


Calculation Policy The Saints' Federation



We aim to offer the children a solid foundation in the basics of the four operations, which they will build upon and develop a real mathematical understanding, as they move through the schools.

The guidance in italics is taken from the non- statutory guidance in the 'National Curriculum in England' document for 2014

Early Years Foundation Stage

Mathematics involves providing children with opportunities to develop and improve their skills in counting, understanding and using numbers, calculating simple addition and subtraction problems. Maths for young children should be meaningful. Where possible, concepts should be taught in the context of real life.

	Expectations	What this will look like	Key Points
EYFS +	<p>Begin to combine groups of objects by count them all.</p> <p>Add 2 single digit numbers by counting on.</p> <p>Solve simple problems.</p> <p>Find one more than a given number.</p> <p>Use the correct language relating to addition.</p>	<p>Practical, counting objects and relating addition to combining two groups of objects.</p> <p>Construct number sentences verbally and practically.</p> <p>Use number tracks, fingers and other practical resources.</p> <p>Check 1:1 correspondence when counting objects.</p> 	<ul style="list-style-type: none"> • Use story telling • Relate it to the world we live in • When children have counted, get them to count again to check • Use songs and rhymes • Children to understand addition as combining two or more sets of objects.

		Singing songs and rhymes.	
EYFS -	<p>Relate subtraction to taking away and counting how many are left.</p> <p>Solve simple problems.</p> <p>Subtract 2 single digit numbers by count back.</p> <p>Find one less than a given number.</p> <p>Use the correct language relating to subtraction.</p>	<p>Teacher modelling, pictorial representation.</p> <p>Practical demonstrations of subtraction relating to 'take away'. E.g. 10 - 1?</p> <p>Use of number tracks, fingers and other practical resources.</p> <p>Vocabulary of subtraction in practical activities.</p>  <p>Use songs and rhymes, etc. e.g. Sing ten green bottles.</p>	<ul style="list-style-type: none"> • Use story telling • Relate it to the world we live in • When children have counted, get them to count again to check • Use songs and rhymes • Children to understand subtraction as taking away.
EYFS X	<p>The link between addition and multiplication can be introduced through doubling.</p> <p>Grouping objects.</p> <p>Counting in twos, fives and tens (exceeding).</p>	<p>Jumping along number tracks in steps of....</p> <p>100 square to look at patterns of multiples.</p> <p>Grouping- counting in equal sized groups. Use concrete resources counters, cubes, etc.</p> <p>Begin counting in steps of 2 and 10</p>  <p>Songs and rhymes. Real life stories.</p>	<ul style="list-style-type: none"> • Use songs and rhymes • Use pictorial representations. • Real life contexts and the use of practical equipment.

EYFS

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Solve problems involving halving and sharing.

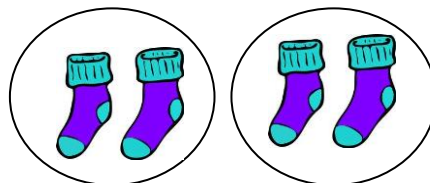
Children need to see and hear representations of division as both grouping and sharing.

Share the biscuits out so that everyone has the same number.

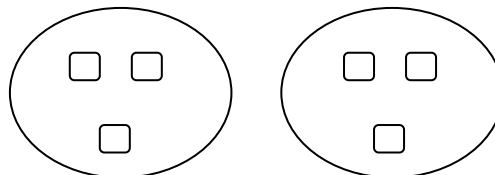
Cut the sandwich in half. How many pieces are there?



Grouping model - Mum has 4 socks. She groups them into pairs. How many pairs does she have?



Sharing model - I have 6 sweets. I share them with my friend. How many will we each have?



- Use songs and rhymes
- Use pictorial representations.
- Real life contexts and the use of practical equipment.

Key Stage 1

Children in Years 1 and 2 will be given a really solid foundation in the basic building blocks of mental and written arithmetic. Through being taught place value, children will develop an understanding of how numbers work, so that they are confident with 2-digit numbers and beginning to read and say numbers above 100.

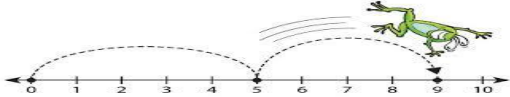

Addition and Subtraction: A focus on number bonds, first via practical hands-on experiences and subsequently using memorisation techniques, enables a good grounding in these crucial facts, and ensures that all children leave Year 2 knowing the pairs of numbers which make all the numbers up to 10 at least. Children will also have experienced and been taught pairs to 20. Children's knowledge of number facts enables them to add several 1-digit numbers, and to add/subtract a 1-digit number to/from a 2-digit number. Another important conceptual tool is the ability to add/subtract 1 or 10, and to understand which digit changes and why. This understanding is extended to enable children to add and subtract multiples of 10 to and from any 2-digit number. The most important application of this knowledge is the ability to add or subtract any pair of 2-digit numbers by counting on or back in 10s and 1s. Children may extend this to adding by partitioning numbers into 10s and 1s.

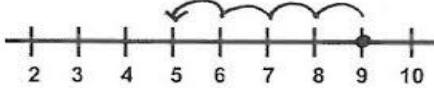
Multiplication and Division: Children will be taught to count in 2s, 3s, 5s and 10s, and will relate this skill to repeated addition. Children will meet and begin to learn the associated $\times 2$, $\times 3$, $\times 5$ and $\times 10$ tables. Engaging in a practical way with the concept of repeated addition and the use of arrays enables children to develop a preliminary understanding of multiplication, and asking them to consider how many groups of a given number make a total will introduce them to the idea of division. Children will also be taught to double and halve numbers, and will thus experience scaling up or down as a further aspect of multiplication and division.

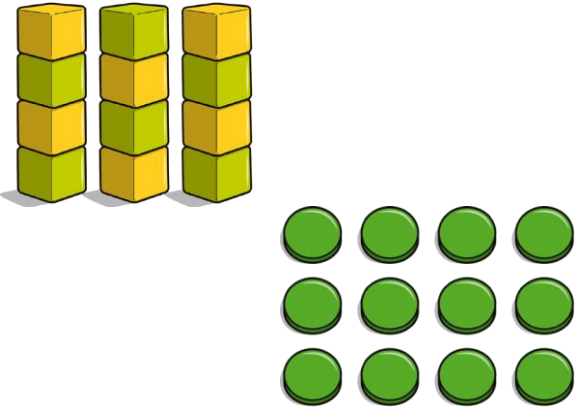
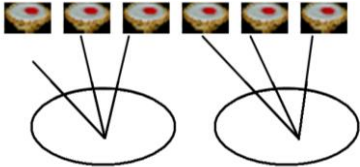
Fractions: Fractions will be introduced as numbers and as operators, specifically in relation to halves, quarters and thirds.

Year 1

	Expectations	What will this look like?	Key Points
Y1 +	Number bonds ('story' of 5, 6, 7, 8, 9 and 10) Count on in 1s from a given 2-digit number Add two 1-digit numbers Add three 1-digit numbers, spotting doubles or pairs to 10	Develop pupils' understanding of addition with practical activities using concrete apparatus such as bundle of straws and counters. Use of the number track and number line-	Continue to develop pupils' understanding of addition with practical activities using concrete apparatus, such as bundles of straws, Dienes, counters and Base Ten <i>Read, write and interpret involving add (+) and equals (=) sign. TEACH THE EQUAL</i>

	<p>Count on in 10s from any given 2-digit number</p> <p>Add 10 to any given 2-digit number</p> <p>Use number facts to add 1-digit numbers to 2-digit numbers e.g. Use $4 + 3$ to work out $24 + 3$, $34 + 3$</p> <p>Add by putting the larger number first</p>	<p>hopping and recording</p> <table border="1" data-bbox="909 336 1487 379"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> </table>  <p>Missing number problems</p> <p>$2 + 3 = \triangle$</p> <p>$\square + \triangle = 4$</p> <p>$10 = 6 + \triangle$</p> <p>$5 + 3 + 1 = 9$</p>	1	2	3	4	5	<p>SIGN AS MEANING 'THE SAME AS' Show children addition can be done in any order.</p> <p>USE OF CONCRETE APPARATUS</p>  <ul style="list-style-type: none"> All numbers should be marked on number lines for them to see. Significant numbers should be emboldened. <p>Children to record pictorially progressing to recording number sentences alongside</p>
1	2	3	4	5				
<p>Y1 —</p>	<p>Number bonds ('story' of 5, 6, 7, 8, 9 and 10)</p> <p>Count back in 1s from a given 2-digit number</p> <p>Subtract one 1-digit number from another</p> <p>Count back in 10s from any given 2-digit number</p> <p>Subtract 10 from any given 2-digit number</p> <p>Use number facts to subtract 1-digit numbers from 2-digit numbers</p>	<p>Use concrete apparatus to experience take away and difference in practical activities.</p> <p>Count out sixteen straws and if you give your friend seven. How many will you have left?</p> <p>Number tracks leading to number lines introduced for recording 'jumps.' Can you count back 5? Take away 5?</p> <table border="1" data-bbox="909 1262 1487 1305"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> </table>	1	2	3	4	5	<p>They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.</p> <p>Pupils combine and increase numbers, counting forwards and backwards.</p> <p>They discuss and solve one step 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</p>
1	2	3	4	5				

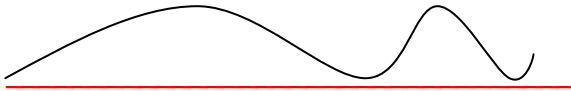
	<p>e.g. Use $7 - 2$ to work out $27 - 2$, $37 - 2$</p>	 <p>Difference introduced practically and then on number tracks and lines. E.g $12 - 7$</p> <p><i>Can you make a rod 12 blocks long? My block is 7 blocks long. What's the difference?</i></p> <p>_____ <i>difference</i></p> <p><i>0 1 2 3 4 5 6 7</i></p> <p>_____ \longleftrightarrow</p> <p><i>0 1 2 3 4 5 6 7 8 9 10 11 12</i></p>	<p>use these operations flexibly.</p> <p>Mostly mental calculations with children making informal jottings leading to introduction of number sentence.</p> <p>Understanding subtraction as "take away" and find a small "difference" by counting up.</p> <p>Use informal written methods to support the subtraction of a 1-digit number from a 1-digit number or a 2 -digit number and a multiple of 10 from a 2-digit number</p> <p><u>Teach through real life situations, songs and rhymes</u></p> <p>When using number lines, ensure the children recognise the difference between an empty number line and one that is labelled.</p>
<p>Y1 x</p>	<p>Begin to count in 2s, 5s and 10s</p> <p>Begin to say what three 5s are by counting in 5s, or what four 2s are by counting in 2s, etc.</p> <p>Double numbers to 10</p>	<p><i>Pupils solve one step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. Three lots of 4</i></p>	<p>They make connections between arrays, number patterns, and counting in twos, fives and tens.</p> <p>Begin steps of 3.</p> <p>Solve practical problems involving groups of</p>

			<p>2, 5 or 10- draw pictures or groups.</p> <p>When ready link to jumps on a number line.</p> <p>Doubling numbers (numbers up to 20) and quantities</p> <p>Find simple fractions of objects, numbers and quantities.</p>
<p>Y1 ÷</p>	<p>Begin to count in 2s, 5s and 10s</p> <p>Find half of even numbers to 12 and know it is hard to halve odd numbers</p> <p>Find half of even numbers by sharing</p> <p>Begin to use visual and concrete arrays or 'sets of' to find how many sets of a small number make a larger number.</p>	<p>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 using sharing and grouping to solve division problems.</p> <p>Sharing</p> <p>6 cakes are shared equally between 2 people. How many cakes does each person get?</p>  <p>Grouping</p>	<p>Teach through storytelling and real life situations.</p> <p>Use of pictures, or number tracks (Use tracks first only move onto number lines when confident) or number lines, to count on in equal groups and solve problems.</p> <p>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.</p> <p>They make connections between arrays, number patterns, and counting in twos, fives and tens.</p>

How many pairs of socks can we make from this pile of socks? Count the pairs



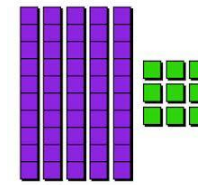
Year 2

	Expectations	What will this look like?	Key Points
<p>Y2 +</p>	<p>Number bonds - know all the pairs of numbers for totals up to 20.</p> <p>Count on in 1s and 10s from any given 2-digit number</p> <p>Add two or three 1-digit numbers</p> <p>Use addition and subtraction facts to 20 to derive related facts to 100.</p> <p>Add a 1-digit number to any 2-digit number using number facts, including bridging multiples of 10 e.g. $45 + 4$ e.g. $38 + 7$</p> <p>Add 10 and small multiples of 10 to any given 2-digit number</p> <p>Add any pair of 2-digit numbers</p>	<p>Use the number line to calculate with bigger numbers, partitioning the smaller number and adding the most significant digit first.</p> <p>$52 + 24$</p>  <p>$52 \quad (+20) \quad 72 \quad (+4) \quad 76$</p> <p>Use number square to count on tens than ones.</p> <p>$61 + 14 = \square$</p> <p>$12 + 7 + 4 = \square$</p>	<p>Add using concrete apparatus, visual representations and mental skills</p> <p>TU + U TU + multiples of 10 TU + TU U + U + U</p> <p>Children to understand addition as combining two or more sets of objects All children still need story telling to solve addition problems - put them into context.</p> <p>'SUM' explain the language</p> <ul style="list-style-type: none"> • Add least significant figures first when working vertically <p>They check their calculations, including by</p>



Expanded column subtraction.

$$\begin{array}{r}
 87 - 54 \qquad 80 \quad 7 \\
 - 50 \quad 4 \\
 \hline
 30 \quad 3
 \end{array}$$



Teach children to look for special cases i.e. take away a small amount ($55-2=53$) and by counting back -9 by compensation

$34 - 9 = 34 - 10$ and then add one back.

Y2
×

Count in 2s, 5s and 10s

Begin to count in 3s

Begin to understand that multiplication is repeated addition and to use arrays

e.g. 3×4 is three rows of 4 dots

Begin to learn the $\times 2$, $\times 3$, $\times 5$ and $\times 10$ tables, seeing these as 'lots of'

e.g. 5 lots of 2, 6 lots of 2, 7 lots of 2

Double numbers up to 20

Begin to double multiples of 5 to 100

Begin to double 2-digit numbers less than 50

Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the signs.

$$4 \times 3 = 12$$

$$3 \times 4 = 12$$

$$12 \div 3 = 4$$

$$12 \div 4 = 3$$

Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication facts.

Count in steps 2, 3, and 5 from 0 and in tens from any number forward and backward.

Pupils use a variety of language to describe multiplication and division.

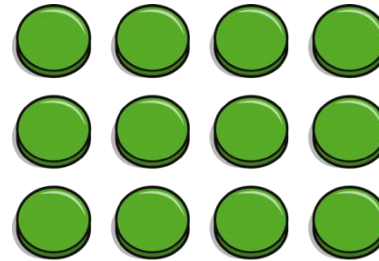
Pupils are introduced to the multiplication tables. They practise to become fluent in the

2, 5 and 10 multiplication tables and connect them to each other (division) including odd and even number (i.e. if it's an even number it will be a multiple of 2)

They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face.

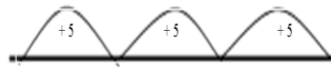
with 1s digits of 1, 2, 3, 4 or 5

Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts, e.g.

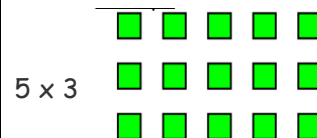


$$4 \times 3 =$$

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'



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, $40 \div 2 = 20$, 20 is a half of 40).

They use commutativity and inverse relations to develop multiplicative reasoning (for example, $4 \times 5 = 20$ and $20 \div 5 = 4$).

Y2
÷

Count in 2s, 5s and 10s

Begin to count in 3s

Using fingers, say where a given number is in the 2s, 5s or 10s count

e.g. 8 is the fourth number when I count in 2s

Relate division to grouping

e.g. How many groups of 5 in 15?

Halve numbers to 20

Begin to halve numbers to 40 and multiples of 10 to 100

Find $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{3}{4}$ of a quantity of objects and of amounts (whole number answers)

Calculate mathematical statements for division within the multiplication tables and write them using the signs.

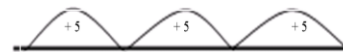
$$4 \times 3 = 12$$

$$3 \times 4 = 12$$

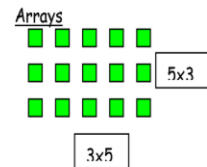
$$12 \div 3 = 4$$

$$12 \div 4 = 3$$

Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in contexts, e.g. 15 pencils are put in boxes of 5. How many boxes of pencils will there be?



There will be 3 boxes of 5 pencils



Also use arrays $15 \div 5 = 3$, $15 \div 3 = 5$

Teach through real life situations.

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, $40 \div 2 = 20$, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, $4 \times 5 = 20$ and $20 \div 5 = 4$).

LOWER KEY STAGE 2

In Lower Key Stage 2, children build on the concrete and conceptual understandings they have gained in Key Stage 1 to develop a real mathematical understanding of the four operations, in particular developing arithmetical competence in relation to larger numbers.

Addition and subtraction: Children are taught to use place value and number facts to add and subtract numbers mentally and they will develop a range of strategies to enable them to discard the 'counting in 1s' or fingers-based methods of Key Stage 1. In particular, children will learn to add and subtract multiples and near multiples of 10, 100 and 1000, and will become fluent in complementary addition as an accurate means of achieving fast and accurate answers to 3-digit subtractions. Standard written methods for adding larger numbers are taught, learned and consolidated, and written column subtraction is also introduced.

Multiplication and division: This key stage is also the period during which all the multiplication and division facts are thoroughly memorised, including all facts up to 12×12 . Efficient written methods for multiplying or dividing a 2-digit or 3-digit number by a 1-digit number are taught, as are mental strategies for multiplication or division with large but 'friendly' numbers, e.g. when dividing by 5 or multiplying by 20.

Fractions and decimals: Children will develop their understanding of fractions, learning to reduce a fraction to its simplest form, as well as finding non-unit fractions of amounts and quantities. The concept of a decimal number is introduced and children consolidate a firm understanding of 1-place decimals, multiplying and dividing whole numbers by 10 and 100.

Year 3

Expectations

What will this look like?

Key points

Y3
+

Know pairs with each total to 20

e.g. $2 + 6 = 8$, $12 + 6 = 18$, $7 + 8 = 15$

Know pairs of multiples of 10 with a total of 100

Add any two 2-digit numbers by counting on in 10s and 1s or by using partitioning

Add multiples and near multiples of 10 and 100

Perform place-value additions without a struggle

e.g. $300 + 8 + 50 = 358$

Use place value and number facts to add a 1-digit or 2-digit number to a 3-digit number

e.g. $104 + 56$ is 160 since $104 + 50 = 154$ and $6 + 4 = 10$

$676 + 8$ is 684 since $8 = 4 + 4$ and $76 + 4 + 4 = 84$

Add pairs of 'friendly' 3-digit numbers

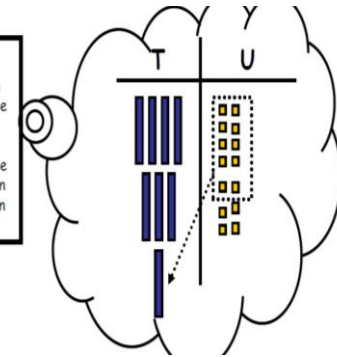
e.g. $320 + 450$

Begin to add amounts of money using partitioning

Use expanded column addition to add two or three 3-digit numbers or three 2-digit numbers.

Expanded method
It is important that the children have a good understanding of place value and partitioning using concrete resources and visual images to support calculations. The expanded method enables children to see what happens to numbers in the standard written method.

$48 + 36$



$$\begin{array}{r} 124 \\ +137 \\ \hline \end{array}$$

or $\begin{array}{r} 100 \quad 20 \quad 4 \\ + 100 \quad 30 \quad 7 \\ \hline \end{array}$

$$\begin{array}{r} 11 \\ 50 \\ 200 \\ \hline 261 \end{array}$$

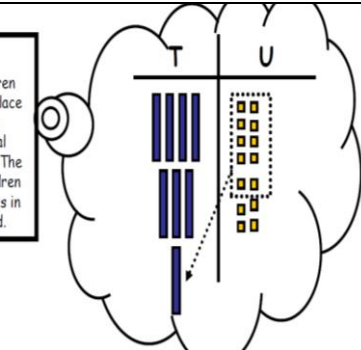
$200 \quad 50 \quad 11 = 261$

Begin to use compact column addition to add numbers with 3 digits

e.g. $\begin{array}{r} 124 \\ +137 \\ \hline \end{array}$

Expanded method
It is important that the children have a good understanding of place value and partitioning using concrete resources and visual images to support calculations. The expanded method enables children to see what happens to numbers in the standard written method.

$48 + 36$



HTU + U

HTU + multiples of 10


HTU + multiples of 100

Estimate the answer to a calculation and use inverse operation to check answers.

- Number lines to be used alongside the concrete apparatus
- Mental use a number line for jottings
- Written use columnar method
- Leading on to vertical layout and understanding importance of lining up units/tens under tens etc
HTU + TU, then HTU + HTU

Cross 10s/100s barrier

- Add **least** significant figures first

		<p style="text-align: center;"><u>2 6 1</u></p> <p style="text-align: center;">1</p> <p>Begin to add like fractions</p> <p style="text-align: center;"><i>e.g. $\frac{3}{8} + \frac{1}{8} + \frac{1}{8}$</i></p> <p>Recognise fractions that add to 1</p> <p style="text-align: center;"><i>e.g. $\frac{1}{4} + \frac{3}{4}$</i></p> <p style="text-align: center;"><i>e.g. $\frac{3}{5} + \frac{2}{5}$</i></p>	<p>when working vertically.</p> <ul style="list-style-type: none"> Mental before written
<p>Y3</p> <p>—</p>	<p>Know pairs with each total to 20</p> <p>e.g. $8 - 2 = 6$ e.g. $18 - 6 = 12$ e.g. $15 - 8 = 7$</p> <p>Subtract any two 2-digit numbers and progress to subtract numbers with up to 3-digits,</p> <p>Perform place-value subtractions without a struggle</p> <p>e.g. $536 - 30 = 506$</p> <p>Subtract 2-digit numbers from numbers > 100 by counting up</p> <p>e.g. $143 - 76$ is done by starting at 76. Then add 4 (80), then add 20 (100), then add 43, making the difference a total of 67</p>	<p>Use counting up as an informal written strategy for subtracting pairs of 3-digit numbers.</p> <p><i>e.g. $423 - 357$</i></p>  <p style="text-align: center;"><i>357 + 3 360 + 40 400 + 23 423</i></p> <p><i>3 + 40 + 23 = 66</i></p> <p><i>So $423 - 357 = 66$</i></p> <p>Subtraction using column subtraction, expanded first and then move on to 3-digit numbers.</p> <p style="text-align: center;"><i>187 - 54 100 80 7</i></p>	<p>Estimate the answer to a calculation.</p> <p>Check answers with the inverse operation .</p> <p>They practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent (from year 4).</p> <p>Solve problems including missing numbers and using number facts,</p> <p>It is important to continue to use concrete materials to aid understanding.</p> <p>Base Ten/Dienes to show exchange</p> <p>Coins/counters on a place value chart, number lines.</p>

Subtract multiples and near multiples of 10 and 100

Subtract, when appropriate, by counting back or taking away, using place value and number facts

Find change from £1, £5 and £10

$$\begin{array}{r} - \quad 50 \quad 4 \\ \hline 100 \quad 30 \quad 3 = 133 \end{array}$$

Progressing to:

(b) $81 - 57 =$ take away $70 \quad 11$

$81 = 80 \quad 1$ "1 take away 7 is tricky" ~~$80 \quad 1$~~

$$\begin{array}{r} - 57 \\ \hline - 50 \quad 7 \end{array} \quad \text{so exchange} \quad \begin{array}{r} - 50 \quad 7 \\ \hline 20 \quad 4 \\ = 24 \end{array}$$

Progressing to $7 \quad 1$


$$\begin{array}{r} \cancel{8} \quad 1 \\ - 5 \quad 7 \\ \hline 2 \quad 4 \end{array}$$

Pupils progress to subtract numbers with up to 3 digits

$$\begin{array}{r} 341 - 123 \\ \hline 300 \quad 40 \quad 1 \\ - 100 \quad 20 \quad 3 \\ \hline 200 \quad 10 \quad 8 \end{array}$$

or $30 \quad 11$



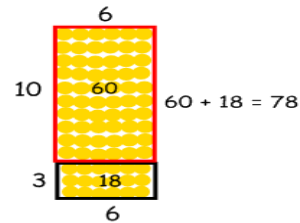
		$\begin{array}{r} 341- 123 \\ 300 \quad \cancel{40} \quad 1 \\ -100 \quad 20 \quad 3 \\ \hline 200 \quad 10 \quad 8 \end{array}$ <p>By the end children will have progressed to</p> $\begin{array}{r} 3 \ 11 \\ \cancel{341} \\ -123 \end{array}$ <p>Begin to subtract like fractions e.g. $7/8 - 3/8$</p>	
<p>Y3 x</p>	<p>Count from 0 in multiples of 4, 8, 50 and 100.</p> <p>Know by heart all the multiplication facts in the $\times 2, \times 3, \times 4, \times 5, \times 8$ and $\times 10$ tables</p> <p>Multiply whole numbers by 10 and 100</p> <p>Recognise that multiplication is commutative</p> <p>Use place value and number facts in mental multiplication e.g. 30×5 is 15×10</p> <p>Partition teen numbers to multiply by a 1-digit</p>	<p>Build on their understanding of repeated addition and arrays to multiply two digits by one digit using tables they know, e.g. 13×3</p>  <p>Informal recording of partition numbers. $15 \times 5 = 10 \times 5 + 5 \times 5 = 50 + 25 = 75$</p> <p>Link arrays to introduce grid multiplication to multiply TU by U , e.g. 13×6</p>	<p>Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve <u>fluency</u>.</p> <p>Recall and use multiplication and division facts for the 2, 3,4,5,6, 8 and 10 times table.</p> <p>Remember to use concrete apparatus and visual representations.</p> <p>Through doubling, they connect the 2, 4 and 8 multiplication tables.</p> <p>Pupils develop efficient mental methods, for</p>

number

e.g. 3×14 as 3×10 and 3×4

Double numbers up to 50

Scaling



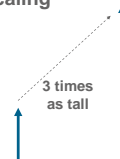
Use partitioning (grid multiplication) to multiply

2-digit and 3-digit numbers by 'friendly' 1-digit numbers

x	20	3
4	80	12

= 92

Scaling



Relate multiplication to scaling.

My string is 12cm long. Cut a piece of string three times longer.

example, using commutativity and associativity (for example, $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and multiplication and division facts (for example, using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts (for example, $30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$).

Pupils develop reliable written methods for multiplication and

Division, starting with calculations of two-digit numbers by one-digit numbers.

ONLY IF READY: progressing to the formal written methods of short multiplication and division.

Pupils solve simple problems (including missing number 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?)

Y3
÷

Know by heart all the division facts derived from the $\times 2$, $\times 3$, $\times 4$, $\times 5$, $\times 8$ and $\times 10$ tables

Divide whole numbers by 10 or 100 to give whole number answers

Recognise that division is not commutative

Use place value and number facts in mental division

e.g. $84 \div 4$ is half of 42

Divide larger numbers mentally by subtracting the 10th multiple as appropriate, including those with remainders

e.g. $57 \div 3$ is $10 + 9$ as $10 \times 3 = 30$ and $9 \times 3 = 27$

Halve even numbers to 100, halve odd numbers to 20

Perform divisions just above the 10th multiple using horizontal or vertical jottings and understanding how to give a remainder as a whole number.

Children use knowledge of multiplication facts and repeated addition to answer division questions.

How many 3s are there in 39?



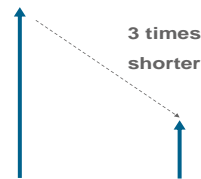
$$10 \times 3 = 30$$

$$3 \times 3 = 9 \quad \text{add together} = 39$$

Extending to use all tables that pupils know and to explore 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?



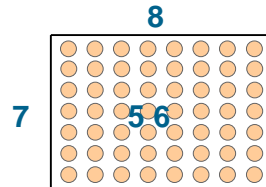
Use a range of apparatus, including Base Ten, coins, counters, arrays.

Pupils develop efficient mental methods, for multiplication and division facts (for example, using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts (for example, $30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$).

Pupils solve simple problems in context (including missing numbers), 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?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).

Use repeated subtraction - chunking

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.



Progress to using the formal written method of division.

$$98 \div 7$$

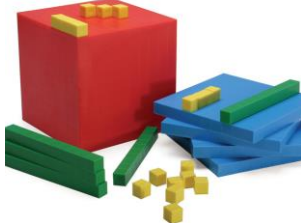
$$\begin{array}{r} 14 \\ 7 \overline{) 98} \\ \underline{7} \\ 28 \\ \underline{28} \\ 0 \end{array} \quad \text{answer 14}$$

Find unit fractions of quantities and begin to find non-unit fractions of quantities

Ensure children see/understand the link between grouping on a number line and vertical recording for chunking.

*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. **Only move on to this method when secure. (By Summer term)***

Year 4

	Expectations	What will this look like?	Key points
<p>Y4 +</p>	<p>Add any two 2-digit numbers by partitioning or counting on</p> <p>Know by heart/quickly derive number bonds to 100 and to £1</p> <p>Add to the next 100, £1 and whole number</p> <p>e.g. $234 + 66 = 300$ e.g. $3 \cdot 4 + 0 \cdot 6 = 4$</p> <p>Perform place-value additions without a struggle</p> <p>e.g. $300 + 8 + 50 + 4000 = 4358$</p> <p>Add multiples and near multiples of 10, 100 and 1000</p> <p>Add £1, 10p, 1p to amounts of money</p> <p>Use place value and number facts to add 1-, 2-, 3- and 4-digit numbers where a mental calculation is appropriate</p> <p>e.g. $4004 + 156$ by knowing that $6 + 4 = 10$ and that $4004 + 150 = 4154$ so the total is</p>	<p>Column addition for 3-digit and 4-digit numbers</p> <p>e.g. $625 + 48$</p> $\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ 1 \\ 1294 \end{array} \quad \begin{array}{r} \pounds 7.89 \\ + \pounds 6.42 \\ \hline \pounds 14.31 \\ 1 \quad 1 \end{array}$ <p>Add like fractions</p> <p>e.g. $\frac{3}{5} + \frac{4}{5} = \frac{7}{5} = 1\frac{2}{5}$</p> <p>Be confident with fractions that add to 1 and fraction complements to 1</p> <p>e.g. $\frac{2}{3} + \frac{1}{3} = 1$</p>	<p>Estimate and use inverse operations to check answers to a calculation.</p> <p>Pupils continue to practise both mental methods and columnar spacing addition and subtraction with increasingly large numbers to aid fluency.</p> <p>Use Base Ten equipment alongside these strategies.</p>  <p>Add least significant figures first when working vertically.</p> <p>Refer to the value of each digit e.g. 40 add 20 or 4 tens add 2 tens.</p>

	<p>4160</p> <p>Solve 2 step problems in context-deciding which operations to use. Include numbers with up to two decimal places in the context of money and measure.</p>		
<p>Y4</p> <p>—</p>	<p>Subtract any two 2-digit numbers</p> <p>Know by heart/quickly derive number bonds to 100</p> <p>Perform place-value subtractions without a struggle</p> <p>e.g. $4736 - 706 = 4030$</p> <p>Subtract multiples and near multiples of 10, 100, 1000, £1 and 10p</p> <p>Subtract multiples of 0.1</p> <p>Subtract by counting up</p> <p>e.g. $503 - 368$ is done by adding $368 + 2 + 30 + 100 + 3$ (so we added 135)</p> <p>Subtract, when appropriate, by counting back or taking away, using place value and number facts</p> <p>Subtract £1, 10p, 1p from amounts of money</p>	<p>Use expanded column subtraction for 3- and 4-digit numbers .</p> $ \begin{array}{r} 784 = 700 \quad \cancel{70}80 \quad \cancel{1}4 \\ -56 \qquad \qquad \quad 50 \quad 6 \\ \hline 700 \quad 20 \quad 8 = 728 \end{array} $ <p>Progressing to</p> $ \begin{array}{r} 7 \quad 1 \\ 7 \quad \cancel{8} \quad \cancel{4} \\ - \quad 5 \quad 6 \\ \hline 7 \quad 2 \quad 8 \end{array} $ <p>Progressing to 4 digit numbers and should be expected at the end of year 4.</p> $ \begin{array}{r} 2754 = 2000 \quad \overset{500}{700} \quad \overset{100}{\cancel{60}} \quad 4 \\ -1562 \quad \quad 1000 \quad 500 \quad 60 \quad 2 \\ \hline 1192 \quad \quad 1000 \quad 100 \quad 90 \quad 2 \end{array} $ $ \begin{array}{r} \overset{51}{2754} \\ -1562 \\ \hline 1192 \end{array} $ <p><i>(A blue arrow points from the text above to the '51' in the second column subtraction.)</i></p>	<p>Pupils continue to practise both mental methods and columnar spacing for addition and subtraction with increasingly large numbers to aid fluency.</p> <p>Estimate and check answers to calculations.</p> <p>Understand subtraction as the inverse of addition.</p> <p>Solve two-step problems in contexts, deciding which operations to use and why.</p> <p>Continue to support understanding with a range of concrete materials, including Base Ten to show exchange</p> <p>Coins/counters on a place value chart, number lines.</p>

	<p>Find change from £10, £20 and £50</p> <p>Subtract numbers with up to 4 digits, including up to 2 d.p. in the context of money and measure.</p> <p>E.g. 26.21m - 11.29m (using end of year layout for calculation).</p>	<p>Use complementary addition to subtract amounts of money, and for subtractions where the larger number is a near multiple of 1000 or 100.</p> <p><i>e.g. 2002 - 1865</i></p> <p>Subtract like fractions</p> <p><i>e.g. $4/5 - 3/5 = 1/5$</i></p> <p>Use fractions that add to 1 to find fraction complements to 1</p> <p><i>e.g. $1 - 2/3 = 1/3$</i></p>									
<p>Y4 x</p>	<p>Know by heart all the multiplication facts up to 12×12</p> <p>Recognise factors up to 12 of 2-digit numbers</p> <p>Multiply whole numbers and 1-place decimals by 10, 100, 1000</p> <p>Multiply multiples of 10, 100 and 1000 by 1-digit numbers</p> <p>e.g. 300×6 e.g. 4000×8</p> <p>Use understanding of place value and number facts in mental multiplication</p>	<p>Use a grid written method to multiply a 1-digit number by a 3-digit number;</p> <p>HTU x U using grid method e.g. 136×5</p> <table border="1" data-bbox="898 1034 1480 1171"> <tr> <td>X</td> <td>100</td> <td>30</td> <td>6</td> </tr> <tr> <td>5</td> <td>500</td> <td>150</td> <td>30</td> </tr> </table> <p>Progressing to the expanded short multiplication method</p> <p><i>136 Moving to the formal written method</i> <i><u>x 5</u> <u>by the Summer term.</u></i></p>	X	100	30	6	5	500	150	30	<p>Recall and use multiplication and division facts for the 2, 3,4,5,6,7,8,9 and 10 times table.</p> <p>Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example $600 \div 3 = 200$ can be derived from $2 \times 3 = 6$).</p> <p>Recognise and use factor pairs and commutativity in mental calculations.</p> <p><i>Pupils practise solving problems to become fluent in the formal written method of short</i></p>
X	100	30	6								
5	500	150	30								

e.g. 36×5 is half of 36×10
 e.g. $50 \times 60 = 3000$

Partition 2-digit numbers to multiply by a 1-digit number mentally

e.g. 4×24 as 4×20 and 4×4

Multiply near multiples by rounding

e.g. 33×19 as $(33 \times 20) - 33$

Find doubles to double 100 and beyond using partitioning

Begin to double amounts of money

e.g. £35.60 doubled is £71.20

$30 \quad 136$

$150 \quad \underline{\times 5}$

$\underline{500} \quad \underline{680}$

$\underline{680} \quad \underline{13}$

Use an efficient written method to multiply a 2-digit number by a 2-digit number by partitioning (grid method) 38×72

x	30	8	
70	2100	560	= 2660 +
2	60	16	= 76
			2736

Progressing to the expanded written form for TU xTU

72

$\underline{\times 38}$

$16 (2 \times 8)$

$560 (70 \times 8)$

multiplication. ??

Pupils write statements about the equality of expressions (for example, use the distributive law (partitioning) $39 \times 7 = 30 \times 7 + 9 \times 7$ and associative law $(2 \times 3) \times 4 = 2 \times (3 \times 4)$). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations for example, $2 \times 6 \times 5 = 10 \times 6 = 60$.

Pupils solve two step problems in context choosing the operation.

Relate multiplication to integer scaling, problems such as n objects are connected to m objects.

		$60 (2 \times 30)$ $2100 (70 \times 30)$ 2736 1	
<p>Y4 ÷</p>	<p>Know by heart all the division facts up to $144 \div 12$</p> <p>Divide whole numbers by 10, 100, to give whole number answers or answers with 1 decimal place</p> <p>Divide multiples of 100 by 1-digit numbers using division facts</p> <p>e.g. $3200 \div 8 = 400$</p> <p>Use place value and number facts in mental division</p> <p>e.g. $245 \div 20$ is half of $245 \div 10$</p> <p>Divide larger numbers mentally by subtracting the 10th or 20th multiple as appropriate</p> <p>e.g. $156 \div 6$ is 20×6 as $20 \times 6 = 120$ and $6 \times 6 = 36$</p> <p>Find halves of even numbers to 200 and</p>	<p>Pupils continue to use the number line to support mental division.</p> <p>Use a written method to divide a 2-digit or a 3-digit number by a 1-digit number</p> $ \begin{array}{r} 98 \div 7 \\ 14 \\ \hline 7 \overline{) 98} \\ \underline{7} \\ 28 \\ \underline{28} \\ 0 \end{array} $ <p style="text-align: right;">answer 14</p> <p>Extend to 3-digit number by a 1-digit number</p> $257 \div 7$ <p>Estimate first by using a number line to count on, if appropriate then use formal written methods as above.</p> <p>Give remainders as whole numbers</p>	<p><i>Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency (up to 12×12).</i></p> <p>Children continue to use strategies used in year 3.</p> <p><i>Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example $600 \div 3 = 200$ can be derived from $2 \times 3 = 6$).</i></p> <p><i>Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers.</i></p> <p>Pupils solve two step problems in context choosing the operation.</p> <p>E.g. Three cakes divided equally between 10 children.</p>

	beyond using partitioning Begin to halve amounts of money e.g. half of £52.40 is £26.20	Begin to reduce fractions to their simplest forms Find unit and non-unit fractions of larger amounts	
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