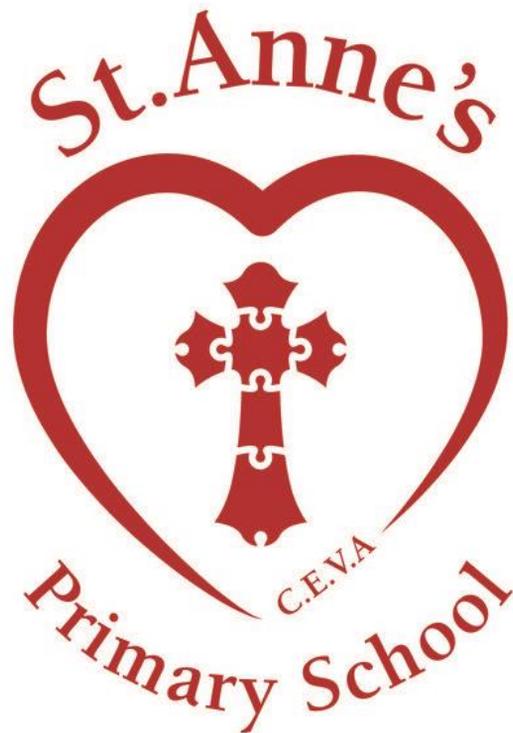


# Maths for Families



**Information about Maths  
teaching in our school**

# CALCULATION METHODS

The methods that we use in school may or may not be familiar to you. Children are often confused when they ask family members for help at home and they try to teach the methods that they themselves were taught. Knowing how the methods in this booklet work will help you to support your children.

Our teachers have worked together to create these calculation methods progressions and all staff in our school work from these documents. This is so that we can ensure the consistency of our approach and can make sure that the children move onto the next step when they are ready.

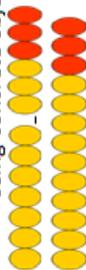
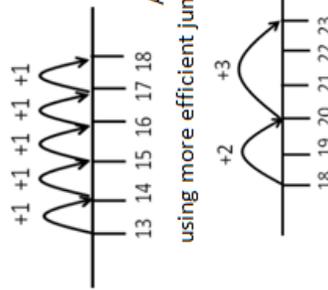
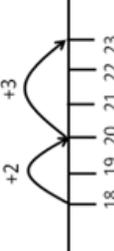
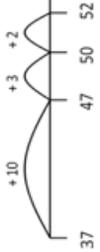
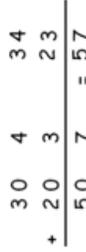
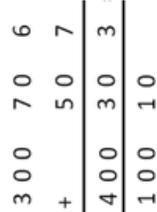
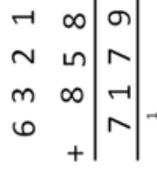
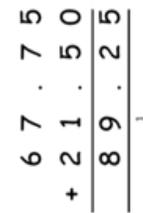
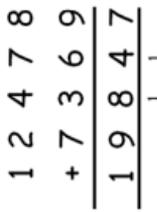
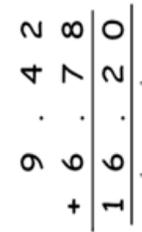
The four operations that are covered by this booklet are addition, subtraction, multiplication and division. Whichever operation is being taught the child needs to experience all of these steps to understand it:

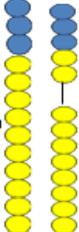
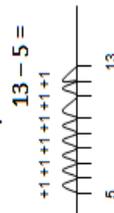
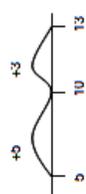
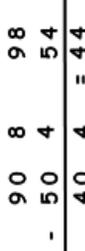
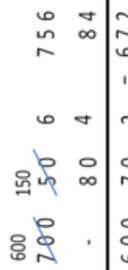
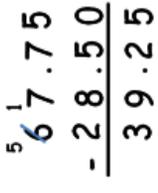
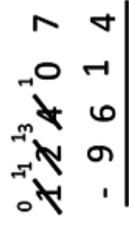
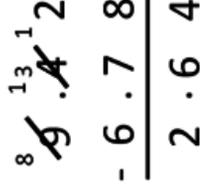
- 1) using objects
- 2) using pictures
- 3) using a number line
- 4) using an expanded method
- 5) using a standard written method

## Why do children need to do written calculations?

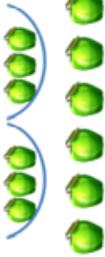
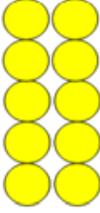
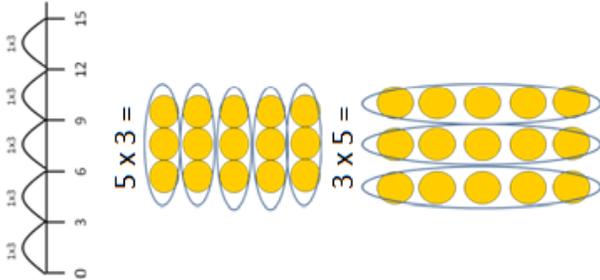
- To represent work that has been done practically.
- To support, record and explain mental calculation
- To keep track of steps in a longer task
- To work out calculations that are too difficult to do mentally

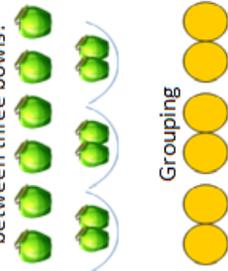
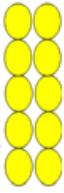
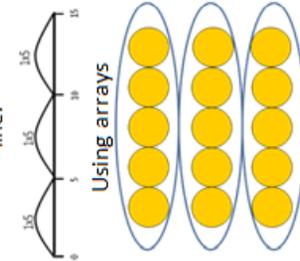
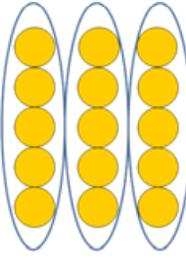
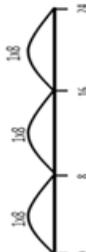
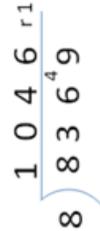
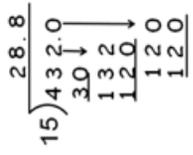
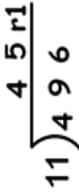
It is important that children use methods that they understand and can apply independently. Therefore, although the methods set out in these progressions are labelled with year groups, you may find that your child is using a method beyond or below their age. This is because their teacher feels it is more appropriate for them at this stage in their mathematical development.

<h2>Year 1</h2> <p><b>Statutory Guidance</b> Add one-digit and two-digit numbers to 20, including zero. Solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems. <u>Possible representations</u> e.g. <math>7 + 6 =</math></p> <p>Using concrete objects</p>  <p>Using pictorial representations e.g. <math>13 + 5 =</math></p>  <p><math>+1 +1 +1 +1 +1</math> Addition using more efficient jumps</p> 	<h2>Year 2</h2> <p><b>Statutory Guidance</b> Solve problems with addition: • using concrete objects and pictorial representations, including those involving numbers, quantities and measures • applying their increasing knowledge of mental and written methods Add numbers using concrete objects, pictorial representations, and mentally, including: • a two-digit number and ones • a two-digit number and tens • two two-digit numbers • adding three one-digit numbers e.g. <math>37 + 15 =</math> 2 digit number add a 2 digit number using efficient place value jumps</p>  <p><u>Non-statutory guidance</u> <math>34 + 23 =</math></p> 	<h2>Year 3</h2> <p><b>Statutory Guidance</b> Add numbers with up to three digits, using formal written methods of columnar addition. Solve problems, including missing number problems, using number facts, place value, and more complex addition. e.g. <math>376 + 57 = 433</math> (expanded addition)</p> 	<h2>Year 4</h2> <p><b>Statutory Guidance</b> Add numbers with up to 4 digits using the formal written methods of columnar addition where appropriate e.g. <math>6321 + 858 =</math></p>  <p><b>Measurement</b> Based on statutory guidance linked to money and measures to 2 decimal places. e.g. <math>67.75 + 21.50 =</math></p> 	<h2>Year 5</h2> <p><b>Statutory Guidance</b> Add whole numbers with more than 4 digits, including using formal written methods (columnar addition) e.g. <math>12478 + 73649 =</math></p>  <p><b>Measurement</b> Based on statutory guidance linked to money and measures to 2 decimal places.</p> 	<h2>Year 6</h2> <p><b>Statutory Guidance</b> Solve addition multi-step problems in contexts, deciding which operations and methods to use and why</p> <p><b>Measurement</b> Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate</p>
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Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p><b>Statutory Guidance</b> Subtract one-digit and two-digit numbers to 20, including zero.</p> <p>Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as <math>7 = \square - 9</math>.</p> <p><u>Possible representations</u> Using concrete objects e.g. <math>13 - 5 =</math>  </p> <p>Using pictorial representations <math>13 - 5 =</math>  </p> <p>Find the difference using more efficient jumps  </p> <p>Children move onto number lines only when confident.</p>	<p><b>Statutory Guidance</b> Subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <ul style="list-style-type: none"> <li>a two-digit number and ones</li> <li>a two-digit number and tens</li> <li>two two-digit numbers</li> <li>adding three one-digit numbers</li> </ul> <p><u>Possible representations</u> e.g. <math>67 - 25 =</math> 2 digit subtract 2 digit using efficient place value jumps  </p> <p><b>Non-statutory guidance</b> suggests expanded decomposition with no exchanges  </p>	<p><b>Statutory Guidance</b> Subtract numbers with up to three digits, using formal written methods of columnar subtraction where appropriate e.g. <math>756 - 84 =</math>  </p>	<p><b>Statutory Guidance</b> Subtract numbers with up to 4 digits using the formal written methods of columnar subtraction where appropriate e.g. <math>8417 - 3908 =</math>  </p> <p><b>Non-statutory Guidance</b> Linked to money and measures (2 decimal places).  </p>	<p><b>Statutory Guidance</b> Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction) e.g. <math>12407 - 9614 =</math>  </p> <p><b>Measurement</b> Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.  </p>	<p><b>Statutory Guidance</b> Solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</p> <p><b>Measurement</b> Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate.</p>

Written calculation strategies for multiplication

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6								
<p><b>Statutory Guidance</b> solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.</p> <p><b>Possible representations</b> e.g. <math>2 \times 3 =</math></p> <p>There are two bowls with three apples in each. How many apples are there altogether?</p>  <p><b>Non- Statutory guidance</b> They make connections between arrays, number patterns, and counting in twos, fives and tens.</p> 	<p><b>Statutory Guidance</b> solve problems involving multiplication using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts.</p> <p><b>Possible representations</b> e.g. <math>5 \times 3 =</math></p>  <p>Multiplication facts include: 2,5 and 10</p>	<p><b>Statutory Guidance</b> Write and calculate mathematical statements for multiplication 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>e.g. <math>34 \times 8 =</math></p> <table border="1" data-bbox="714 937 799 1168"> <tr> <td>x</td> <td>30</td> <td>4</td> <td></td> </tr> <tr> <td>8</td> <td>240</td> <td>32</td> <td>= 272</td> </tr> </table> <p>Multiplication facts include: 2,3,4,5,8 and 10</p>	x	30	4		8	240	32	= 272	<p><b>Statutory Guidance</b> Multiply two-digit and three-digit numbers by a one digit number using the formal written layout.</p> <p>e.g. <math>347 \times 7 =</math></p> $\begin{array}{r} 347 \\ \times 7 \\ \hline 2429 \end{array}$ <p>Multiplication facts up to <math>12 \times 12</math></p>	<p><b>Statutory Guidance</b> Multiply numbers up to 4 digits by a one – or two-digit number using the formal written method,</p> <p>e.g. <math>2741 \times 6 =</math></p> $\begin{array}{r} 2741 \\ \times 6 \\ \hline 16446 \end{array}$ <p>including long multiplication for two-digit numbers</p> $\begin{array}{r} 24 \\ \times 16 \\ \hline 144 \\ 240 \\ \hline 384 \end{array}$	<p><b>Statutory Guidance</b> Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. e.g. <math>2741 \times 66 =</math></p> $\begin{array}{r} 2741 \\ \times 66 \\ \hline 16446 \\ 164460 \\ \hline 180906 \end{array}$ <p>From Fractions section: Multiply one-digit numbers with up to two decimal places by whole numbers</p> $\begin{array}{r} 2.41 \\ \times 6 \\ \hline 14.46 \end{array}$
x	30	4											
8	240	32	= 272										

<h2>Year 1</h2> <p><b>Statutory Guidance</b> Solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.</p> <p><b>Possible representations</b> e.g. <math>6 \div 3 =</math></p> <p>How many apples are in each bowl if I share 6 apples between three bowls?</p>  <p><b>Grouping</b></p> <p><b>Non-statutory guidance</b> They make connections between arrays, number patterns, and counting in twos, fives and tens.</p>  <p>(With support of the teacher)</p>	<h2>Year 2</h2> <p><b>Statutory Guidance</b> Solve problems involving division, using materials, arrays, repeated addition, mental methods, and division facts, including problems in contexts.</p> <p><b>Possible representations</b> e.g. <math>15 \div 5 =</math></p> <p>Counting up on a number line.</p>  <p><b>Using arrays</b></p>  <p><b>Division facts: 2, 5 &amp; 10</b></p> <p><b>Non-statutory guidance</b> They connect unit fractions to equal sharing and grouping, to numbers when they can be calculated, and to measures, finding fractions of lengths, quantities, sets of objects or shapes.</p>	<h2>Year 3</h2> <p><b>Statutory Guidance</b> Write and calculate mathematical statements for division using the multiplication tables that they know, progressing to formal written methods</p> <p>e.g. <math>24 \div 8 =</math></p> <p>Counting up on a number line.</p>  <p><b>Division facts include:</b> 2, 3, 4, 5, 8 and 10</p>	<h2>Year 4</h2> <p><b>Statutory Guidance</b> <b>No reference written division calculations.</b></p> <p>North Somerset example: e.g. <math>98 \div 7 =</math></p> <p>Counting up on a number line.</p>  <p><b>Non-statutory guidance</b> Pupils practise to become fluent in the formal written method of short division with exact answers</p>  <p><b>Division facts up to 12 x 12</b></p>	<h2>Year 5</h2> <p><b>Statutory Guidance</b> 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>Divide whole numbers and those involving decimals by 10, 100 and 1000</p> <p>e.g. <math>8369 \div 8 =</math></p>  <p><b>Non-statutory guidance</b> Interpret non integer answers to division by expressing results in different ways</p> <p>e.g.</p> $98 \div 4 = \frac{98}{4} = 24\frac{2}{4} = 24\frac{1}{2} = 24.5$	<h2>Year 6</h2> <p><b>Statutory Guidance</b> 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> <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>Long division e.g. <math>432 \div 15 =</math></p>  <p><b>And short division are statutory requirements</b></p>  <p><b>Answer 45 <math>\frac{1}{11}</math></b></p>
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# End of Key Stage Expectations

## End of Early Years Foundation Stage

Numbers: Pupils count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.

Shape, space and measures: Pupils use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns. They explore characteristics of everyday objects and shapes and use mathematical language to describe them.

## End of KS1 (Years 1 & 2)

- 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].
- Pupils develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary.
- Pupils describe and compare different quantities such as length, mass, capacity/volume, time and money.
- Pupils know the number bonds to 20 and are precise in using and understanding place value.
- Pupils read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

# End of Key Stage Expectations

## End of LKS2 (Years 3 & 4)

- Pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value.
- Pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.
- Pupils develop their ability to solve a range of problems, including with simple fractions and decimal place value.
- Pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them.
- Pupils 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 read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

## End of UKS2 (Years 5 & 6)

- 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.
- Pupils 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.
- Pupils classify shapes with increasingly complex geometric properties and 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 read, spell and pronounce mathematical vocabulary correctly.

# What can families do to help?

- Count with your child
- Play number games
- Involve children when taking measurements or weighing items
- Take note of numbers in real life e.g. Telephone numbers, bus numbers, lottery numbers etc.
- Give children opportunities to use money to shop, check change etc.
- Talking about the mathematics in football e.g. 'How many points does your favourite team need to catch the next team in the league?'
- When helping your children calculate use the method that they have been taught not ones that you have been taught. Ask them to show you or refer to the calculation methods set out in this booklet.

*Thank you for your continued support.*