li>recall <b>multiplication</b> and <b>division</b> facts for <b>multiplication</b> tables up to <math>12 \times 12</math></li> <li>use place value, know n and <b>derived facts</b> to <b>multiply</b> and <b>divide</b> <b>mentally</b>, including: <b>multiplying</b> by 0 and 1; <b>dividing</b> by 1; <b>multiplying</b> together 3 numbers</li> <li>recognise and use factor pairs and commutativity in <b>mental calculations</b></li> <li>multiply two-digit and three-digit numbers by a one-digit number <b>using formal written layout</b></li> <li>solve problems involving <b>multiplying</b> and <b>adding</b>, including using the distributive law to <b>multiply</b> two-digit numbers by 1 digit, integer <b>scaling</b> problems and harder correspondence problems such as n objects are connected to m objects</li> </ul>	<ul style="list-style-type: none"> <li>identify <b>multiples</b> and <b>factors</b>, including <b>finding</b> all factor pairs of a number, and <b>common factors</b> of 2 numbers</li> <li>know and use the vocabulary of <b>prime numbers</b>, <b>prime factors</b> and <b>composite (non-prime) numbers</b></li> <li>establish whether a number up to 100 is prime and <b>recall</b> prime numbers up to 19</li> <li>multiply numbers up to 4 digits by a one- or two-digit number <b>using a formal written method</b>, including <b>long multiplication</b> for two-digit numbers</li> <li>multiply and <b>divide</b> numbers <b>mentally</b>, drawing upon known facts</li> <li>divide numbers up to 4 digits by a one-digit number using the <b>formal written method of short division</b> and <b>interpret</b> remainders appropriately for the context</li> <li>multiply and <b>divide</b> whole numbers and those involving decimals by 10, 100 and 1,000</li> <li>recognise and use <b>square numbers</b> and <b>cube numbers</b>, and the notation for squared (<math>^2</math>) and cubed (<math>^3</math>)</li> <li>solve problems involving the four operations, including <b>using</b> their knowledge of factors and multiples, squares and cubes; including <b>scaling</b> by simple fractions and problems involving simple rates</li> </ul>	<ul style="list-style-type: none"> <li>multiply multi-digit numbers up to 4 digits by a two-digit whole number <b>using the formal written method of long multiplication</b></li> <li>divide numbers up to 4 digits by a two-digit whole number <b>using the formal written method of long division</b>, and <b>interpret</b> remainders as whole number remainders, <b>fractions</b>, or by <b>rounding</b>, as appropriate for the context</li> <li>divide numbers up to 4 digits by a two-digit number using the <b>formal written method of short division</b> where appropriate, <b>interpreting</b> remainders according to the context</li> <li>perform <b>mental calculations</b>, including with mixed operations and large numbers</li> <li>identify common factors, common multiples and prime numbers</li> <li>use their knowledge of the <b>order of operations</b> to carry out <b>calculations</b> involving the 4 operations</li> <li>solve problems involving <b>multiplication</b> and <b>division</b></li> <li>use <b>estimation</b> to <b>check</b> answers to <b>calculations</b> and <b>determine</b>, in the context of a problem, an appropriate degree of accuracy</li> </ul>
Skills	Solve Represent Multiplication Division Calculate	<ul style="list-style-type: none"> <li>Recall</li> <li>Use</li> <li>Multiplication</li> <li>Division</li> <li>Recognise</li> <li>Write</li> <li>Show</li> <li>Solve</li> </ul>	<ul style="list-style-type: none"> <li>Recall</li> <li>Multiplication</li> <li>Division</li> <li>Recognise</li> <li>Write</li> <li>Formal/mental methods</li> <li>Scaling</li> <li>Solve</li> <li>Calculate</li> </ul>	<ul style="list-style-type: none"> <li>Recall</li> <li>Multiplication</li> <li>Division</li> <li>Recognise</li> <li>Write</li> <li>Formal/mental methods</li> <li>Scaling</li> <li>Solve</li> <li>Calculate</li> </ul>	<ul style="list-style-type: none"> <li>Identify</li> <li>Multiplication</li> <li>Division</li> <li>Recognise</li> <li>Know and use</li> <li>Formal/mental methods</li> <li>Scaling</li> <li>Solve</li> <li>Calculate</li> </ul>	<ul style="list-style-type: none"> <li>Identify</li> <li>Multiplication</li> <li>Division</li> <li>Recognise</li> <li>Know and use</li> <li>Formal/mental methods</li> <li>Scaling</li> <li>Solve</li> <li>Estimate/calculate/check</li> </ul>

## Progression of knowledge of skills – Fractions, Decimals and Percentages

Strand	1	2	3	4	5	6
<b>Fractions, decimals and percentages</b>	<ul style="list-style-type: none"> <li>recognise, find and name a half as 1 of 2 equal parts of an object, shape or quantity</li> <li>recognise, find and name a quarter as 1 of 4 equal parts of an object, shape or quantity</li> </ul>	<ul style="list-style-type: none"> <li>recognise, find, name and write fractions third, quarter, two-quarters and three-quarters of a length, shape, set of objects or quantity</li> <li>write simple fractions</li> </ul>	<ul style="list-style-type: none"> <li>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</li> <li>recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators</li> <li>recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators</li> <li>recognise and show, using diagrams, equivalent fractions with small denominators</li> <li>add and subtract fractions with the same denominator within one whole</li> <li>compare and order unit fractions, and fractions with the same denominators</li> <li>solve problems that involve all of the above</li> </ul>	<ul style="list-style-type: none"> <li>recognise and show, using diagrams, families of common equivalent fractions</li> <li>count up and down in hundredths; recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10</li> <li>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</li> <li>add and subtract fractions with the same denominator</li> <li>recognise and write decimal equivalents of any number of tenths or hundreds</li> <li>recognise and write decimal equivalents to quarter, half and three-quarters</li> <li>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</li> <li>round decimals with 1 decimal place to the nearest whole number</li> <li>compare numbers with the same number of decimal places up to 2 decimal places</li> <li>solve simple measure and money problems involving fractions and decimals to 2 decimal places</li> </ul>	<ul style="list-style-type: none"> <li>compare and order fractions whose denominators are all multiples of the same number</li> <li>identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths</li> <li>recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements <math>&gt; 1</math> as a mixed number</li> <li>add and subtract fractions with the same denominator, and denominators that are multiples of the same number</li> <li>multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams</li> <li>read and write decimal numbers as fractions</li> <li>recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents</li> <li>round decimals with 2 decimal places to the nearest whole number and to 1 decimal place</li> <li>read, write, order and compare numbers with up to 3 decimal places</li> <li>solve problems involving number up to 3 decimal places</li> <li>recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction</li> <li>solve problems which require knowing percentage and decimal equivalents of half, quarter, fifth, two-fifths, four-fifths and those fractions with denominators of multiples of 10 or 25.</li> </ul>	<ul style="list-style-type: none"> <li>use common factors to simplify fractions; use common multiples to express fractions in the same denomination</li> <li>compare and order fractions, including fractions <math>&gt; 1</math></li> <li>add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions</li> <li>multiply simple pairs of proper fractions, writing the answer in its simplest form</li> <li>divide proper fractions by whole numbers</li> <li>associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction</li> <li>identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places</li> <li>multiply one-digit numbers with up to 2 decimal places by whole numbers</li> <li>use written division methods in cases where the answer has up to 2 decimal places</li> <li>solve problems which require answers to be rounded to specified degrees of accuracy</li> <li>recall and use equivalences between simple fractions, decimals and percentages, including in different contexts</li> </ul>
Skills	<ul style="list-style-type: none"> <li>recognise</li> <li>find</li> <li>name</li> </ul>	<ul style="list-style-type: none"> <li>Recognise</li> <li>Find</li> <li>Name</li> <li>Write</li> </ul>	<ul style="list-style-type: none"> <li>Count</li> <li>Find/Recognise</li> <li>Division</li> <li>Find</li> <li>Write</li> <li>Use/solve</li> <li>Show</li> <li>Add/subtract fractions</li> <li>Compare and order</li> </ul>	<ul style="list-style-type: none"> <li>Count</li> <li>Recognise/identify</li> <li>Division</li> <li>Find</li> <li>Write</li> <li>Use (including diagrams)</li> <li>Show</li> <li>Add/subtract fractions</li> <li>Solve/calculate</li> <li>Compare</li> </ul>	<ul style="list-style-type: none"> <li>Count</li> <li>Recognise/identify</li> <li>Division</li> <li>Find</li> <li>Write</li> <li>Use (including diagrams)</li> <li>Show</li> <li>Add/subtract fractions</li> <li>Solve/calculate</li> <li>Compare/order</li> </ul>	<ul style="list-style-type: none"> <li>Count</li> <li>Recognise/identify/recall</li> <li>Division</li> <li>Find</li> <li>Write</li> <li>Use (including diagrams)</li> <li>Show</li> <li>Add/subtract fractions</li> <li>Solve/calculate</li> <li>Compare/order</li> </ul>

## Progression of knowledge of skills – Measurement

Strand	1	2	3	4	5	6
<b>Measurement</b>	<ul style="list-style-type: none"> <li>• <b>compare, describe and solve</b> practical problems for: length and heights, mass/w eight, capacity and volume, time.</li> <li>• <b>measure</b> and begin to <b>record</b> the following: length and heights, mass/w eight, capacity and volume, time.</li> <li>• <b>recognise and know</b> the value of different denominations of coins and notes</li> <li>• <b>sequence</b> events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]</li> <li>• <b>recognise and use</b> language relating to dates, including days of the week, weeks, months and years</li> <li>• <b>tell the time</b> to the hour and half past the hour and draw the hands on a clock face to show these times</li> </ul>	<ul style="list-style-type: none"> <li>• <b>choose and use</b> appropriate standard units to <b>estimate</b> and <b>measure</b> 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</li> <li>• <b>compare and order</b> lengths, mass, volume/capacity and record the results using &gt;, &lt; and =</li> <li>• <b>recognise and use</b> symbols for pounds (£) and pence (p); combine amounts to make a particular value</li> <li>• <b>find</b> different combinations of coins that equal the same amounts of money</li> <li>• <b>solve</b> simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change</li> <li>• compare and sequence intervals of time</li> <li>• <b>tell and write</b> the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times</li> <li>• <b>know</b> the number of minutes in an hour and the number of hours in a day</li> </ul>	<ul style="list-style-type: none"> <li>• <b>measure, compare, add and subtract:</b> lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)</li> <li>• <b>measure</b> the perimeter of simple 2-D shapes</li> <li>• <b>add and subtract</b> amounts of money to give change, using both £ and p in practical contexts</li> <li>• <b>tell and write</b> the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks</li> <li>• <b>estimate and read time</b> with increasing accuracy to the nearest minute; record and <b>compare time</b> in terms of seconds, minutes and hours; <b>use vocabulary</b> such as o'clock, am/pm, morning, afternoon, noon and midnight</li> <li>• <b>know</b> the number of seconds in a minute and the number of days in each month, year and leap year</li> <li>• <b>compare</b> durations of events</li> </ul>	<ul style="list-style-type: none"> <li>• <b>convert</b> between different units of measure</li> <li>• <b>measure and calculate</b> the perimeter of a rectilinear figure (including squares) in centimetres and metres</li> <li>• <b>find</b> the area of rectilinear shapes by counting squares</li> <li>• <b>estimate, compare and calculate</b> different measures, including money in pounds and pence</li> <li>• <b>read, write and convert time</b> between analogue and digital 12- and 24-hour clocks</li> <li>• <b>solve</b> problems involving <b>converting</b> from hours to minutes, minutes to seconds, years to months, weeks to days</li> </ul>	<ul style="list-style-type: none"> <li>• <b>convert</b> between different units of metric measure</li> <li>• <b>understand and use</b> approximate equivalences between metric units and common imperial units</li> <li>• <b>measure and calculate</b> the perimeter of composite rectilinear shapes in centimetres and metres</li> <li>• <b>calculate and compare</b> the area of rectangles (including squares), including <b>using</b> standard units, square centimetres (cm<sup>2</sup>) and square metres (m<sup>2</sup>), and <b>estimate</b> the area of irregular shapes</li> <li>• <b>estimate</b> volume and capacity</li> <li>• <b>solve</b> problems involving converting between units of time</li> <li>• <b>use</b> all four operations to <b>solve</b> problems involving measure [for example, length, mass, volume, money] using decimal notation, including <b>scaling</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>solve</b> problems involving the calculation and <b>conversion</b> of units of measure, <b>using</b> decimal notation up to 3 decimal places where appropriate</li> <li>• <b>use, read, write and convert</b> between standard units, <b>converting</b> measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, <b>using</b> decimal notation to up to 3 decimal places</li> <li>• <b>convert</b> between miles and kilometres</li> <li>• <b>recognise</b> that shapes with the same areas can have different perimeters and vice versa</li> <li>• <b>recognise</b> when it is possible to use formulae for area and volume of shapes</li> <li>• <b>calculate</b> the area of parallelograms and triangles</li> <li>• <b>calculate, estimate and compare</b> volume of cubes and cuboids <b>using</b> standard units, including cubic centimetres (cm<sup>3</sup>) and cubic metres (m<sup>3</sup>), and extending to other units</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>○ Compare and describe</li> <li>○ Solve</li> <li>○ Measure</li> <li>○ Recognise</li> <li>○ Know</li> <li>○ Use</li> <li>○ Sequence</li> <li>○ Tell the time</li> </ul>	<ul style="list-style-type: none"> <li>○ Chose and use</li> <li>○ Estimate and measure</li> <li>○ Compare and order</li> <li>○ Recognise</li> <li>○ Find and know</li> <li>○ Solve</li> <li>○ Compare and sequence</li> <li>○ Tell the time and write times</li> </ul>	<ul style="list-style-type: none"> <li>○ Measure</li> <li>○ Compare</li> <li>○ Tell and write the time</li> <li>○ Estimate</li> <li>○ Know</li> </ul>	<ul style="list-style-type: none"> <li>○ Measure</li> <li>○ Compare</li> <li>○ Read, tell and write the time</li> <li>○ Estimate</li> <li>○ Convert</li> <li>○ Solve</li> <li>○ Calculate</li> </ul>	<ul style="list-style-type: none"> <li>○ Measure</li> <li>○ Compare</li> <li>○ Read, tell and write the time</li> <li>○ Estimate</li> <li>○ Convert</li> <li>○ Solve</li> <li>○ Calculate</li> </ul>	<ul style="list-style-type: none"> <li>○ Use, read and write</li> <li>○ Compare</li> <li>○ Convert</li> <li>○ Estimate</li> <li>○ Convert</li> <li>○ Solve</li> <li>○ Recognise</li> <li>○ Calculate</li> </ul>

## Progression of knowledge of skills – Geometry

Strand	1	2	3	4	5	6
<b><u>Geometry – Properties of shapes</u></b>	<ul style="list-style-type: none"> <li>• <b>recognise and name</b> common 2-D and 3-D shapes, including:                             <ul style="list-style-type: none"> <li>○ 2-D shapes [for example, rectangles (including squares), circles and triangles]</li> <li>○ 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>identify and describe</b> the properties of 2-D shapes, including the number of sides, and line symmetry in a vertical line</li> <li>• <b>identify and describe</b> the properties of 3-D shapes, including the number of edges, vertices and faces</li> <li>• <b>identify</b> 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]</li> <li>• <b>compare and sort</b> common 2-D and 3-D shapes and everyday objects</li> </ul>	<ul style="list-style-type: none"> <li>• <b>draw</b> 2-D shapes and make 3-D shapes using modelling materials; <b>recognise</b> 3-D shapes in different orientations and describe them</li> <li>• <b>recognise</b> angles as a property of shape or a description of a turn</li> <li>• <b>identify</b> right angles, recognise that 2 right angles make a half-turn, 3 make three-quarters of a turn and 4 a complete turn; identify whether angles are greater than or less than a right angle</li> <li>• <b>identify</b> horizontal and vertical lines and pairs of perpendicular and parallel lines</li> </ul>	<ul style="list-style-type: none"> <li>• <b>compare and classify</b> geometric shapes, including quadrilaterals and triangles, based on their properties and sizes</li> <li>• <b>identify</b> acute and obtuse angles and <b>compare and order</b> angles up to 2 right angles by size</li> <li>• <b>identify</b> lines of symmetry in 2-D shapes presented in different orientations</li> <li>• <b>complete a simple symmetric</b> figure with respect to a specific line of symmetry</li> </ul>	<ul style="list-style-type: none"> <li>• <b>identify</b> 3-D shapes, including cubes and other cuboids, from 2-D representations</li> <li>• <b>know</b> angles are measured in degrees: estimate and compare acute, obtuse and reflex angles</li> <li>• <b>draw</b> given angles, and measure them in degrees (°)</li> <li>• <b>identify:</b> <ul style="list-style-type: none"> <li>○ angles at a point and 1 whole turn (total 360°)</li> <li>○ angles at a point on a straight line and half a turn (total 180°)</li> <li>○ other multiples of 90°</li> </ul> </li> <li>• <b>use</b> the properties of rectangles to deduce related facts and find missing lengths and angles</li> <li>• <b>distinguish</b> between regular and irregular polygons based on <b>reasoning</b> about equal sides and angles</li> </ul>	<ul style="list-style-type: none"> <li>• <b>draw</b> 2-D shapes using given dimensions and angles</li> <li>• <b>recognise, describe and build</b> simple 3-D shapes, including making nets</li> <li>• <b>compare and classify</b> geometric shapes based on their properties and sizes and <b>find</b> unknown angles in any triangles, quadrilaterals, and regular polygons</li> <li>• <b>illustrate and name</b> parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius</li> <li>• <b>recognise</b> angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles</li> </ul>
<b><u>Geometry – Position and direction</u></b>	<ul style="list-style-type: none"> <li>• <b>describe</b> position, direction and movement, including whole, half, quarter and three-quarter turns</li> </ul>	<ul style="list-style-type: none"> <li>• <b>order and arrange</b> combinations of mathematical objects in patterns and sequences</li> <li>• <b>use</b> mathematical vocabulary to <b>describe</b> position, direction and movement, including movement in a straight line and <b>distinguishing</b> between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)</li> </ul>	<ul style="list-style-type: none"> <li>• Pupils connect decimals and rounding to drawing and measuring straight lines in centimetres, in a variety of contexts. (Non-statutory)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>describe</b> positions on a 2-D grid as coordinates in the first quadrant</li> <li>• <b>describe</b> movements between positions as translations of a given unit to the left/right and up/down</li> <li>• <b>plot</b> specified points and draw sides to complete a given polygon</li> </ul>	<ul style="list-style-type: none"> <li>• <b>identify, describe and represent</b> the position of a shape following a reflection or translation, <b>using</b> the appropriate language, and <b>know</b> that the shape has not changed</li> </ul>	<ul style="list-style-type: none"> <li>• <b>describe</b> positions on the full coordinate grid (all 4 quadrants)</li> <li>• <b>draw and translate</b> simple shapes on the coordinate plane, and reflect them in the axes</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>○ <b>Recognise</b></li> <li>○ <b>Name</b></li> <li>○ <b>Describe</b></li> </ul>	<ul style="list-style-type: none"> <li>○ <b>Identify</b></li> <li>○ <b>Describe</b></li> <li>○ <b>Compare</b></li> <li>○ <b>Sort</b></li> <li>○ <b>Order and arrange</b></li> <li>○ <b>Use</b></li> <li>○ <b>Distinguish</b></li> </ul>	<ul style="list-style-type: none"> <li>○ <b>Draw</b></li> <li>○ <b>Recognise</b></li> <li>○ <b>Identify</b></li> <li>○ <b>Connect</b></li> </ul>	<ul style="list-style-type: none"> <li>○ <b>Classify</b></li> <li>○ <b>Compare</b></li> <li>○ <b>Identify</b></li> <li>○ <b>Complete symmetry</b></li> <li>○ <b>Describe</b></li> <li>○ <b>Plot</b></li> </ul>	<ul style="list-style-type: none"> <li>○ <b>Draw and know</b></li> <li>○ <b>Recognise and describe</b></li> <li>○ <b>Build</b></li> <li>○ <b>Compare and classify</b></li> <li>○ <b>Illustrate and name</b></li> <li>○ <b>Distinguish</b></li> <li>○ <b>Represent</b></li> </ul>	<ul style="list-style-type: none"> <li>○ <b>Draw</b></li> <li>○ <b>Recognise and describe</b></li> <li>○ <b>Build</b></li> <li>○ <b>Compare and classify</b></li> <li>○ <b>Illustrate and name</b></li> <li>○ <b>translate</b></li> </ul>



## Progression of knowledge of skills – Extra Units

Strand	1	2	3	4	5	6
<p><b>Extra units – Statistics (Y2, 3, 4, 5 and 6) Ratio and proportion – Y6 ONLY Algebra – Year 6 ONLY</b></p>	<p>N/A</p>	<ul style="list-style-type: none"> <li>• <b>interpret and construct</b> simple pictograms, tally charts, block diagrams and tables</li> <li>• <b>ask and answer</b> simple questions by counting the number of objects in each category and sorting the categories by quantity</li> <li>• <b>ask-and-answer</b> questions about totalling and comparing categorical data</li> </ul>	<ul style="list-style-type: none"> <li>• <b>interpret and present</b> data using bar charts, pictograms and tables</li> <li>• <b>solve</b> 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</li> </ul>	<ul style="list-style-type: none"> <li>• <b>interpret and present</b> discrete and continuous data using appropriate graphical methods, including bar charts and time graphs</li> <li>• <b>solve</b> comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs</li> </ul>	<ul style="list-style-type: none"> <li>• <b>solve</b> comparison, sum and difference problems <b>using</b> information presented in a line graph</li> <li>• <b>complete, read and interpret</b> information in tables, including timetables</li> </ul>	<p><b>Statistics</b></p> <ul style="list-style-type: none"> <li>• <b>interpret and construct</b> pie charts and line graphs and <b>use</b> these to solve problems</li> <li>• <b>calculate and interpret</b> the mean as an average</li> </ul> <hr/> <p><b>Algebra</b></p> <ul style="list-style-type: none"> <li>• <b>use</b> simple formulae</li> <li>• <b>generate and describe</b> linear number sequences</li> <li>• <b>express</b> missing number problems algebraically</li> <li>• <b>find</b> pairs of numbers that satisfy an equation with 2 unknowns</li> <li>• <b>enumerate</b> possibilities of combinations of 2 variables</li> </ul> <hr/> <p><b>Ratio and Proportion</b></p> <ul style="list-style-type: none"> <li>• <b>solve</b> problems involving the relative sizes of 2 quantities where missing values can be found by using integer multiplication and division facts</li> <li>• <b>solve</b> problems involving the calculation of percentages [for example, of measures and such as 15% of 360] and the use of percentages for comparison</li> <li>• <b>solve</b> problems involving similar shapes where the scale factor is known or can be found</li> <li>• <b>solve</b> problems involving unequal sharing and grouping using knowledge of fractions and multiples</li> </ul>
	<p><b>Skills</b></p>		<ul style="list-style-type: none"> <li>○ <b>Interpret</b></li> <li>○ <b>Construct</b></li> <li>○ <b>Ask and answer</b></li> </ul>	<ul style="list-style-type: none"> <li>○ <b>Interpret</b></li> <li>○ <b>Present</b></li> <li>○ <b>Solve</b></li> </ul>	<ul style="list-style-type: none"> <li>○ <b>Interpret</b></li> <li>○ <b>Present</b></li> <li>○ <b>Solve</b></li> </ul>	<ul style="list-style-type: none"> <li>○ <b>Complete</b></li> <li>○ <b>Read</b></li> <li>○ <b>Interpret</b></li> <li>○ <b>Solve</b></li> </ul>