St. Laurence C.E. (A) Primary School & Foundation Stage

Calculations POLICY

Introduction

Children are introduced to the processes of calculation through practical, oral and mental activities. As children begin to understand the underlying ideas they develop ways of recording to support their thinking and calculation methods, use particular methods that apply to special cases, and learn to interpret and use the signs and symbols involved. Over time children learn how to use models and images, such as empty number lines, to support their mental and informal written methods of calculation. As children's mental methods are strengthened and refined, so too are their informal written methods. These methods become more efficient and succinct and lead to efficient written methods that can be used more generally. By the end of Year 6 children are equipped with mental, written and calculator methods that they understand and can use correctly. When faced with a calculation, children are able to decide which method is most appropriate and have strategies to check its accuracy.

At whatever stage in their learning, and whatever method is being used, children's strategies must still be underpinned by a secure and appropriate knowledge of number facts, along with those mental skills that are needed to carry out the process and judge if it was successful.

The overall aim is that when children leave primary school they:

- have a secure knowledge of number facts and a good understanding of the four operations;
- are able to use this knowledge and understanding to carry out calculations mentally and to apply general strategies when using one-digit and two-digit numbers and particular strategies to special cases involving bigger numbers;
- make use of diagrams and informal notes to help record steps and part answers when using mental methods that generate more information than can be kept in their heads;
- have an efficient, reliable, written method of calculation for each operation that children can apply with confidence when undertaking calculations that they cannot carry out mentally

Mental methods of calculation

Oral and mental work in mathematics is essential, particularly so in calculation. Early practical, oral and mental work must lay the foundations by providing children with a good understanding of how the four operations build on efficient counting strategies and a secure knowledge of place value and number facts. Later work must ensure that children recognise how the operations relate to one another and how the rules and laws of arithmetic are to be used and applied. Ongoing oral and mental work provides practice and consolidation of these ideas.

The ability to calculate mentally forms the basis of all methods of calculation and has to be maintained and refined. A good knowledge of numbers or a 'feel' for numbers is the product of structured practice and repetition. It requires an understanding of number patterns and relationships developed through directed enquiry, use of models and images and the application of acquired number knowledge and skills.

Secure mental calculation requires the ability to:

- recall key number facts instantly – for example, all addition and subtraction facts for each number to at least 20 (Year 1), demonstrating commutativity of addition and multiplication (Year 2)
- use taught strategies to work out the calculation – for example, recognise that addition can be done in any order and use this to add mentally a unit, ten or hundred to a 3 digit number (Year 3), partition two-digit numbers in different ways including into multiples of ten and one and add the tens and ones separately and then recombine (Year 2).
- understand how the rules and laws of arithmetic are used and applied – for example, to add or subtract mentally combinations of one-digit and two-digit numbers (Year 3), and to calculate mentally with whole numbers and decimals (Year 6).
- recall multiplication and division facts to 12 × 12 (year 4), recognise multiples of one-digit numbers and divide multiples of 10 or 100 by a single-digit number using their knowledge of division facts and place value;
- know how to find a remainder working mentally – for example, find the remainder when 48 is divided by 5;
- understand and use multiplication and division as inverse operations.

Written methods of calculation

The aim is that by the end of Key Stage 2, the great majority of children should be able to use an efficient method for each operation with confidence and understanding. The challenge for teachers is determining when their children should move on to a refinement in the method and become confident and more efficient at written calculation.

Children should be equipped to decide when it is best to use a mental or written method based on the knowledge that they are in control of this choice as they are able to carry out all three methods with confidence.

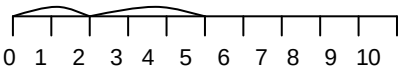
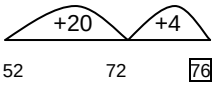
Written methods for addition of whole numbers

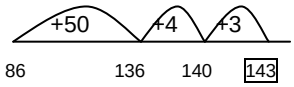
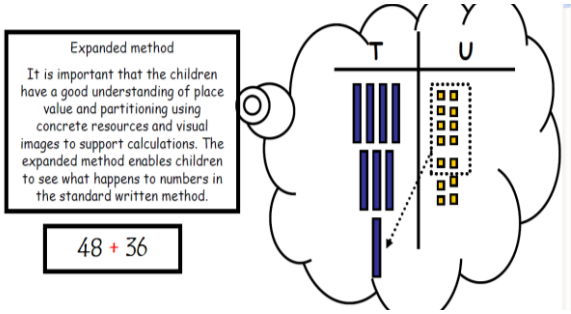
The aim is that children use mental methods when appropriate but, for calculations that they cannot do in their heads, they use an efficient written method accurately and with confidence. Children are entitled to be taught and to acquire secure mental methods of calculation and at least one efficient written method of calculation for addition which they know they can rely on when mental methods are not appropriate. These notes show the stages in building up to using an efficient written method for addition of whole numbers by the end of Year 4.

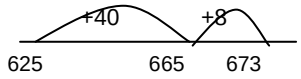
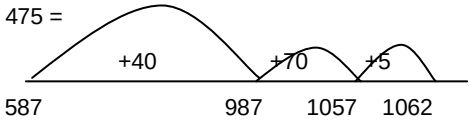
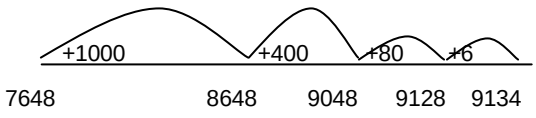
To add successfully, children need to be able to:

- recall all addition pairs to 9 + 9 and complements in 10, (such as ☐ + 3 =10);
- add mentally a series of one-digit numbers, (such as 5 + 8 + 4);
- add multiples of 10 (such as 60 + 70) or of 100, (such as 600 + 700) using the related addition fact, 6 + 7, and their knowledge of place value;
- partition two-digit and three-digit numbers into multiples of 100, 10 and 1 in different ways.

It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for addition.

Year	What will addition look like?	Guidance
EYFS	Practical, counting objects and relating addition to combining two groups of objects	
1	Use of the number track and number line - hopping and recording. (a) 2 and 3 equals 5  2 + 3 = ☐ 5 + 3 + 1 = 9 ☐ + △ = 4 10 = 6 + △ Continue to develop pupils' understanding of addition with practical activities using concrete apparatus, such as bundles of straws, numicon, counters and diennes	*Pupils memorise and reason with number bonds to 10 and 20 in several forms (e.g. 9 + 7 = 16; 16 - 7 = 9; 7 = 16 - 9). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.* *Pupils combine and increase numbers, counting forwards and backwards.* *They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms put together, add, altogether, total, take away, distance between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.*
2	Pupils continue to use the number line to calculate with bigger numbers, partitioning the smaller number and adding the most significant digit first (a) 52 + 24 (b) 61 + 14 = ☐  (c) 12 + 7 + 4 = ☐ When children have a good understanding of place value and partitioning, introduce the columnar methods with additions that do not cross the tens boundary using concrete apparatus laid out in a columnar form.	*Pupils extend their understanding of the language of addition and subtraction to include sum and difference* *Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using 3 + 7 = 10, 10 - 7 = 3 and 7 = 10 - 3 to calculate 30 + 70 = 100, 100 - 70 = 30 and 70 = 100 - 30. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (e.g. 5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5). This establishes commutativity and associativity of addition.* *Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.*

		
3	(a) Pupils continue to use the number line to support mental calculation  86 + 57 Pupils build on their understanding of place value, partitioning and their concrete experiences to develop columnar methods of addition which bridge the tens, then hundreds, initially in the expanded form.  67 83 + 24 + 42 11 5 80 120 91 125 and check answer Progressing to 3 digit numbers 124 +137 11 50 200 261	*Pupils practise solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100.* *Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent*

4	Partition one number when adding mentally (a) 625 + 48  Pupils use their understanding of the expanded columnar methods of addition to progress to use the compact method. 625 + 48 673 1 1294 + 2345 3639 1	*Pupils continue to practise both mental methods and columnar spacing addition and subtraction with increasingly large numbers to aid fluency.*
5	Adding larger numbers mentally, partitioning the smaller number 587 + 475 =  Pupils use the compact column method to calculate with decimal numbers, and with larger whole numbers. £ 6.72 8.56 + 2.30 £ 17.58	*Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency* *They practise mental calculations with increasingly large numbers to aid fluency*.
6	Adding larger numbers mentally, supported by the number line, partitioning the smaller number (a) 7648+1486 =  	*Pupils practise addition and subtraction for larger numbers, using the formal written methods of columnar addition and subtraction. They undertake mental calculations with increasingly large numbers and more complex calculations.*

	Pupils add larger whole numbers using the columnar method. They add decimals with differing numbers of decimal places using the columnar method. Pupils may fill empty columns with zeros initially, to preserve place value. (a) 7648 + 1486 9134 111 (b) 124.9 + 7.25 124.90 + 7.25 132.15 11	

Signed: Head teacher

Signed: Chair of Governors

Date:

Review Date November 2017

Written methods for subtraction of whole numbers

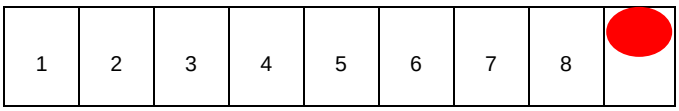
The aim is that children use mental methods when appropriate but, for calculations that they cannot do in their heads they use an efficient written method accurately and with confidence. Children are entitled to be taught and to acquire secure mental methods of calculation and at least one efficient written method of calculation for subtraction which they know they can rely on when mental methods are not appropriate.

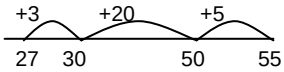
These notes show the stages in building up to using an efficient method for subtraction of two-digit and three-digit whole numbers.

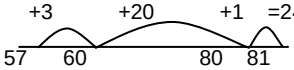
To subtract successfully, children need to be able to:

- recall all addition and subtraction facts to 20;
- subtract multiples of 10 (such as 160 – 70) using the related subtraction fact, 16 – 7, and their knowledge of place value;
- partition two-digit, three-digit and four-digit numbers into multiples of one thousand, hundred, ten and one in different ways (e.g. partition 74 into 70 + 4 or 60 + 14).

It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for subtraction.

	What will subtraction look like?	Notes
EYFS	Teacher modelling, pictorial representation Practical demonstrations of subtraction relating to 'take away'. E.g. 10 – 1? Use of number tracks. Vocabulary of subtraction in practical activities	
Y1	Number tracks leading to number lines introduced for recording 'jumps' back.  1 2 3 4 5 6 7 8 *Can you count back 5? Take away 5.* Difference introduced practically and then on number tracks and lines, e.g. 12 - 7 *Can you make a rod 12 blocks long? My block is 7 blocks long.* *What's the difference?* *difference* *0 1 2 3 4 5 6 7* 0 1 2 3 4 5 6 7 8 9 10 11 12 Pupils use concrete apparatus to experience take away and difference in practical activities.	*Pupils memorise and reason with number bonds to 10 and 20 in several forms (e.g. 9 + 7 = 16; 16 - 7 = 9; 7 = 16 - 9). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.* *Pupils combine and increase numbers, counting forwards and backwards.* *They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms put together, add, altogether, total, take away, distance between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.*

	Count out 16 straws. If you give your friend 7, how many will you have left?	
Y2	(a) Pupils practice finding the difference by counting on using a number line. They are able to choose when to take away and when to find the difference when answering a subtraction problem.  so 55 – 27 = 28 55 – 27 = 28 27 + ? = 55 55 - ? =27 ? + 26 = 55 (b) Pupils use concrete apparatus to explore exchange in practical activities. E.g. Subtract 18p from 33p  (c) Pupils begin to organise their subtractions using expanded columnar methods 87 – 54 80 7 -50 4 30 3	*Pupils extend their understanding of the language of addition and subtraction to include sum and difference* *Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using 3 + 7 = 10, 10 - 7 = 3 and 7 = 10 - 3 to calculate 30 + 70 = 100, 100 - 70 = 30 and 70 = 100 - 30. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (e.g. 5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5). This establishes commutativity and associativity of addition.* *Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.*

<table>
<tr>
<td>Y3</td>
<td>
(a) 81-57 = difference +3 +20 +1 =24

57 60 80 81

(b) 81 – 57 = take away

81 = 80 1 “1 take away 7 is tricky so exchange”
70 11
80 1
- 57 - 50 7 - 50 7
20 4 = 24

and check answers with inverse.

Pupils progress to subtract numbers with up to 3 digits

30 11
341- 123 300 40 1
-100 20 3
200 10 8

or

30 11
341- 123 300 ~~40~~ 1
-100 20 3
200 10 8
</td>
<td>Pupils practise solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100.

Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent</td>
</tr>
<tr>
<td>Y4</td>
<td>
(a) Pupils continue to calculate difference mentally using a number line
(b) Pupils progress to using the compact columnar method for subtraction.

70 1 7 1
784 = 700 80 4 adjust from T to U 7 8 4
- 56 50 6 - 5 6
700 20 8 = 728 7 2 8

Progressing to 4 digit numbers

600 100 6 1
2754 = 2000 700 ~~50~~ 4 2~~7~~54
-1562 1000 500 60 2 1562
1192 1000 100 90 2 1192
</td>
<td>Pupils continue to practise both mental methods and columnar spacing for addition and subtraction with increasingly large numbers to aid fluency.</td>
</tr>
<tr>
<td></td>
<td>(a) Pupils continue to calculate difference mentally, supported with a number line.</td>
<td>Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers</td>
</tr>
</table>

Y5	(b) Pupils use the column method to solve increasingly more complex calculations involving many exchanges, and solve subtractions with more than 4 digits 5 13 16 6 4 6 7 – 2 6 8 4 3 7 8 3 Pupils subtract decimals with more than one decimal place and with differing numbers of digits. 0 1 12 1 1 2 3 . 0 4 - 8 5 . 6 3 7 . 4 4	*to aid fluency.* *They practise mental calculations with increasingly large numbers to aid fluency*
Y6	Pupils continue to find the difference using the number line with increasingly large numbers. (b) 6467 – 2684 5 1 3 1 6 4 6 7 - 2 6 8 4 3 7 8 3 and check answer 3783 + 2684 6467 1 1 then 324.9 – 7.2 1 1 8 1 3 2 4.9 0 - 7.2 5 and continue to use inverse to check 3 1 7.6 5 .	*Pupils practise addition and subtraction for larger numbers, using the formal written methods of columnar addition and subtraction.* *They undertake mental calculations with increasingly large numbers and more complex calculations.*

Written methods for multiplication of whole numbers

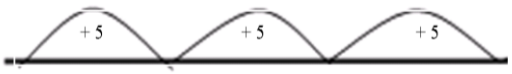
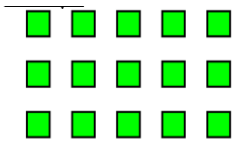
The aim is that children use mental methods when appropriate, but for calculations that they cannot do in their heads, they use an efficient written method accurately and with confidence. Children are entitled to be taught and to acquire secure mental methods of calculation and

One efficient written method of calculation for multiplication which they know they can rely on when mental methods are not appropriate.

To multiply successfully, children need to be able to:

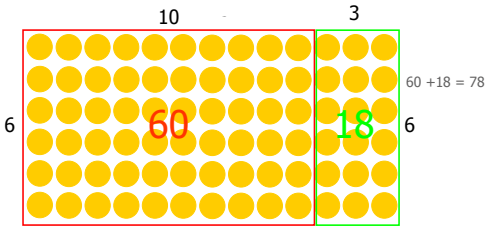
- recall all multiplication facts to 12 × 12;
- partition numbers into multiples of one hundred, ten and one;
- work out products such as 70 × 5, 70 × 50, 700 × 5 or 700 × 50 using the related fact 7 × 5 and their knowledge of place value;
- multiply two or more single-digit numbers mentally;
- use known number facts to help them solve more complicated problems

It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for multiplication.

Year	What will multiplication look like?	Guidance
EYFS	Jumping along number lines in steps of…. 100 square to look at patterns of multiples. Grouping- counting in equal sized groups.	
1	Pupils solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	*They make connections between arrays, number patterns, and counting in twos, fives and tens.*
2	Pupils calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs 2 x 5 = 10 12 = 4 x 3 Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts, e.g. 3 friends have 5 pencils each. How many pencils do they have altogether?  5 x 3 = '5 multiplied by 3' or '5 times 3' or '5, three times' 5 x 3 	*Pupils use a variety of language to describe multiplication and division.* *Pupils are introduced to the multiplication tables. They practise to become fluent in the* *2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.* *Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example, 40*

<table>
<tr><td></td><td></td><td>÷ 2 = 20, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, 4 × 5 = 20 and 20 ÷ 5 = 4).</td></tr>
<tr><td>3</td><td>Build on their understanding of repeated addition and arrays to multiply two digits by one digit using tables they know, e.g. 13 x 3
 

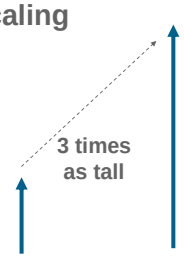
Informal recording of partitioned numbers,
15 x 5 = 10 x 5 and 5 x 5 or 10 x 5 + 5 x 5

Link arrays to introduce grid multiplication to multiply TU by U , e.g. 13 x 6
 

13 x 6 = 78

Use grid method to multiply TU by U , progressing to formal written methods when appropriate (see year 4)

<table><tr><td>x</td><td>20</td><td>3</td></tr><tr><td>4</td><td>80</td><td>12</td></tr></table> = 92</td><td>Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.
Pupils develop efficient mental methods, for example, using commutativity and associativity (for example, 4 × 12 × 5 = 4 × 5 × 12 = 20 × 12 = 240) and multiplication and division facts (for example, using 3 × 2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3) to derive related facts (for example, 30 × 2 = 60, 60 ÷ 3 = 20 and 20 = 60 ÷ 3).
Pupils develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division.

Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?</td></tr>
<tr><td></td><td>Scaling
 

Relate multiplication to scaling.
My string is 12cm long. Cut a piece of string three times longer.</td><td></td></tr>
<tr><td>4</td><td>Pupils multiply two-digit and three-digit numbers by a one-digit number using formal written layout

HTU x U using grid method, e.g. 136 x 5</td><td>Pupils continue to practise recalling and using multiplication tables and related division facts to</td></tr>
</table>

	<table><tr><td>x</td><td>100</td><td>30</td><td>6</td></tr><tr><td>5</td><td></td><td></td><td></td></tr></table> Progressing to the expanded short multiplication method (least significant digit first) 136 x 5 30 150 500 680 Moving to the formal written method. 136 X 5 680 13	*aid fluency.* *Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example 600 ÷ 3 = 200 can be derived from 2 x 3 = 6).* *Pupils practise to become fluent in the formal written method of short multiplication.* *Pupils write statements about the equality of expressions (for example, use the distributive law 39 × 7 = 30 × 7 + 9 × 7 and associative law (2 × 3) × 4 = 2 × (3 × 4)). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations for example, 2 x 6 x 5 = 10 x 6 = 60.* .
5	Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers Multiply ThHTU x U using the formal written method,,e.g. 1345 x 6 1345 x 6 8070 223 Multiply TU x TU using the grid method, e.g. 38 x 72 <table><tr><td>**x**</td><td>**30**</td><td>**8**</td><td></td></tr><tr><td>**70**</td><td>2100</td><td>560</td><td>= 2660 +</td></tr><tr><td>**2**</td><td>60</td><td>16</td><td>= 76</td></tr><tr><td></td><td></td><td></td><td>2736</td></tr></table> Progressing to the expanded written form for TU x TU 72 x 38 16 (2 X 8) 560 (70 X 8) 60 (2 X 30) 2100 (70 X 30) 2736	*Pupils practise and extend their use of the formal written methods of short multiplication. They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.* *They use and understand the terms factor, multiple and prime, square and cube numbers.* *Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres.*

	1 Extending to the formal written method of long multiplication (see Year 6)	
6	Pupils multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication 124 × 26 becomes 1 2 1 2 4 × 2 6 7 4 4 2 4 8 0 3 2 2 4 1 1 Answer: 3224	*Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication* *They undertake mental calculations with increasingly large numbers and more complex calculations.* *Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.*

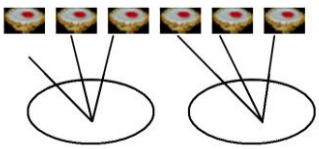
Written methods for division of whole numbers

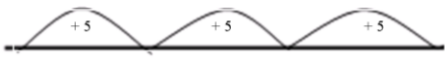
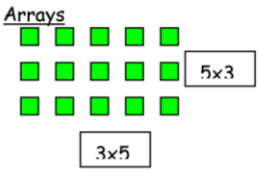
The aim is that children use mental methods when appropriate but, for calculations that they cannot do in their heads, they use an efficient written method accurately and with confidence. Children are entitled to be taught and to acquire secure mental methods of calculation and

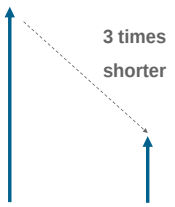
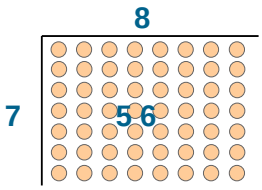
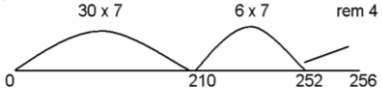
one efficient written method of calculation for division which they know they can rely on when mental methods are not appropriate.

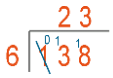
To carry out written methods of division successfully, children also need to be able to:

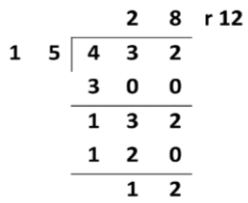
- understand division as repeated subtraction (Grouping):
- estimate how many times one number divides into another – for example, how many sixes there are in 47, or how many 23s there are in 92;
- Know subtraction facts to 20 and to use this knowledge to subtract multiples of 10 e.g.120 - 80, 320 – 90

Year	What will division look like?	Guidance
EYFS	Pupils use concrete objects and practical situations to explore sharing to answer questions such as: Share the biscuits out so that everyone has the same number.  Cut the sandwich in half. How many pieces are there?	
1	Pupils solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. Pupils use sharing and grouping to solve division problems. <u>Sharing</u> e.g. 6 cakes are shared equally between 2 people. How many cakes does each person get?  <u>Grouping</u> How many pairs of socks can we make from this pile of socks? Count the pairs. 	*Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.* *They make connections between arrays, number patterns, and counting in twos, fives and tens.*

2	Pupils calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs 4 x 3 = 12 3 x 4 = 12 12 ÷ 4 = 3 12 ÷ 3 = 4 Pupils solve problems involving multiplication and division, using practical materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts, e.g. 15 pencils are put into boxes of 5. How many boxes of pencils will there be?  5 x 3 = "5 multiplied by three" or "5 times 3" or "5, three times"  There will be 3 boxes of 5 pencils Also use arrays to model division. 15 ÷ 5 = 3 and 15 ÷ 3 = 5	*Pupils use a variety of language to describe multiplication and division.* *Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.* *Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example, 40÷ 2 = 20, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, 4 × 5 = 20 and 20 ÷ 5 = 4).*
3	Pupils write and calculate mathematical statements for division using the multiplication tables that they know, using mental and progressing to formal written methods. Use knowledge of multiplication facts and repeated addition to answer division questions, e.g. How many 3s are there in 39?  Extending to use all tables that pupils know and to explore	*Pupils develop efficient mental methods, for multiplication and division facts (for example, using 3 × 2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3) to derive related facts (for example, 30 × 2 = 60, 60 ÷ 3 = 20 and 20 = 60 ÷ 3).* *Pupils develop reliable written methods for division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short division.* *Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence*

	the idea of the remainder Pupils explore the use of scaling as a model for division, e.g. My ribbon is 24 cm long. Can you cut a ribbon 3 times shorter?  Pupils are introduced to the formal written method of short division with whole number answers, using the image of the array and place value apparatus initially.  Pupils progress to use the formal written method of short division 98 ÷ 7 becomes 1 4 7 | 9 8 2 Answer: 14	*problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).*
4	Pupils continue to use the number line to support mental division. Extend to 3 –digit divided by a 1- digit number 257 ÷ 7 Estimate first, use a number line to count on, if appropriate.  Pupils continue to become fluent with the formal written method of short division with exact answers, e.g.	*Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency.* *Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example 600 ÷ 3 = 200 can be derived from 2 x 3 = 6).* *Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers.* .

		
5	Pupils 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, e.g. *432 school children go on a camping trip. Each tent sleeps five. How many tents will they need to take?* 432 ÷ 5 becomes 8 6 r 2 5 | 4 3 2 Answer: 86 remainder 2 *Answer: They will need to take 87 tents*	*Pupils practise and extend their use of the formal written methods of short division. They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.* *Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (for example, 98 ÷ 4 = = 24 r 2 = 24 = 24.5 ≈ 25).* *Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres.*
6	Pupils divide numbers up to 4 digits by a two-digit whole number using the formal written method of short division where appropriate, interpreting remainders according to the context, e.g. *496 pupils attend a football tournament. When they are put into teams of 11, how many full teams will there be? Will everyone be in a team?* 496 ÷ 11 becomes 4 5 r 1 11 | 4 9 6 *Answer: there will be 45 full teams of 11 players and one pupil will not have a team.* Pupils progress to expressing their remainders as a fraction, e.g. *432 litres of water are stored in 15 litre drums. How many full drums of water will there be and what fraction of the final drum will be filled?* *Answer: there will be 28 full drums and the 29th drum will be*	*Pupils practise division for larger numbers, using the formal written methods of short and long division.*

	4/5 full. Progressing to expressing the remainder as a decimal, e.g. *£432 was raised at the school fair and is to be shared equally between 15 classes. How much will each class receive?* *Answer: Each class will receive £28.80* If needed, because a child is struggling to understand the short division method, pupils divide numbers up to 4 digits by a 2 digit number using long division e.g. *Chocolates are packed in trays of 15. If I have 432 chocolates, how many full trays will I have and how many chocolates will be left over?* 432 ÷ 15 becomes  *Answer: there will be 28 trays of chocolates and 12 chocolates left.*	

Signed: Head teacher

Signed: Chair of Governors

Date