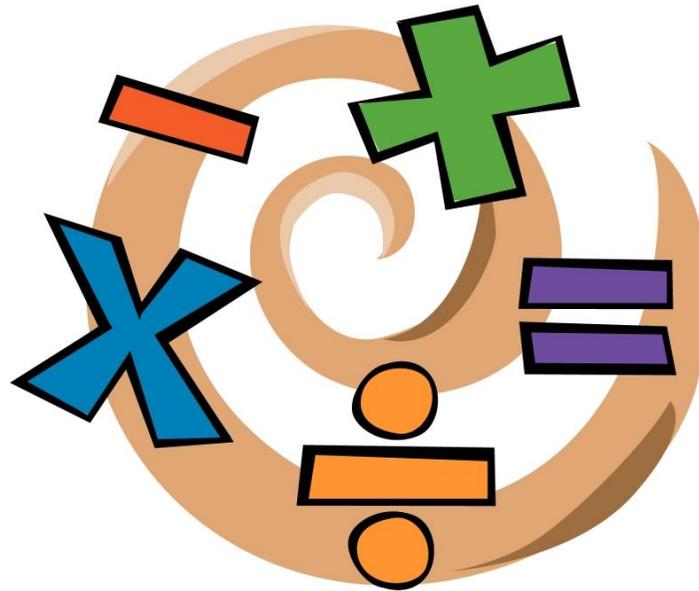


Rush Common Calculation Policy



Introduction:

Children are introduced to the processes of calculation through practical, oral and mental activities. As they begin to understand the underlying ideas, they develop ways of recording to support their thinking and calculation methods, so that they develop both **conceptual understanding** and **fluency** in the fundamentals of mathematics. Whilst interpreting signs and symbols involved with calculation, orally in the first instance, children use models and images to support their mental and written methods of calculation. As children's mental methods are strengthened and refined they begin to work more efficiently, which will support them with using succinct written calculation strategies as they are developed.

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 through progression in relevant practical maths experiences and visual representations.

By the end of Year 6, children will be equipped with efficient mental and written calculation methods, which they use with fluency. Decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. At whatever stage in their learning, and whatever method is being used, children's strategies must still be underpinned by a secure understanding and knowledge of number facts that can be recalled fluently.

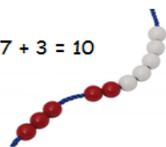
The overall aims are that when children leave primary school they:

- Are able to recall number facts with fluency, having developed conceptual understanding through being able to visualise key ideas – such as those related to place value - through experience with practical equipment and visual representations;
- 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 number operation that they can apply with confidence when undertaking calculations that they cannot carry out mentally;
- Are able to make connections between all four number operations, understanding how they relate to one another, as well as how the rules and laws of arithmetic can be applied.

Mental Calculation Strategies for Addition and Subtraction

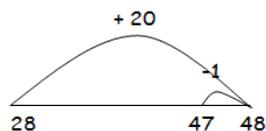
Number Bonds

$7 + 3 = 10$



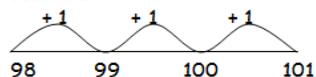
Adjusting

$28 + 19 = 47$



Finding the Difference

$101 - 98 = 3$

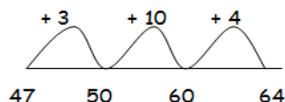


Doubles



Bridging

$47 + 17 = 64$



Near Doubles



Partitioning

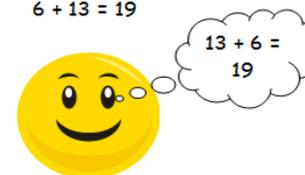
$44 + 34 = 78$

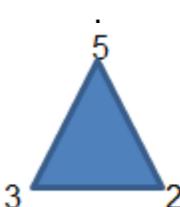
~~$44 + 34 = 78$~~
 $70 + 8 = 78$

Reordering

e.g. put big number in head when counting on

$6 + 13 = 19$



	Counting	Mental maths Requirements and strategies	Rapid recall	Written calculation requirements and appropriate models and images to support conceptual understanding
Year 1:	Count in ones to and across 100 forwards and backwards starting from 0, 1 and other numbers. Count in multiples of two, five and ten.	Pupils use apparatus to explore addition as the inverse of subtraction. 	Rapid recall of all pairs of numbers totalling up to 10 and pairs totalling 20. Use structured apparatus – i.e. Numicon, tens frames,	<ul style="list-style-type: none"> Given a number, identify one more Read, write and interpret mathematical statements involving addition (+) and the equals (=) sign Add one- digit and two-digit numbers within 20, including zero Solve missing number problems eg $10 + \square = 16$ <p>Combining two groups:</p> <ul style="list-style-type: none"> Children develop a mental picture of the number system for use with calculation. A range of



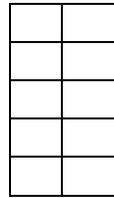
●●● ●●
 $3 + 2 = 5$

●●●●● ○○○○
'eight add two more makes ten'



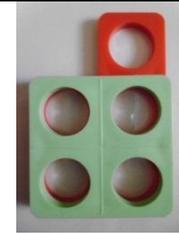
4 add 1 is 5
5 subtract 4
leaves 1

abaci, etc.



key models and images support this, alongside practical equipment.

- Teachers model use of number tracks to count on or line up counters/objects along the number track. This is a precursor to use of a fully numbered number-line.



'one more than four is five'

Year 2:

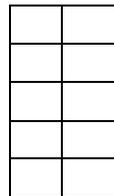
Continue practicing above skills. Count in steps of 2, 3 and 5 forwards and backwards to and from zero. Count in tens from any number – link to coins in a piggy bank as well as a number square.

add and subtract 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
Reorder numbers when adding, i.e. start with largest number, find

Recall addition and subtraction facts for all numbers to 20. Connect pairs totalling ten to pairs of multiples of 10 totalling 100.



Use 10ps in tens frame.

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
- Three one-digit numbers

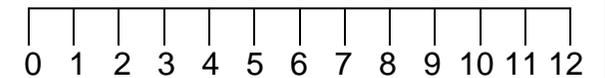
Counting on from any number:

- Children begin to use numbered lines to support their own calculations, initially counting in ones, then in tens, then partitioning the smaller number into tens and ones before beginning to work more efficiently.

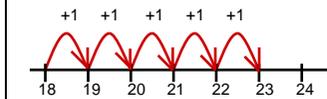
Counting on from the largest number:

- Children reorder calculations to start with the largest number.

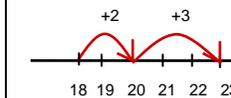
Number line with all numbers labelled



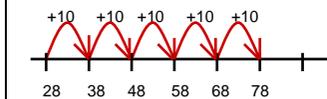
$18 + 5$



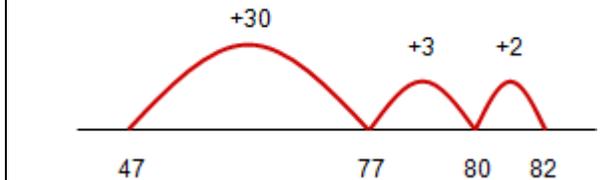
...to...



And in 10s, $28 + 50 = 78$



$35 + 47$



bonds, etc.
 Show addition is commutative, subtraction is not.
 Add doubles and derive near doubles.
 Round numbers to the nearest 10.

Also use the partitioning method to add two two-digit numbers:

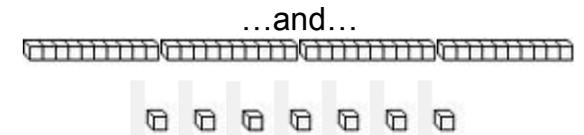
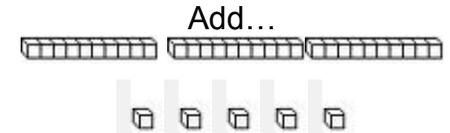
Partition the numbers into tens and ones/units.
 Add the tens together and then add the ones/units together.
 Recombine to give the answer'.
 Then move on to calculations that bridge the tens:

$$\begin{array}{r} 43 + 25 = 68 \\ \underline{40 \quad 3 \quad 20 \quad 5} \end{array}$$

$$\begin{aligned} 40 + 20 &= 60 \\ 3 + 5 &= 8 \\ 60 + 8 &= 68 \end{aligned}$$

$$\begin{aligned} 48 + 36 &= 40 + 8 + 30 + 6 \\ 40 + 30 &= 70 \\ 8 + 6 &= 14 \\ 70 + 14 &= 84 \\ 48 + 36 &= 84 \end{aligned}$$

Support partitioning with apparatus:

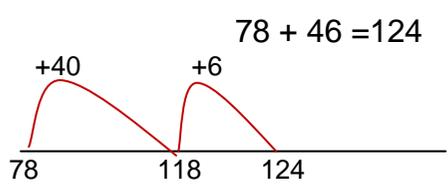


By partitioning and recombining

$$\begin{aligned} 30 + 40 &= 70 \\ 5 + 7 &= 12 \\ 70 + 12 &= 82 \end{aligned}$$



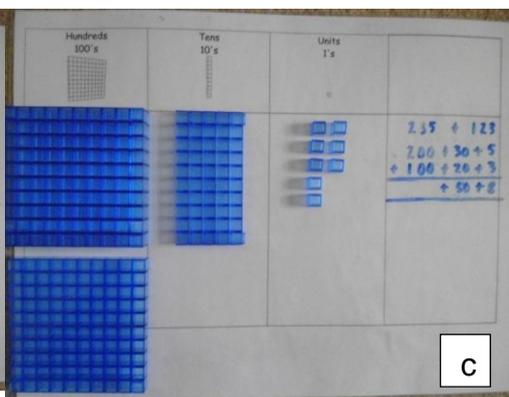
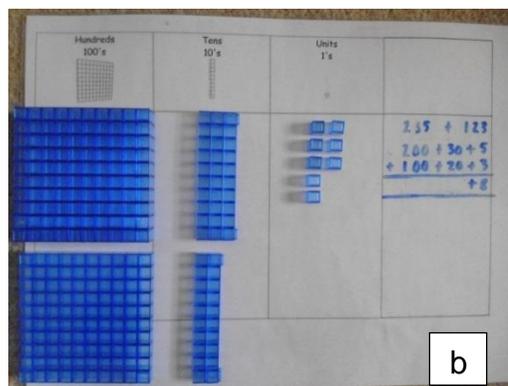
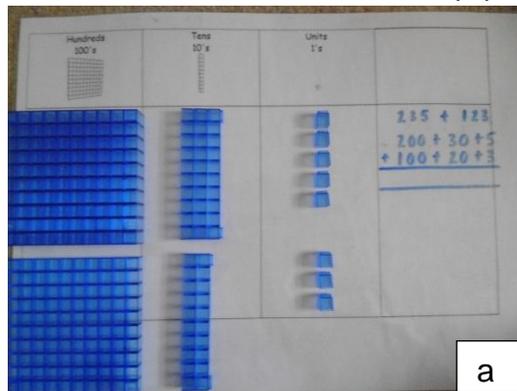
Use of questions such as: 'How might I rearrange these to find the total?'

<p>Year 3:</p>	<p>Continue practising above skills. Count from 0 in multiples of 4, 8, 50 and 100. Count on by 10 or 100 from any two digit number. Link to counting stick: counting forwards and backwards flexibly. Count up and down in tenths – linking to visual image.</p>	<p>add and subtract numbers mentally, including:</p> <ul style="list-style-type: none"> * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds <p>Partitioning by bridging through 10 and multiples of 10 when adding. Adjusting when adding 11 or 9 to a number. Relating inverse number operations – using structured apparatus to explore and understand that subtraction undoes addition.</p>	<p>Continue practising rapid recall from Year 2. Recall pairs of two-digit numbers with a total of 100, i.e. $32 + ? = 100$.</p>	<p>Add numbers with up to three digits, using formal written method of columnar addition</p> <p>NB Ensure that children are confident with the methods outlined in the previous year's guidance before moving on.</p> <p>Further develop the use of the empty number line with calculations that bridge 100</p> <p>:Expanded horizontal addition:</p> <ul style="list-style-type: none"> • Add numbers using structured apparatus to support understanding of place value. • Make connections between partitioning both numbers using structured apparatus and partition the second number only using a number line. <p>Further develop the partitioning method with calculations that bridge 100:</p> <p>Introduce the expanded written method with the calculation presented both horizontally and vertically (in columns). Initially use calculations where it has not been necessary to bridge across the tens or hundreds:</p> <p>As children move towards using a columnar method, links continue to be made with earlier models and images, including the number line.</p>	<div style="text-align: right;"> $78 + 46 = 124$ </div>  <p>85 + 37 = 80 + 5 + 30 + 7 80 + 30 = 110 5 + 7 = 12 110 + 12 = 122 85 + 37 = 122</p> <p>63 + 32 = 95</p> $\begin{array}{r} 60 + 3 \\ + 30 + 2 \\ \hline 90 + 5 = 95 \end{array}$ <p>Then...</p> $\begin{array}{r} 63 \\ + 32 \\ \hline 95 \end{array}$ <p style="text-align: right;">(3 + 2) 90 (60 + 30) 95</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>'Partition the numbers into tens and ones/units. Add the tens together and then add the ones/units together. Recombine to give the answer.'</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Add the least significant digits (units) together first and then the tens in preparation for the formal written method.</p> </div> <p>This will lead into the formal written method...</p> $\begin{array}{r} 63 \\ + 32 \\ \hline 95 \end{array}$ <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Use the language of place value to ensure understanding: 'Three add two equals five. Write five in the units column. 60 add 30 equals 90. Write 9 (90) in the tens column.'</p> </div> <p>NB Informal/mental methods would be more appropriate for numbers of this size, but use two-digit numbers when introducing the columnar method.</p>
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				<p>Then introduce calculations where it is necessary to bridge, returning to an expanded method initially:</p> <p>When children are confident, extend with examples where it is necessary to bridge across the tens and the hundreds:</p> <p>If children are ready introduce the formal written method, where it is necessary to</p>	<p> $68 + 24 = 92$ $60 + 8$ $+ 20 + 4$ $80 + 12 = 92$ </p> <p> 68 $+24$ $12 (8 + 4)$ $80 (60 + 20)$ 92 </p> <p> 68 $+24$ 92 1 </p> <p> $76 + 47 = 123$ $70 + 6$ $+ 40 + 7$ $110 + 13 = 123$ </p> <p>Then...</p> <p> 76 $+ 47$ $13 (7 + 6)$ $110 (70 + 40)$ 123 </p>
<p>'Partition the numbers into tens and ones/units. Add the tens together and then add the ones/units together. Recombine to give the answer.'</p>					
<p>Add the least significant digits (units) together first and then the tens in preparation for the formal written method.</p>					
<p>Use the language of place value to ensure understanding: 'Eight add four equals 12. Write two in the units column and 'carry' one (10) across into the tens column. 60 add 20 and the ten that we 'carried' equals 90. Write 9 (90) in the tens column. 92 is the answer.</p>					
<p>Partition the numbers into tens and ones/units. Add the tens together and then add the ones/units together. Recombine to give the answer.</p>					
<p>Add the least significant digits (units) together first and then the tens in preparation for the formal written method.</p>					
<p>Use the language of place value to ensure understanding: 'Seven add six equals 13. Write three in the units column and 'carry' one (10) across into the tens column. 40 add 70 and the ten that we 'carried'</p>					

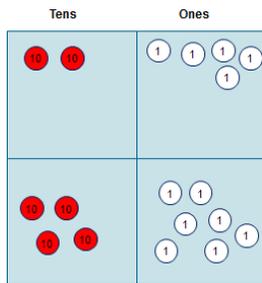
			<p>'carry' across the columns and bridge 100:</p> <p>If children are confident, further develop with the addition of a three- digit number and a two -digit number:</p>	$76 + 47 = 123$ $\begin{array}{r} 47 \\ + 76 \\ \hline 123 \\ 11 \end{array}$	<p>equals 120. Write 2 (20) in the tens column and 'carry' one (100) across into the hundreds column (100).</p>
				$178 + 43 = 221$ $\begin{array}{r} 178 \\ + 43 \\ \hline 221 \\ 11 \end{array}$	

Illustration of how to use Dienes equipment and place value counters to ensure children have an understanding of place value when using columnar addition.

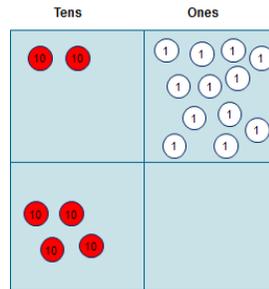


Formal columnar:

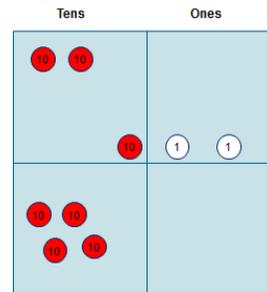
$$\begin{array}{r} 25 \\ +47 \\ \hline \end{array}$$



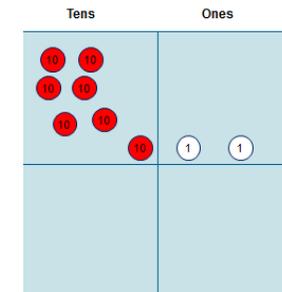
$$\begin{array}{r} 25 \\ +47 \\ \hline 2 \\ \hline 1 \end{array}$$



$$\begin{array}{r} 25 \\ +47 \\ \hline 2 \\ \hline 1 \end{array}$$



$$\begin{array}{r} 25 \\ +47 \\ \hline 72 \\ \hline 1 \end{array}$$



Year 4:

Continue practising previous skills. Count forwards and backwards from 0 in multiples of 6, 7, 9, 25 and 1000 using counting sticks, number lines, number squares, etc. Count up and down in tenths, hundredths and simple fractions using models and images, i.e. Dienes equipment, counting stick,

Bridging through 60 for time, i.e. 70 minutes = 1 hour and 10 minutes. Rounding any number to the nearest 10, 100 or 1000. Rounding numbers with one decimal place to nearest whole number. Explore inverse as a way to derive new facts and to check accuracy of answers.

As above. Use known facts and place value to derive new ones, i.e. 'If I know $8 + 3 = 11$, I also know $0.8 + 0.3 = 1.1$ and $8/100 + 3/100 = 11/100$.' Sums and differences of pairs of multiples of 10, 100 or 1000. Addition doubles of numbers to 100. Pairs of fractions

Add numbers with up to 4 digits using the formal written method of columnar addition where appropriate
NB Ensure that children are confident with the methods outlined in the previous year's guidance before moving on. Continue to teach the use of empty number lines with three and four digit numbers, as appropriate. Further develop the formal written method of addition, with three-digit numbers. Revisit the expanded method first, if necessary:

- Written recording should follow teacher modelling around the size of numbers and place value using a variety of concrete materials, e.g. straws, Numicon, Dienes and place-value cards.
- Teachers model how numbers can be partitioned into tens and ones, as well as in different ways, e.g. $20 + 5$

It is crucial that empty number lines are kept as well as using more formal written calculation methods.

$$\begin{array}{r} 176 + 147 = 323 \\ 176 \\ + 147 \\ \hline 13 \quad (7 + 6) \\ 110 \quad (70 + 40) \\ \hline 200 \quad (100 + 100) \\ \hline 323 \end{array}$$

This will lead into the formal written method...

$$\begin{array}{r} 176 + 147 = 323 \\ 147 \\ 176 \\ \hline 323 \\ \hline 1 \end{array}$$

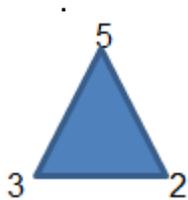
Use the language of place value to ensure understanding: 'Seven add six equals 13. Write three in the units column and 'carry' one across into the tens column (10). 40 add 70 and the ten that we carried equals 120. Write 2 in the tens column (20) and 'carry' 1 across into the hundreds column (100). 100 add 100 and the 100 that has been carried equals 300. Write 3 in the hundreds column (300).'

	ITPs.		totalling 1.	10 + 15 If children are confident, introduce the addition of a four-digit number and a three digit number:	1845 + 526 = 2371 $\begin{array}{r} 1845 \\ + 526 \\ \hline 2371 \\ \small{1 \quad 1} \end{array}$
Year 5:	Count forwards and backwards in steps of powers of 10 for any given number up to one million. Continue to count forwards and backwards in simple fractions. Count forward and backwards in appropriate decimals and percentages.	Use apparatus and knowledge of place value to add decimals, i.e. $3.8 + 2.5 = 5 + 1.3$ Reorder increasingly complex calculations, i.e. $1.7 + 2.8 + 0.3 = 1.7 + 0.3 + 2.8$ Compensating – i.e. $405 + 399 \rightarrow$ add 400 and then subtract 1.	Continue to practise previous year and make links between known facts and addition pairs for fractions, percentages and decimals Doubles and halves of decimals, i.e. half of 5.6, double 3.4. Sums and differences of decimals, i.e. $6.5 + 2.7$	Add whole numbers with more than 4 digits, including using formal written method (columnar addition) NB Ensure that children are confident with the methods outlined in the previous year's guidance before moving on. Continue to teach the use of empty number lines with larger numbers (and decimals), as appropriate. Continue to develop the formal written method for addition with larger numbers (and decimal numbers) and with the addition of three or more numbers: Use the formal written method for the addition of decimal numbers:	21848 + 1523 = 23371 $\begin{array}{r} 21848 \\ + 1523 \\ \hline 23371 \\ \small{1 \quad 1} \end{array}$ £154.75 + £233.82 = £388.57 $\begin{array}{r} 154.75 \\ + 233.82 \\ \hline 388.57 \\ \small{1} \end{array}$

Continue to use the language of place value to ensure understanding. Ensure that the digits that have been 'carried' are recorded under the line in the correct column.

Year 6:	Continue to practise previous skills. Count forwards and backwards in simple fractions, decimals and percentages.	Bridging through decimals, i.e. $0.8 + 0.35 = 0.8 + 0.2 + 0.15$ using empty number lines. Partitioning using near doubles, i.e. $2.5 + 2.6 = 5 + 0.1$ Reorder decimals, i.e. $4.7 + 5.6 - 0.7$...as... $4.7 - 0.7 + 5.6 = 4 + 5.6$.	Ensure all children are confident recalling basic facts to 20 and deriving facts using place value. Make links between decimals, fractions and percentages.	Children will continue to practise and use the formal written method for larger numbers and decimals and use these methods when solving problems, when appropriate (see previous year's guidance for methods). Our aim is that by the end of Y6, children use mental methods (with jottings) when appropriate, but for calculations that they cannot do in their heads, they use an efficient formal written method accurately and with confidence.	
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Subtraction:

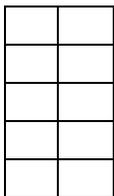
	Counting	Mental strategies	Rapid Recall	Written calculation and appropriate models and images to support conceptual understanding
Year 1:	Count in ones to and across 100, forwards and backwards starting from 0, 1 and other numbers. Count in multiples of two, five and	Pupils use apparatus to explore addition as the inverse of subtraction: 	Rapid recall of subtraction facts for numbers up to 10 then numbers up to 20 Use structured apparatus, i.e.	<ul style="list-style-type: none"> • Given a number, identify one less • Read, write and interpret mathematical statements involving subtraction • (-) and the equals (=) sign • Subtract one-digit and two-digit   <p>'six take away two leaves four'</p>

ten.



'four add one is five.'
'five subtract four leaves one'

Numicon, tens frames, abaci etc.



numbers within 20, including zero

- **Solve missing number problems**
eg $20 - = 15$
Subtraction as taking away from a group:

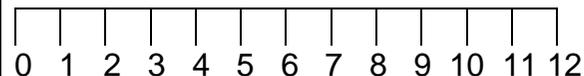
Children develop a mental picture of the number system for use with calculation. A range of key models and images support this, alongside practical equipment.

Teachers model use of number tracks to count back or remove counters/objects from the number track or set. This is a precursor to use of a fully numbered number-line.

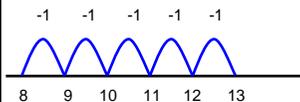


'one less than six is five'

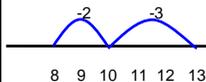
Number line with all numbers labelled



$$13 - 5 = 8$$



$$13 - 5 = 8$$

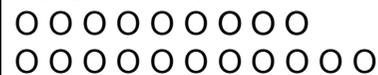


Counting on to find a small difference:

Introduce complementary addition to find differences (only use for small differences).

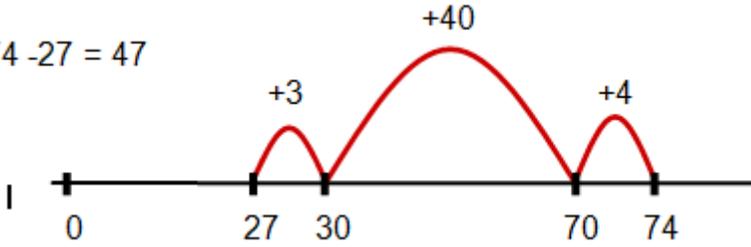
The use of models is extremely important here to understand the idea of "difference".

Count up from the smallest number to the largest to find the difference using resources, e.g. cubes, beads, number tracks/lines:



$$11 - 9 = 2$$

The difference between nine and eleven is two.

<p>Year 2:</p>	<p>Continue practicing above skills. Count in steps of 2, 3 and 5, forwards and backwards to and from zero. Count in tens from any number – link to coins in a piggy bank as well as a number square.</p>	<p>Bridging through two digit numbers, i.e. $24 - 19 = 19 + 1 + 4$ using number lines. Subtracting 11 by subtracting 10 and then 1 more. Move to subtracting 9 by subtracting 10 and adding 1 using apparatus.</p>	<p>recall and use addition and subtraction facts to 20 fluently Connect subtractions from ten to subtractions from multiples of 10 totalling 100.</p> <table border="1" data-bbox="757 619 864 810"> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> </table> <p>Use 10ps in tens frame. Subtract two digit numbers from 100 i.e. $? = 100 - 78$</p>											<p>Subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <ul style="list-style-type: none"> o A two digit number and ones o A two digit number and tens o Two two-digit numbers <p>NB Ensure that children are confident with the methods outlined in the previous year's guidance before moving on.</p> <p>Finding the difference:</p> <ul style="list-style-type: none"> • Teachers model how to find the difference when two numbers are relatively 'close together.' • Initially children compare two sets before moving on to a number line comparison. • Pupils are taught to choose whether to count on or back depending on which is more efficient. 	<p>Introduce complementary addition to find differences (only use for small differences). The use of models is extremely important here to understand the idea of "difference"</p> <p>Count up from the smallest number to the largest to find the difference.</p> <p>$12 - 8 = 4$ +1 +1 +1 +1</p>  <p>8 9 10 11 12 'The difference between 8 and 12 is 4.'</p> <p>$32 - 28 = 4$ +1 +1 +1 +1</p>  <p>28 29 30 31 32 'The difference between 28 and 32 is 4.'</p> <p>If children are confident, further develop this method: by bridging through multiples of ten.</p> <p>$74 - 27 = 47$</p>  <p>Subtract by starting with the first number and partitioning the second, i.e.</p> <p>$74 - 27$ $74 - 20 = 54$ $54 - 4 = 50$ $50 - 3 = 47$</p>

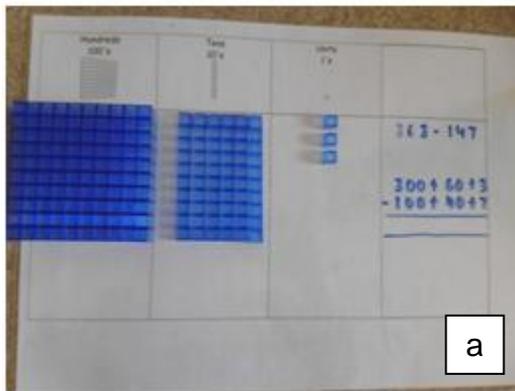
<p>Year 3:</p>	<p>Continue practising above skills. Count from 0 in multiples of 4, 8, 50 and 100. Count on and back by 10 or 100 from any two digit number. Link to counting stick counting forwards and backwards flexibly. Count up and down in tenths – linking to visual image.</p>	<p>Partitioning by bridging through 10 and multiples of 10 when subtracting. Continue to practice adjusting when subtracting 11 or 9 from a number. Relating inverse number operations – use structured apparatus to explore and understand that subtraction undoes addition.</p>	<p>Connect Continue practising rapid recall form Year 2</p>	<p>Subtract numbers with up to three digits, using formal written method of columnar subtraction</p> <p>NB Ensure that children are confident with the methods outlined in the previous year's guidance before moving on. Further develop the use of the empty number line with calculations that bridge 100: Introduce the expanded written method with the calculation presented both horizontally and vertically (in columns). Use two-digit numbers when introducing this method, initially:</p> <p>Introduce the expanded written method where exchange/decomposition is required:</p> <p>When children are confident with the expanded method introduce the formal written method, involving decomposition/exchange:</p>	<p>$126 - 95 = 31$ $+5 +10 +10 +6$</p>  <p>95 100 110 120 126</p> <p>Then use more efficient jumps, jumping in multiples of 10</p> <p>$78 - 23 = 55$ $70 + 8$ $-20 + 3$ $50 + 5 = 55$</p> <p>This will lead into the formal written method:</p> <p>78 -23 55</p> <p>$73 - 27 = 46$ $70 + 3$ $-20 + 7$</p> <p>$73 - 27 = 46$ $\begin{array}{r} 6\ 13 \\ -7\ 3 \\ \hline -27 \\ \hline 46 \end{array}$</p> <div data-bbox="1659 475 2119 612" style="border: 1px solid black; padding: 5px;"> <p>'Partition numbers into tens and ones/units. Subtract the ones, and then subtract the tens. Recombine to give the answer.' NB In this example decomposition (exchange) is not required.</p> </div> <div data-bbox="1675 730 2119 906" style="border: 1px solid black; padding: 5px;"> <p>Use the language of place value to ensure understanding: 'Eight subtract three, seventy subtract twenty.' NB A number line would be an appropriate method for this calculation but use twodigit numbers to illustrate the formal written method initially.</p> </div> <div data-bbox="1816 981 2011 1086" style="text-align: center;"> <p>$60 + 13$ $-20 + 7$ $40 + 6 = 46$</p> </div> <div data-bbox="1590 1201 2119 1342" style="border: 1px solid black; padding: 5px;"> <p>Use the language of place value to ensure understanding. 'We can't subtract seven from three, so we need to exchange a ten for ten ones to give us 60 + 13.' Use base ten materials to support understanding.</p> </div>
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				<p>If children are confident, extend the use of the formal written method with numbers over 100, returning to the expanded method first, if necessary.</p>	$235 - 127 = 108$ $\begin{array}{r} 235 \\ - 127 \\ \hline 108 \end{array}$	<div style="border: 1px solid black; padding: 5px;"> <p>Use the language of place value to ensure understanding. In this example it has only been necessary to exchange from the tens column. Use base ten materials to support understanding.</p> </div>
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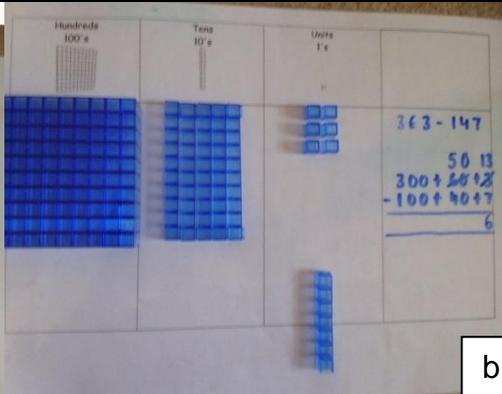
Illustration of how to use Dienes equipment and place value counters to ensure children understand transference of numbers when using columnar subtraction.

$$363 - 147 = 216$$

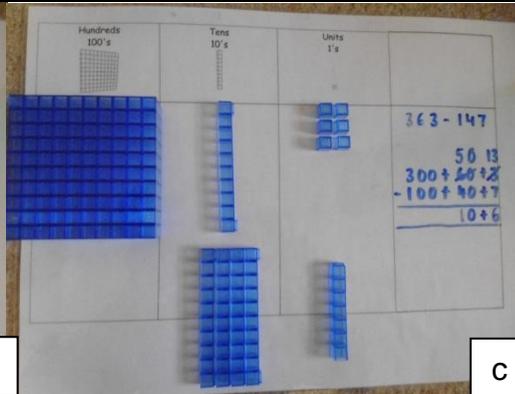
$$\begin{array}{r} 50\ 13 \\ 300 + 60 + 3 \\ - 100 + 40 + 7 \\ \hline 200 + 10 + 6 = 216 \end{array}$$



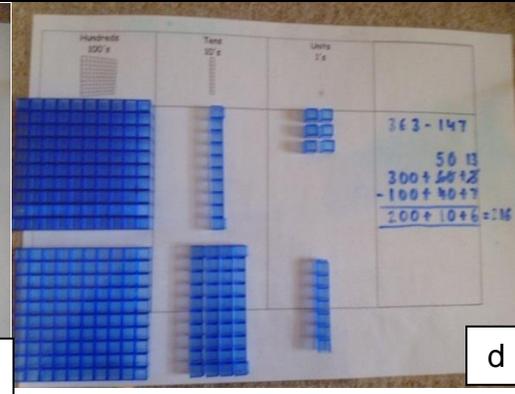
a



b



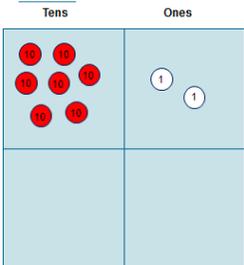
c



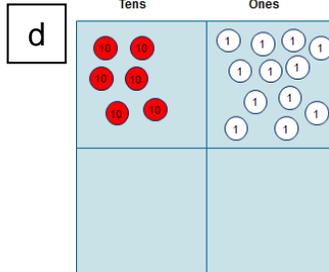
d

Formal columnar:

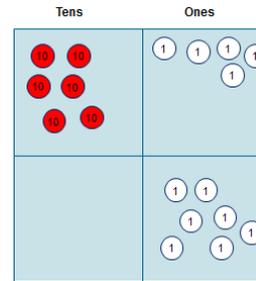
$$\begin{array}{r} 72 \\ - 47 \\ \hline \end{array}$$



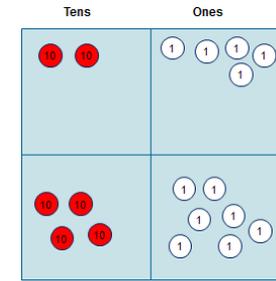
$$\begin{array}{r} \overset{6}{\cancel{7}}2 \\ - 47 \\ \hline \end{array}$$



$$\begin{array}{r} \overset{6}{\cancel{7}}2 \\ - 47 \\ \hline 5 \end{array}$$



$$\begin{array}{r} \overset{6}{\cancel{7}}2 \\ - 47 \\ \hline 25 \end{array}$$



Year 4:

Continue practising of previous skills. Count forwards and backwards from 0 in multiples of 6, 7, 9, 25 and 1000 using counting sticks, number lines, number squares, etc. Count up and down in tenths, hundredths

Bridging through 60 for time, i.e. 70 minutes = 1 hour and 10 minutes Rounding any number to the nearest 10, 100 or 1000. Rounding numbers with one decimal place to nearest whole number. Explore inverse as a way to derive new facts and to check accuracy of answers.

As above. Use known facts and place value to derive new ones, i.e. 'If I know $11 - 3 = 8$, I also know $1.1 - 0.3 = 0.8$ and $8/100 - 3/100 = 5/100$.' Sums and differences of pairs of multiples of 10, 100 or 1000. Subtraction

Subtract numbers with up to 4 digits using the formal written method of columnar subtraction where appropriate
NB Ensure that children are confident with the methods outlined in the previous year's guidance before moving on. Continue to teach the use of empty number lines with three and four digit numbers, as appropriate. Continue to develop the formal written method of subtraction by revisiting the expanded method first, if necessary.

$$258 - 73 = 185$$

$$200 + 50 + 8 - 70 + 3 \text{ becomes}$$

$$100 + 150 + 8 - 70 + 3 = 185$$

This leads to the formal written method, involving decomposition...

$$\begin{array}{r} 1 \ 15 \\ 2 \ 58 \\ - 73 \\ \hline 1 \ 85 \end{array}$$

Use the language of place value to ensure understanding and use base ten materials, if necessary.

Further develop by subtracting a three-digit number from a three-digit number:

$$637 - 252 = 385$$

$$600 + 30 + 7 - 200 + 50 + 2 = 385$$

$$500 + 130 + 7 - 200 + 80 + 5 = 385$$

	<p>and simple fractions using models and images, i.e. Dienes equipment, counting stick, ITPs.</p>		<p>of fractions totalling 1, i.e. $1 - 0.3 = 0.7$</p>	<p>Continue to use base - ten materials to support understanding.</p>	<p>This leads to a formal written method</p> $\begin{array}{r} \\ 6 \\ - 2 \\ \hline 3 \end{array}$ <p style="text-align: center;">$503 - 278 = 225$</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">$500 + 0 + 3$</td> <td style="text-align: center;">$400 + 90 + 13$</td> </tr> <tr> <td style="text-align: center;">$- 200 + 70 + 8$</td> <td style="text-align: center;">$- 200 + 70 + 8$</td> </tr> <tr> <td style="text-align: center;"><hr/></td> <td style="text-align: center;"><hr/></td> </tr> <tr> <td style="text-align: center;">$200 + 20 + 5$</td> <td></td> </tr> </table> <p>This leads into the written method (there is potential for error in this example):</p> $\begin{array}{r} \\ \del{5} \del{0} \del{3} \\ - 2 \\ \hline 2 \end{array}$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>There are no tens in the first number (503) so we have to exchange a hundred for 10 tens before we can exchange a ten for ten ones</p> </div> <p style="text-align: right;">formal</p> <p>When children are confident, develop with four digit numbers and decimal numbers (in the context of money and measures).</p> $3625 - 1219 = 2406$ $\begin{array}{r} \\ 3 \del{2} \del{5} \\ - 1 \\ \hline 2 \end{array}$	$500 + 0 + 3$	$400 + 90 + 13$	$- 200 + 70 + 8$	$- 200 + 70 + 8$	<hr/>	<hr/>	$200 + 20 + 5$	
$500 + 0 + 3$	$400 + 90 + 13$												
$- 200 + 70 + 8$	$- 200 + 70 + 8$												
<hr/>	<hr/>												
$200 + 20 + 5$													

<p>Year 5:</p>	<p>Count forwards and backwards in steps of powers of 10 for any given number up to one million. Continue to count forwards and backwards in simple fractions. Count forward and backwards in appropriate decimals and percentages.</p>	<p>Use apparatus and knowledge of place value to subtract decimals, i.e. $3.8 - 2.5 = 1.3$ Reorder increasingly complex calculations, i.e. $1.7 - 5 - 0.7 = 1.7 - 0.7 - 5$. Compensating – i.e. $405 - 399 \rightarrow$ subtract 400 and then add 1.</p>	<p>Continue to practise previous year and make links between known facts and addition pairs for fractions, percentages and decimals. Doubles and halves of decimals, i.e. half of 5.6, double 3.4. Sums and differences of decimals, i.e. $6.5 + 2.7$</p>	<p>Subtract whole numbers with more than 4 digits, including using formal written method (columnar subtraction) NB Ensure that children are confident with the methods outlined in the previous year’s guidance before moving on. Continue to teach the use of empty number lines with larger numbers and decimals, as appropriate. Continue to develop the formal written method for subtraction with three and four digit numbers (see Y4 guidance), returning to an expanded method and using base ten materials, if necessary.</p>	<p>When children are confident extend with larger numbers (and decimal numbers). Return to an expanded method, if necessary.</p> <p>$12731 - 1367 = 11364$</p> $\begin{array}{r} \\ \\ - \\ \hline \end{array}$ <div data-bbox="1632 387 2058 464" style="border: 1px solid black; padding: 2px; width: fit-content; margin-left: 100px;"> <p>In this example it has been necessary to exchange from the tens and the hundreds columns.</p> </div> <p>Introduce subtraction of decimals, initially in the context of money and measures.</p> <p>$£166.25 - £83.72 = £82.53$</p> $\begin{array}{r} \\ \\ - \\ \hline \end{array}$ <div data-bbox="1641 778 2007 845" style="border: 1px solid black; padding: 2px; width: fit-content; margin-left: 100px;"> <p>Ensure the decimal points line up.</p> </div> <p>Continue to practise and apply the formal written method with large numbers and decimals throughout year five.</p>
<p>Year 6:</p>	<p>Continue to practise previous skills. Count forwards and backwards in simple fractions, decimals</p>	<p>Bridging through decimals, i.e. $1.5 - 0.8 = 1.5 - 0.5$ then -0.3 using empty number line.</p>	<p>Ensure all children are confident recalling basic facts to 20 and deriving using place value. Make links</p>	<p>Children will continue to practise and use the formal written method for larger numbers and decimals and use these methods when solving problems, when appropriate (see previous years’ guidance for methods).</p>	

	and percentages.		between decimals, fractions and percentages.	Our aim is that by the end of Y6 children use mental methods (with jottings) when appropriate, but for calculations that they cannot do in their heads, they use an efficient formal written method accurately and with confidence.	
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Multiplication:

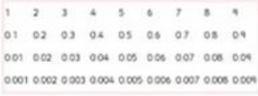
Mental Calculation Strategies for Multiplication and Division

Knowing multiplication and division facts to 12 X 12



Multiplying and dividing by multiples of 10

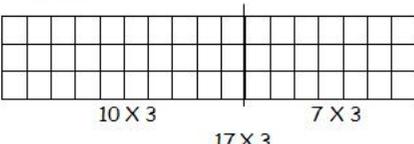
thousands	hundreds	tens	ones



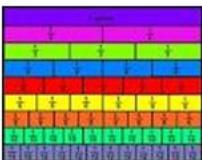
Doubling and halving

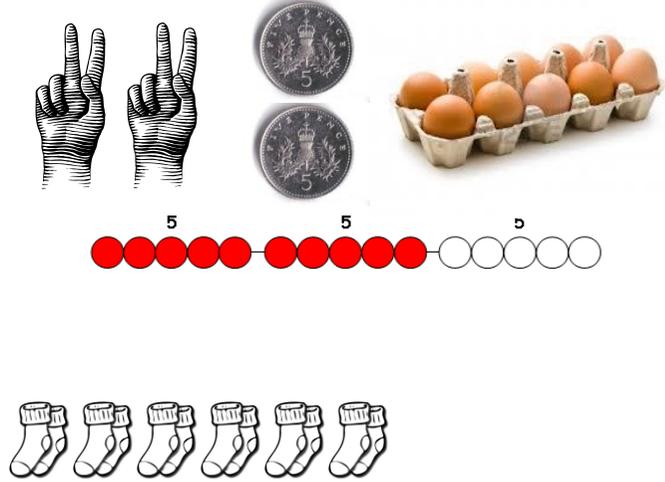


Multiplying and dividing by single-digit numbers and multiplying by two-digit numbers



Finding fractions, decimals and percentages




	Counting	Mental strategies	Rapid recall	Written calculation and appropriate models and images to support conceptual understanding	
Year 1:	Count forwards and backwards in 2s, 5s and 10s	Doubling up to six and then ten whilst using related models and images.	<p>Derive/recall doubles up to five and derive/recall halves up to ten.</p> <p>Recall odd and even numbers to 10 in reference to structured apparatus.</p> 	<p>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>☐ Count in multiples of twos, fives and tens (to the 10th multiple)</p> <p>Children will count repeated groups of the same size in practical contexts. They will use the vocabulary associated with multiplication in practical contexts. They will solve practical problems that involve combining groups of 2, 5 or 10. e.g. socks, fingers and cubes.</p>	<p>Use objects, pictorial representations and arrays to show the concept of multiplication:</p>  <p>'Six pairs of socks. How many socks altogether? 2, 4, 6, 8, 10, 12'</p> <p>Use arrays to support early multiplication</p>  <p>Five groups of two faces. How many faces altogether? 2, 4, 6, 8, 10 Two groups of five faces. How many faces altogether? 5, 10</p>
Year 2:	Count forwards and backwards in 2s, 3s, 5s	Begin to understand and use inverse number operations:	Derive/recall doubles up to ten and derive/recall halves up to	<p>• Calculate mathematical statements for multiplication within the</p> <p>Combining Groups (repeated addition)</p> 	

and 10s
from zero.

2 5

Stories are used alongside a triad to help children understand links between number operations, e.g. "There are five pencils in two packs, which means that there are ten pencils altogether."

twenty.

Recall odd and even numbers to 20 in reference to structured apparatus.

Recall & use multiplication facts for the 2X, 5X and 10X-tables.

- **multiplication tables and write them using the multiplication (x) and equals (=) signs**
- **solve problems involving multiplication, using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts**

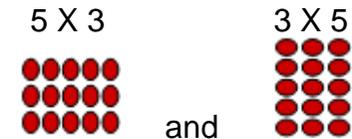
show that multiplication of two numbers can be done in any order (commutative)

NB Ensure that children are confident with the methods outlined in the previous year's guidance before moving on. Children will use a range of vocabulary to describe multiplication and use practical

- resources, pictures,

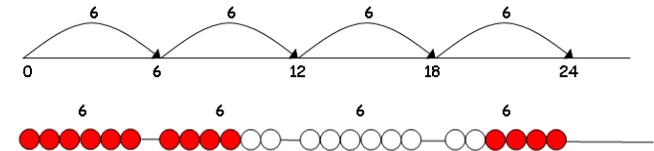
'3 groups of 5 crayons'
'How many crayons altogether?'
'5 + 5 + 5 = 15'
'3 groups of 5' '3 times 5'
'3 x 5 = 15' '5 x 3 = 15'

Arrays:

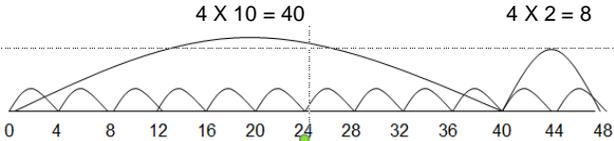
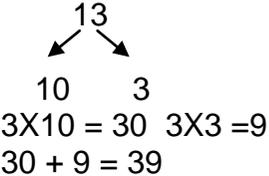
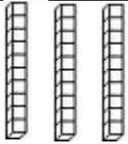
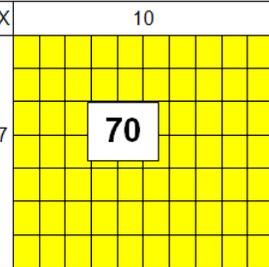
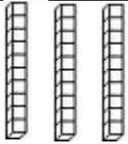
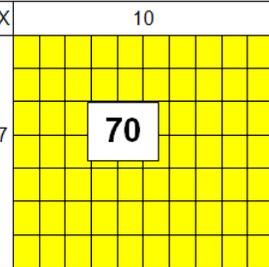
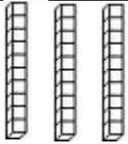
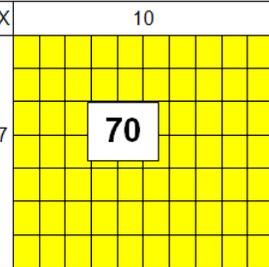


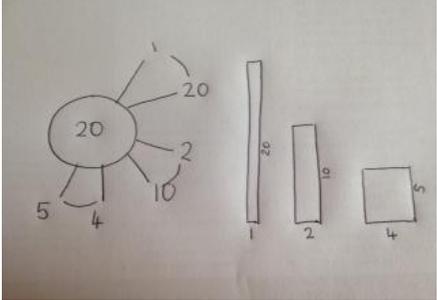
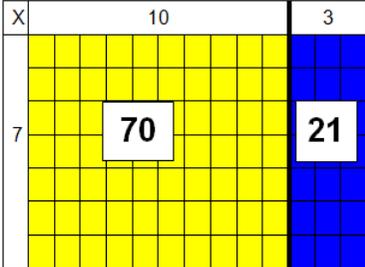
Number lines:

$$6 \times 4 = 24$$



So: 'Six taken four times'

				<p>diagrams and the x sign to record..</p>																
<p>Year 3:</p>	<p>Counting forwards and backwards in 2s, 3s, 4s, 5s, 8s and 10s from zero.</p> <p>Count up and down in tenths.</p>	<p>Use doubling to make connections between the 2X, 4X and 8X-tables.</p> <p>Understand that multiplication can be undertaken by partitioning numbers, e.g. $12 \times 4 = 10 \times 4 + 2 \times 4$</p> <p>Introduce the structure of scaling: e.g. Find a ribbon that is 4 times as long as the blue ribbon</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>2cm</p> </div> <div style="text-align: center;">  <p>8cm</p> </div> </div>	<p>Recall odd and even numbers to 100 in reference to structured apparatus.</p> <p>Recall and use multiplication facts for the 2X, 3X, 4X, 5X, 8X and 10X tables.</p>	<p>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 a formal written method</p> <p>NB Ensure that children are confident with the methods outlined in the previous year's guidance before moving on. Continue to use number lines and arrays to support multiplication, as appropriate (see Y2 guidance).</p>	<p>Children use an empty number line to chunk efficiently:</p> <p>$4 \times 12 = 48$</p> <div style="text-align: center;">  </div> <p>Partitioning:</p> <p>3×13</p> <div style="text-align: center;">  </div> <p>$3 \times 13 = 39$</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>X</td> <td>10</td> <td>3</td> </tr> <tr> <td>3</td> <td></td> <td></td> </tr> </table> <p>$7 \times 13 = 91$</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>X</td> <td>10</td> <td>3</td> </tr> <tr> <td>7</td> <td></td> <td></td> </tr> <tr> <td></td> <td>70</td> <td>21</td> </tr> </table>	X	10	3	3			X	10	3	7				70	21
X	10	3																		
3																				
X	10	3																		
7																				
	70	21																		

					<p>Moving to the grid method</p> $13 \times 8 = 104$ <table border="1" data-bbox="1547 245 1832 389"> <tr> <td>X</td> <td>10</td> <td>3</td> </tr> <tr> <td>8</td> <td>80</td> <td>24</td> </tr> </table> <p>$80 + 24 = 104$ 'Partition 13 into 10 + 3 then multiply each number by 8. Add the partial products (80 and 24) together.'</p>	X	10	3	8	80	24
X	10	3									
8	80	24									
<p>Year 4:</p>	<p>Counting forwards and backwards in 2s, 3s, 4s, 5s, 7s, 8s, 10s, 25s and 100s from zero.</p> <p>Count up and down in tenths and hundredths.</p>	<p>Derive factor pairs of numbers using models and images, e.g.</p>  <p>Know what happens when a number is multiplied by zero or one.</p> <p>Use reordering to multiply three numbers.</p>	<p>Recall & use multiplication facts for all times-tables up to 12 X 12.</p>	<p>Multiply two-digit and three-digit numbers by a one-digit number using formal written layout</p> <p>NB Ensure that children are confident with the methods outlined in the previous year's guidance before moving on. Continue to use empty number lines, as appropriate (see Y3 guidance).</p> <p>Further develop the grid method for two-digit numbers multiplied by a one-digit number.</p>	<p>Relate multiplying a 3/2-digit by 1-digit number, now also setting it out as short multiplication.</p>  <p>$7 \times 13 = 91$</p> $\begin{array}{r} 7 \times 10 = 70 \\ 7 \times 3 = 21 \\ \hline = 91 \end{array}$ <p>$36 \times 4 = 144$</p> <table border="1" data-bbox="1547 1217 1832 1361"> <tr> <td>X</td> <td>30</td> <td>6</td> </tr> <tr> <td>4</td> <td>120</td> <td>24</td> </tr> </table> <p>$120 + 24 = 144$</p>	X	30	6	4	120	24
X	30	6									
4	120	24									

					<p>Expanded short multiplication (two-digit number by a one-digit number):</p> $36 \times 4 = 144$ $\begin{array}{r} 30 + 6 \\ \times 4 \\ \hline 24 \quad (4 \times 6 = 24) \\ + 120 \quad (4 \times 30 = 120) \\ \hline 144 \end{array}$ <p>Refine the recording in preparation for formal short multiplication:</p> $\begin{array}{r} 36 \\ \times 4 \\ \hline 24 \quad (4 \times 6 = 24) \\ + 120 \quad (4 \times 30 = 120) \\ \hline 144 \end{array}$								
Year 5:	Counting forwards and backwards in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 25s and 1000s from zero.	Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.	Recall & use multiplication facts for all times-tables up to 12 X 12.	<p>Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers</p> <p>NB Ensure that children are confident with the methods outlined in the previous year's guidance before moving on. Build on the work covered in Y4 with the formal method of short</p>	<p>Short multiplication (formal method) of a two-digit number multiplied by a one-digit number:</p> $36 \times 4 = 144$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Use the language of place value to ensure understanding. Ensure that the digit 'carried over' is written under the line in the correct column.</p> </div> $\begin{array}{r} 36 \\ \times 4 \\ \hline 144 \\ 2 \end{array}$ <p>If necessary, return to the grid method and/or expanded method first:</p> $127 \times 6 = 762$ <table border="1" style="margin: 10px auto; text-align: center;"> <tr> <td>X</td> <td>100</td> <td>20</td> <td>7</td> </tr> <tr> <td>6</td> <td>600</td> <td>120</td> <td>42</td> </tr> </table> <p>$600 + 120 + 42 = 762$ (add the partial products) This leads to expanded short multiplication:</p>	X	100	20	7	6	600	120	42
X	100	20	7										
6	600	120	42										

multiplication
(two-digit number multiplied by a one-digit number).

$$\begin{array}{r} 127 \times 6 = 762 \\ 127 \\ \times 6 \\ \hline 42 \text{ (6x7)} \\ + 120 \text{ (6x20)} \\ \hline 600 \text{ (6x100)} \\ \hline 762 \end{array}$$

This will lead into short multiplication (formal method):

$$\begin{array}{r} 127 \\ \times 6 \\ \hline 762 \\ 14 \end{array}$$

Grid method (two-digit number multiplied by a teen- number):

$$23 \times 13 = (20 + 3) \times (10 + 3) = 299$$

X	20	3
10	200	30
3	60	9

Add the partial products $(200 + 30) + (60 + 9) = 299$

Expanded long multiplication (two-digit numbers multiplied by a teen- number):

$$\begin{array}{r} 23 \times 13 = 299 \\ 23 \\ \times 13 \\ \hline 9 \text{ (3 x 3)} \\ 60 \text{ (3 x 20)} \\ + 30 \text{ (10 x 3)} \\ \hline 200 \text{ (10 x 20)} \\ \hline 299 \end{array}$$

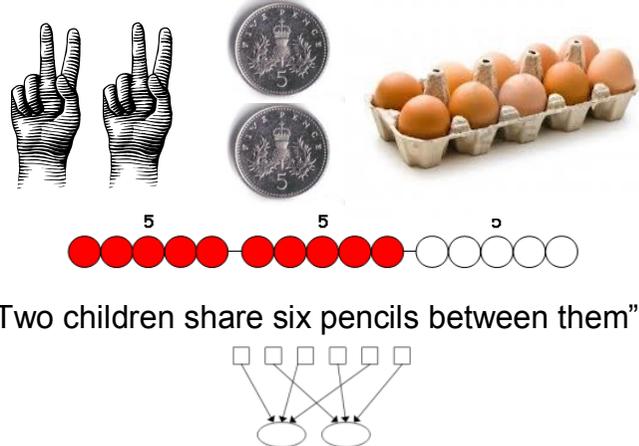
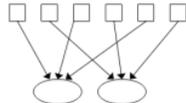
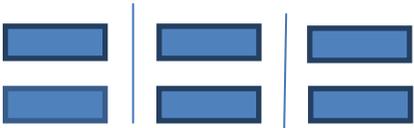
This leads into...

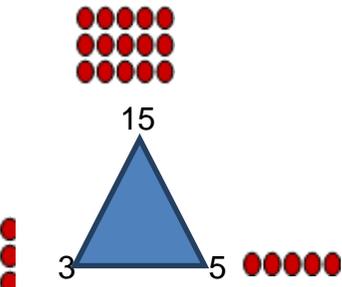
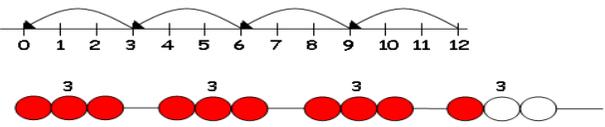
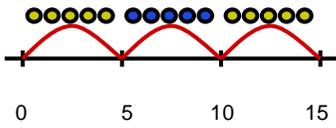
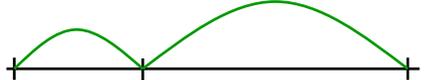
Compact long multiplication (formal method):

					<p>Compact long multiplication (formal method):</p> $56 \times 27 = 1512$ $\begin{array}{r} 56 \\ \times 27 \\ \hline 392 \text{ (7x56)} \\ 1120 \text{ (20x56)} \\ \hline 1512 \end{array}$ <p>When children are confident with long multiplication extend with three-digit numbers multiplied by a two-digit number, returning to the grid method first, if necessary:</p> $\begin{array}{r} 124 \\ \times 26 \\ \hline 7424 \text{ (6x124)} \\ + 2480 \text{ (20x124)} \\ \hline 3224 \\ \hline 11 \end{array}$ <div data-bbox="1727 129 2096 304" style="border: 1px solid black; padding: 5px;"> <p>Use the language of place value to ensure understanding. In this example there are digits that have been 'carried' over in the partial products. Add the partial products.</p> </div> <div data-bbox="1776 660 2125 810" style="border: 1px solid black; padding: 5px;"> <p>Use the language of place value to ensure understanding. Add the partial products. The prompts (in brackets) can be omitted if children no longer need them.</p> </div>																				
<p>Year 6:</p>	<p>Consolidate all previous counting, including forwards and backwards in fractions.</p>	<p>Perform mental calculations, including with mixed numbers and operations.</p>	<p>Recall & use multiplication facts for all times-tables up to 12 X 12. In addition, use facts confidently to make larger calculations.</p>	<p>Multiply multi-digit numbers including decimals) up to 4 digits by a two-digit whole umbers NB Ensure that children are confident with the methods outlined in the previous year's guidance before moving on. Continue to practise and develop the formal short multiplication method and formal long multiplication</p>	<p>The grid method (decimal number multiplied by a two-digit number):</p> $53.2 \times 24 = 1276.8$ <table border="1" data-bbox="1496 979 1980 1187"> <tr> <td>x</td> <td>50</td> <td>3</td> <td>0.2</td> <td></td> </tr> <tr> <td>20</td> <td>1000</td> <td>60</td> <td>4</td> <td>1064.0</td> </tr> <tr> <td>4</td> <td>200</td> <td>12</td> <td>0.8</td> <td>212.8</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>1276.8</td> </tr> </table> <p>The formal written method of long multiplication:</p> $\begin{array}{r} 53.2 \\ \times 24.0 \\ \hline 2112.8 \text{ (53.2 x 4)} \\ 1064.0 \text{ (53.2 x 20)} \\ \hline 1276.8 \end{array}$ <div data-bbox="1843 1305 2121 1481" style="border: 1px solid black; padding: 5px;"> <p>It is an option to include .0 in this example, but not essential. The prompts (in brackets) can be omitted if children no longer need them.</p> </div> <p>Our aim is that by the end of Y6 children use</p>	x	50	3	0.2		20	1000	60	4	1064.0	4	200	12	0.8	212.8					1276.8
x	50	3	0.2																						
20	1000	60	4	1064.0																					
4	200	12	0.8	212.8																					
				1276.8																					

				method with larger numbers and decimals throughout Y6. Return to an expanded forms of calculation initially, if necessary (see Y5 guidance).:	mental methods (with jottings) when appropriate, but for calculations that they cannot do in their heads, they use an efficient formal written method accurately and with confidence.
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Division:

	Counting	Mental strategies	Rapid recall	Written calculation and appropriate models and images to support conceptual understanding
Year 1:	Count forwards and backwards in 2s, 5s and 10s	Doubling up to six and then ten whilst using related models and images.	<p>Derive/recall doubles up to five and derive/recall halves up to ten.</p> <p>Recall odd and even numbers to 10 in reference to structured apparatus.</p> 	<p>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>Use objects, pictorial representations and arrays to show the concept of division as grouping and sharing.</p>  <p>“Two children share six pencils between them”</p>  <p>“Six children are asked to get into three equal groups”</p> 

<p>Year 2:</p>	<p>Count forwards and backwards in 2s, 3s, 5s and 10s from zero.</p>	<p>Begin to understand and use inverse number operations.</p>  <p>Stories are used alongside a triad to help children understand links between number operations, e.g. "15 children are asked to get into three groups and find out that there are five people in each group."</p>	<p>Derive/recall doubles up to ten and derive/recall halves up to twenty.</p> <p>Recall odd and even numbers to 20 in reference to structured apparatus.</p> <p>Recall and use multiplication facts for the 2X, 5X and 10X-tables.</p>	<p>Calculate mathematical statements for division within the multiplication tables they know and write them using the division (\div) and equals (=) signs Solve problems involving division, using materials, arrays, repeated subtraction, mental methods, and multiplication and division facts, including problems in contexts.</p>	<p>Sharing and grouping;</p>  <p>15 crayons shared equally between three pots.' (Sharing) 'We have 15 crayons and put 5 crayons in each pot. How many pots do we need?' (Grouping) '15 divided by 5 = 3' '15 divided by 3 = 5'</p> <p>Number lines and arrays:</p> <p>$12 \div 3 = 4$</p>  <p>$15 \div 5 = 3$</p> 
<p>Year 3:</p>	<p>Counting forwards and backwards in 2s, 3s, 4s, 5s, 8s and 10s from zero.</p>	<p>Use doubling to make connections between the 2X, 4X and 8X-tables.</p> <p>Understand that multiplication can be undertaken by partitioning numbers, e.g. $12 \times 4 = 10 \times 4 + 2 \times 4$</p>	<p>Recall odd and even numbers to 100 in reference to structured apparatus.</p>	<p>Write and calculate mathematical statements for division using the multiplication tables that they know, including</p>	<p>Children use an empty number line to chunk efficiently.</p> <p>$96 \div 6 = 16$</p> <p>$6 \times 6 = 36$ $10 \times 6 = 60$</p> 

		<p>Introduce the structure of scaling: e.g. Find a ribbon that is 4 times as long as the blue ribbon.</p> 	<p>Recall & use multiplication facts for the 2X, 3X, 4X, 5X, 8X and 10X tables.</p>	<p>for two-digit numbers divided by one-digit numbers, using mental and progressing to a formal written method</p>	<p>0 36 96</p> <p>Introduce the formal layout using multiplication/division facts that the children know: $24 \div 3 = 8$ This can also be recorded as... $\begin{array}{r} 8 \\ 3 \overline{)24} \end{array}$ Twenty four divided by three equals eight. 'How many threes are there in twenty four?'</p>
Year 4:	<p>Counting forwards and backwards in 2s, 3s, 4s, 5s, 7s, 8s, 10s, 25s and 1000s from zero.</p>	<p>Derive factor pairs of numbers using models and images.</p> <p>Know what happens when a number is multiplied by zero or one.</p> <p>Use reordering to multiply three numbers.</p>	<p>Recall & use multiplication facts for all times-tables up to 12 X 12.</p>	<p>Use place value, known and derived facts to divide mentally Divide two-digit and three-digit numbers by a one-digit number using formal written layout</p>	<p>Children use an empty number line to chunk efficiently.</p> $224 \div 8 = 28$ $224 \div 8 = (160 + 64) \div 8$ $= (160 \div 8) + (64 \div 8)$ $= 20 + 8 = 28$ <p> $8 \times 8 = 64$ $20 \times 8 = 160$ (X8) (X20) + 64 + 160  </p> $\begin{array}{r} 28 \\ 8 \overline{)224} \\ - 160 \quad (8 \times 20) \\ \hline 64 \\ - 64 \quad (8 \times 8) \\ \hline 0 \quad 0 \end{array}$
Year 5:	<p>Counting forwards and backwards in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 25s</p>	<p>Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.</p>	<p>Recall & use multiplication facts for all times-tables up to 12 X 12.</p>	<p>Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders</p>	<p>Remainders should be interpreted in the following ways when long division is used:</p> <ul style="list-style-type: none"> • as whole numbers • as fractions • through rounding in an appropriate way to the context <p>Long division:</p>

	and 1000s from zero.			<p>appropriately for the context NB Ensure that children are confident with the methods outlined in the previous year's guidance before moving on.</p>	$415 \div 9 = 46 \text{ and } 1/9$ $\begin{array}{r} 46 \text{ and } 1/9 \\ 9 \overline{) 415} \\ - 360 \quad (9 \times 40) \\ \hline 55 \\ - 54 \quad (9 \times 6) \\ \hline 1 \end{array}$
Year 6:	Consolidate all previous counting, including forwards and backwards in fractions.	Perform mental calculations, including with mixed numbers and different number operations.	Recall & use multiplication facts for all times-tables up to 12 X 12. In addition, use facts confidently to make larger calculations.	<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>□ 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</p>	<p>Remainders should be interpreted in the following way when short division is used: through rounding in an appropriate way to the context</p> <p>Long division: $432 \div 15 = 28 \frac{4}{5}$</p> $\begin{array}{r} 28 \\ 15 \overline{) 432} \\ - 30 \quad 15 \times 20 \\ \hline 132 \\ - 120 \quad 15 \times 8 \\ \hline 12 \end{array}$ <p>$\frac{12}{15} = \frac{4}{5}$</p> <p>Answer: $28 \frac{4}{5}$</p> <p>Short division: $138 \div 6 = 23$</p>

rounding, as appropriate for the context.

$$6 \overline{) 138} \begin{matrix} 23 \\ \underline{12} \\ 18 \\ \underline{18} \\ 0 \end{matrix}$$

