

Mathematics



**Evelyn Street
Primary Academy**

Teaching Calculations

Teaching Calculations at Evelyn Street Primary Academy

This document sets out the expectations for each year group in terms of calculations strategies which will be taught, explored and applied to a range of contexts.

Concrete, Pictorial, Abstract

The children's understanding of these calculation strategies will be underpinned by a secure understanding of place value. At Evelyn Street Primary Academy we teach through a CPA (concrete, pictorial, abstract) approach. Understanding in all areas of maths will be developed by children using concrete resources and interpreting and using pictorial representations before moving onto solve abstract calculations. There are a range of place value and counting resources available for the children to use in each classroom. The CPA process/approach will be clearly exemplified on maths working walls for the current maths focus.

Checking Children's Understanding

Teachers will be aware, not only of their year group's expectations but those the children have learnt previously. It is important that teachers check the children's understanding of the previous teaching before moving on, in order for the children to really master the mathematics curriculum. Where individuals or groups of children do not show a secure understanding of what has been taught previously, it will be necessary to track back, either through whole-class teaching or individual or group intervention (boost sessions).

Mental Strategies

This document also contains essential information about the mental strategies that children will be taught. It is of vital importance that these are given high-priority during maths teaching and practised regularly, so that children have the skills which are required across all areas of maths.

ADDITION

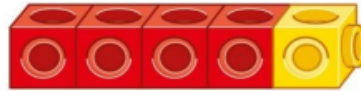
EYFS -
nursery
and
reception

Counting and adding more

Children add one more person or object to a group to find one more.

Counting and adding more

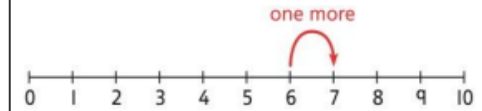
Children add one more cube or counter to a group to represent one more.



One more than 4 is 5.

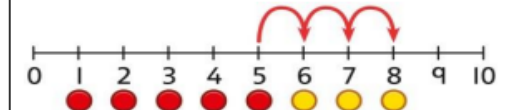
Counting and adding more

Use a number line to understand how to link counting on with finding one more.



*One more than 6 is 7.
7 is one more than 6.*

Learn to link counting on with adding more than one.



$$5 + 3 = 8$$

Understanding part-part-whole relationship

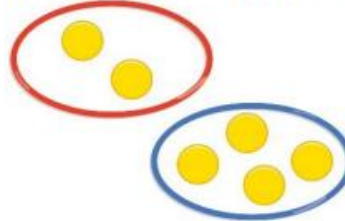
Sort people and objects into parts and understand the relationship with the whole.



The parts are 2 and 4. The whole is 6.

Understanding part-part-whole relationship

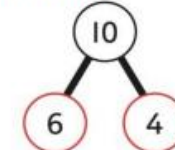
Children draw to represent the parts and understand the relationship with the whole.



The parts are 1 and 5. The whole is 6.

Understanding part-part-whole relationship

Use a part-whole model to represent the numbers.



$$6 + 4 = 10$$

$$6 + 4 = 10$$

Knowing and finding number bonds within 10

Break apart a group and put back together to find and form number bonds.



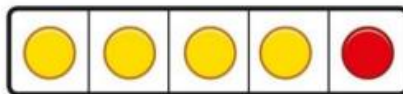
$$3 + 4 = 7$$



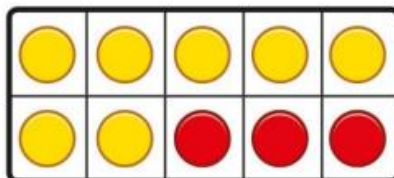
$$6 = 2 + 4$$

Knowing and finding number bonds within 10

Use five and ten frames to represent key number bonds.



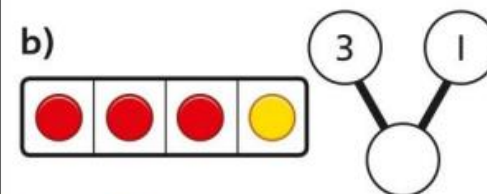
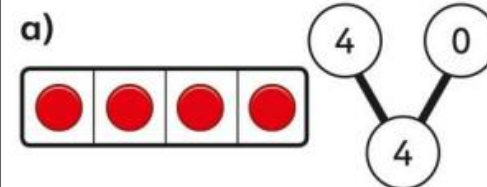
$$5 = 4 + 1$$



$$10 = 7 + 3$$

Knowing and finding number bonds within 10

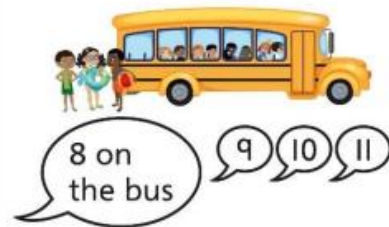
Use a part-whole model alongside other representations to find number bonds. Make sure to include examples where one of the parts is zero.



$$4 + 0 = 4$$
$$3 + 1 = 4$$

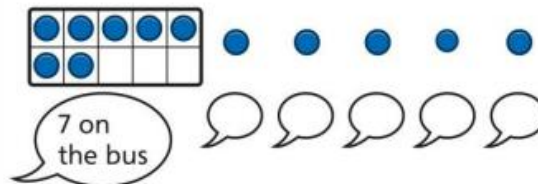
Adding by counting on

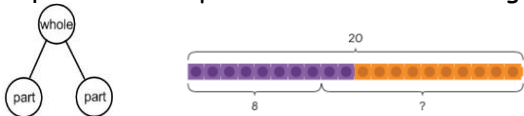
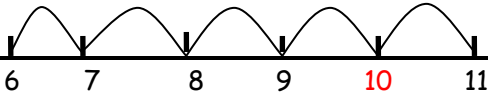
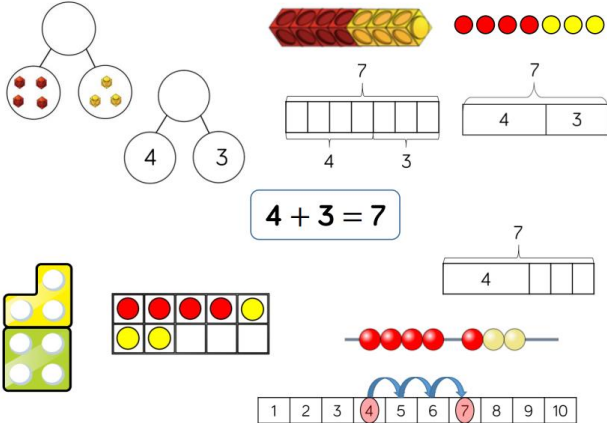
Children use knowledge of counting to 20 to find a total by counting on using people or objects.

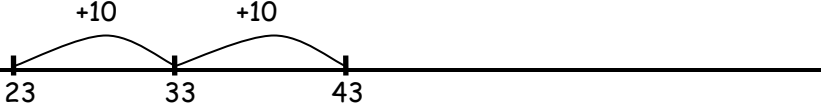
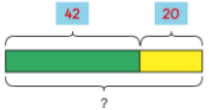
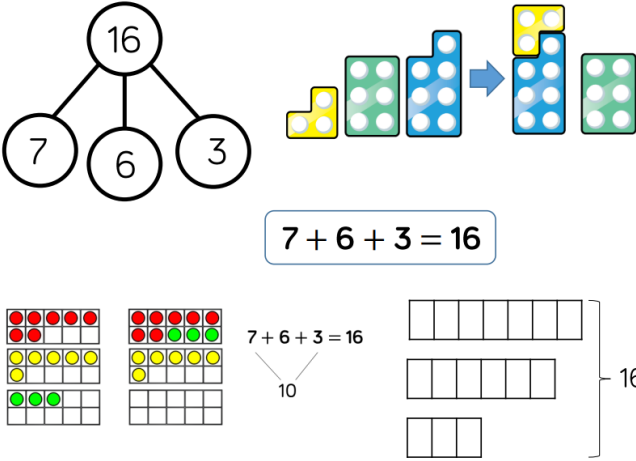


Adding by counting on

Children use counters to support and represent their counting on strategy.



	Mental strategies	Written methods	Vocabulary	Models, images and resources
Year 1	<p>The children should be taught to use the following mental strategies, and to use jottings to support their methods:</p> <ul style="list-style-type: none"> Counting on in ones Re-ordering the numbers when adding e.g. put the larger number first Counting on and back in ones, twos and tens Looking for pairs of numbers that equal 10 Partitioning small numbers to bridge tens e.g. $8+3 = 8+2+1$ Partitioning using known facts e.g. double and adjust $5+6 = 5+5+1$ Adding 9 to a number by adding 10 and then subtracting 1 Recalling number bonds to 10 and 20 in several different forms (e.g. $9+7 = 16$, $16-7=9$ and $7=16-9$) 	<p>Solve simple one-step problems that involve addition using concrete objects and pictorial representations and missing number problems. Explain methods & reasoning</p>  <p>Use the 100 square to add 10 to a single digit number Record addition by:</p> <ul style="list-style-type: none"> showing jumps on prepared number lines recording number sentences e.g. $6 + 5 = 11$ is $6 + 4 + 1 = 11$  <p>Read, write and interpret mathematical statements involving addition (+) and equals (=) signs</p> <p>Use tens frames and number lines to support understanding of bridging to 10</p>	<p>add total more count number bond number story inverse part whole</p>	<p>100 square number lines number tracks objects of various size and shape bead strings bead bar tens frames Numicon Dienes (base 10) part whole rekenrek</p>
	 <p>$4 + 3 = 7$</p>			

<p>Year 2</p>	<p>The children should be taught to use the following mental strategies, and to use jottings to support their methods:</p> <ul style="list-style-type: none"> • Reordering numbers when adding • Count on in tens or ones • Using knowledge of pairs making 10 and place value • Compensating: add 9, 19, 11 or 21 • Compensating: doubling and adjusting. • Partitioning: Bridge through 10 when adding. • Partition and combine multiples of tens and ones. • Looking for number bonds/known facts when adding 3 one-digit numbers 	<p>Count or add in multiples of 10 using 100 square or number line</p>  <p>Add by using partitioning of TO + TO</p> <p>Solve simple problems with addition using concrete objects and pictorial representations, involving numbers and measures</p>  <p>Recognise and use the inverse relationship between addition and subtraction to check calculations and missing number problems. Check by adding in different order e.g. $5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5$</p> <p>Record addition in columns to support place value and prepare for efficient written methods.</p>	<p>add sum more than total altogether plus partition into tens and ones regroup inverse commutative</p>	<p>jottings 100 square number lines number tracks practical equipment bead strings arrow cards dienes tens frames bar model part part whole place value counters</p>
	<div data-bbox="875 826 1509 1289">  <p>$7 + 6 + 3 = 16$</p> </div>			
<p>Year 3</p>	<p>The children should be taught to use the following mental strategies, and to use jottings to support their methods, where appropriate:</p> <ul style="list-style-type: none"> • Counting on in hundreds, tens and ones to find the total. 	<p>Add numbers with up to three digits, using efficient written methods of columnar addition. Use understanding of place value and partitioning</p>	<p>partition hundreds, tens, ones digit number line regroup inverse adjust</p>	<p>jottings number lines arrow card 100 square dienes apparatus</p>

- Partitioning into hundreds, tens, and ones in different ways, then recombine ($824 = 800 + 20 + 4$, $824 = 700 + 110 + 14$).
- Reorder the numbers when adding.
- Bridge through a multiple of 10, then adjust.
- Use known facts and place value to add
- Use patterns of similar calculations
- Compensating: add or subtract 10, 20 or 100 and adjust



Estimate answers and use inverse operations to check

Solve problems, including missing number problems, using number facts, place value, and more complex addition.

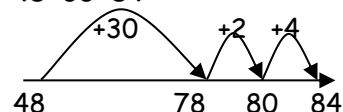
Add by using partitioning

$$\begin{aligned} 67 + 24 &= 60 + 20 + 7 + 4 \\ &= 80 + 11 \\ &= 91 \end{aligned}$$

Children use number lines with increasingly large numbers.

Count on from the largest number

$$48 + 36 = 84$$



or

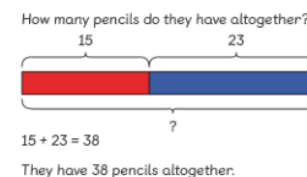


Expanded columnar addition

$$\begin{array}{r} 47 \\ + 24 \\ \hline 11 \quad 7 + 4 \\ \underline{60} \quad 40 + 20 \\ 71 \end{array}$$

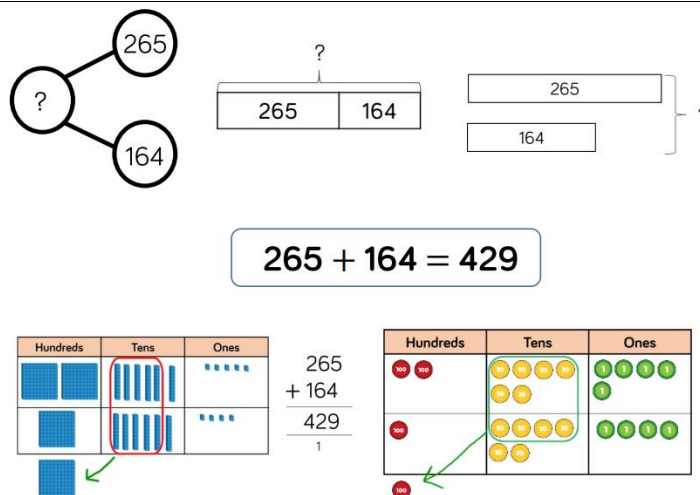
Compact columnar addition

$$\begin{array}{r} 32 \\ + 64 \\ \hline 96 \end{array} \qquad \begin{array}{r} 29 \\ + 46 \\ \hline 75 \\ \underline{1} \end{array}$$



compensate
commutative
regroup
addend
sum

addition
diagram
bar model
place value
counters



Year 4

The children should be taught to use the following mental strategies, and to use jottings to support their methods, where appropriate:

- Count in steps of thousands, hundreds, tens and ones.
- Reorder numbers in a calculation
- Add 3 or 4 small numbers
- Partition: adding the most significant digit first
- Compensating: doubling and adjusting
- Compensating: Adding the nearest multiple of 10 or 100 and then adjust
- Using knowledge of place value and related calculations e.g. working out $150 + 140 = 290$ by using $15 + 14 = 29$.

Columnar addition

Add numbers up to 4 digits using efficient written column method

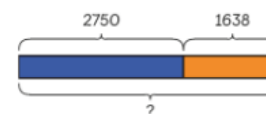
Practise with increasingly large numbers to aid fluency.

$$\begin{array}{r} 372 \\ + 74 \\ \hline 446 \\ 1 \end{array} \quad \begin{array}{r} 357 \\ + 145 \\ \hline 502 \\ 1 \quad 1 \end{array} \quad \begin{array}{r} 1306 \\ + 722 \\ \hline 2028 \end{array}$$

Add using pictorial representations

Estimate and use inverse operations to check answers

Solve addition two-step problems in contexts, deciding which operations and methods to use and why. Include problems involving decimals in money or measures e.g. $6.3\text{m} + 3.7\text{m} = 10\text{m}$



jottings

sum

total

rename

partition

place value

regroup

digit

crossing tens,

hundreds boundary

inverse

addend

sum

arrow cards

dienes

apparatus

bar model

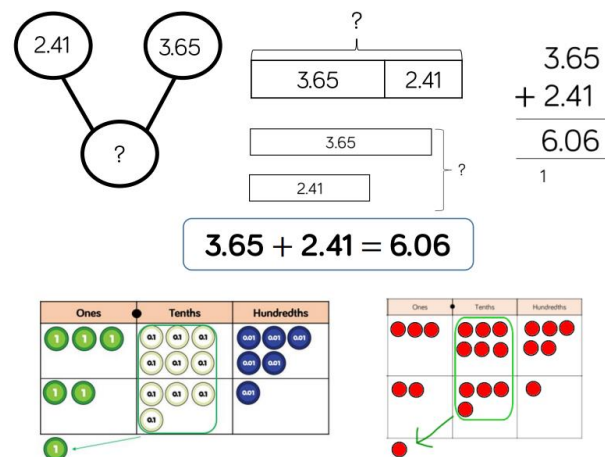
place value

grid

place value

counters

Year 5	<p>The children should be taught to use the following mental strategies, and to use jottings to support their methods, where appropriate:</p> <ul style="list-style-type: none"> • Counting on in steps of 0.1, 1, 10, 100 or 1,000 • Reorder the numbers in a calculation • Partitioning, adding the most significant digit first • Compensating: Add a multiple of 10, 100 or 1,000 and adjust. • Compensating: Double and adjust. • Use knowledge of place value and related calculations e.g. $6.3 + 4.8$ using $63 + 48$ • Add numbers mentally with increasingly large number to aid fluency e.g. $12\,462 + 2\,300 = 14\,762$ • Use rounding to check answers and determine, levels of accuracy • Add pairs of decimal fractions each with ones and tenths, e.g. $5.7 + 2.5$, $6.3 + 4.8$ • Count through zero including negative numbers 	<p>Add whole numbers with more than 4 digits and increasingly large numbers using efficient column written methods to aid fluency</p> $\begin{array}{r} 3\,7\,2 \\ + 4\,7\,4 \\ \hline 8\,4\,6 \\ \hline 1 \end{array}$ $\begin{array}{r} 2\,7\,0\,3 \\ + 1\,3\,9\,8 \\ \hline 4\,1\,0\,1 \\ \hline 1\,1\,1 \end{array}$ <p>Solve multi-step problems in contexts, deciding which methods are most efficient.</p>	<p>jottings rounding inverse addend sum</p>	<p>bar model place value grid place value counters</p>



Year 6

The children should be taught to use the following mental strategies, and to use jottings to support their methods, where appropriate.

- Consolidate all strategies from previous years
- Partition, adding the most significant digit first
- Compensating: adding a whole number, multiple of 10 or double and adjust.
- Use knowledge of place value and related calculations e.g. $680 + 430$, $6.8 + 4.3$, $0.68 + 0.43$ can all be worked out using the related calculation $68 + 43$.

Calculate mentally with increasingly large numbers and more complex calculations.
Addition facts for multiples of 10 to 1000 and decimal numbers with one decimal place, e.g. $650 + \square = 930$, $\square + 1.4 = 2.5$

Practise addition for larger numbers, using the efficient written methods of columnar addition.

addend
sum
adjust
compensate

SUBTRACTION

EYFS

Counting back and taking away

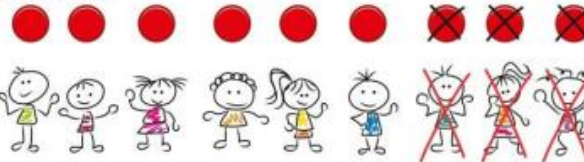
Children arrange objects and remove to find how many are left.



1 less than 6 is 5.
6 subtract 1 is 5.

Counting back and taking away

Children draw and cross out or use counters to represent objects from a problem.



$$9 - \square = \square$$

There are \square children left.

Counting back and taking away

Children count back to take away and use a number line or number track to support the method.



$$9 - 3 = 6$$

Finding a missing part, given a whole and a part

Children separate a whole into parts and understand how one part can be found by subtraction.



$$8 - 5 = ?$$

Subtraction within 10

Understand when and how to subtract 1s efficiently.

Use a bead string to subtract 1s efficiently.



$$5 - 3 = 2$$

Subtraction within 10

Understand when and how to subtract 1s efficiently.

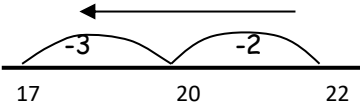

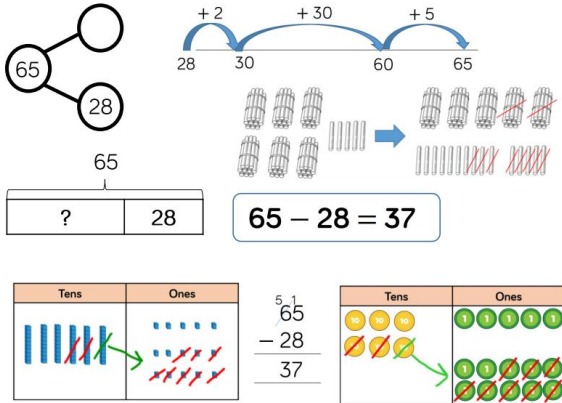



$$5 - 3 = 2$$

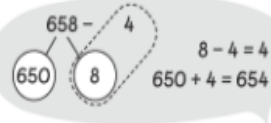
Subtraction within 10

Understand how to use knowledge of bonds within 10 to subtract efficiently.

$$5 - 3 = 2$$

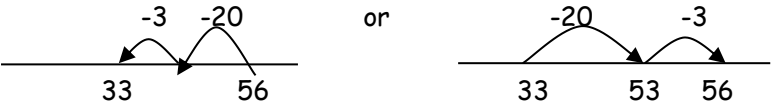
<p>Year 2</p>	<ul style="list-style-type: none"> Counting back in tens and ones. Subtract mentally a 'near multiple of 10' by subtracting and adjusting Subtract a small number by counting back. Find a small difference by counting up from the smaller to the larger number (on a number line) Recalling subtraction facts for numbers to 20 and using these to derive the related facts up to 100. Subtract by partitioning the second number and subtracting tens then ones. Use patterns of similar calculations. 	<p>Understand when it is sensible to count back (take away) and when to count on (find the difference)</p> <p>Use number lines to bridge through multiple of 10</p> $22 - 5 = 17 \text{ (counting back)}$  <p>Subtract by using partitioning of TU - TU</p> <p>Solve simple problems involving numbers, quantities and measures using concrete objects and pictorial representations,</p>  <p>Recognise and use the inverse relationship between addition and subtraction to check calculations.</p> <p>Record subtraction in columns to support understanding of place value and prepare for efficient written methods.</p>	<p>count back count on subtract take away less than minus decrease difference inverse rename hundreds, tens, ones</p>	<p>100 square number lines number tracks practical equipment bead strings arrow cards dienes tens frames part part whole place value counters</p>
				
<p>Year 3</p>	<p>Use number bonds to 20 and links to bonds of multiples of 10 to 100 , complements to 100 e.g. $100 - 55 = 45$</p> <p>Practise solving varied subtraction questions mentally with two-digit numbers, the answers could exceed 100.</p> <p>Subtract numbers mentally, including:</p>	<p>Solve problems, including missing number problems, using number facts, place value, and more complex subtraction</p> <p>Subtract with up to three digits, using efficient written columnar methods, understanding of place value and partitioning</p> 	<p>jottings subtraction partition thousands, hundreds, tens, ones digit number line count back count on</p>	<p>number line arrow card 100 square dienes bead bar place value diagrams place value counters bar model</p>

a three-digit number and ones
 a three-digit number and tens
 a three-digit number and hundreds
 groups of small numbers, e.g. $9 - 3 - 2$
 a two-digit number from a multiple of 10, eg. $50 - 38$, $90 - 27$, $68 - 35$

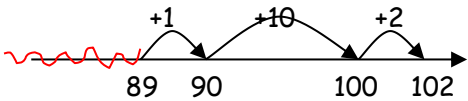


Use partitioning to subtract
 $67 - 24 = 60 - 20 + 7 - 4$
 $= 40 + 3$
 $= 43$

Count back from the largest number
 $56 - 23 = 33$



Count on or find the difference when the numbers involved are close together
 $102 - 89 = 13$



Expanded columnar subtraction

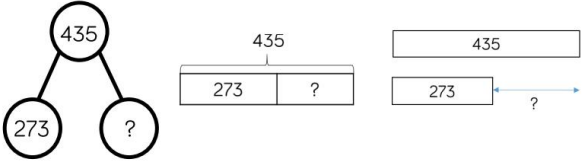
$$\begin{array}{r} 89 - 57 \text{ is } 80 + 9 \\ - 50 + 7 \\ \hline 30 + 2 = 32 \end{array}$$

Columnar subtraction

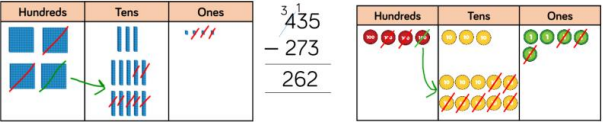
$$\begin{array}{r} 86 \\ - 64 \\ \hline 22 \end{array} \qquad \begin{array}{r} 86 \\ - 28 \\ \hline 58 \end{array}$$

Estimate answers calculations and use inverse operations to check

find the difference
 inverse
 regroup
 subtrahend
 minuend
 difference



$$435 - 273 = 262$$



Year 4	<ul style="list-style-type: none"> Counting back in hundreds, tens and ones. Counting on as a mental strategy for subtraction when the numbers are close together (e.g. 131-129), and for finding a small difference. Compensating: subtract mentally a near multiple of 10 then adjust. Bridging through a multiple of 10 Use knowledge of number facts and place value to subtract pairs of numbers Subtract a two-digit number by partitioning it then subtracting tens and ones. Use patterns of similar calculations Use the relationship between addition and subtraction 	<p>Subtract numbers with up to 4 digits using efficient written column method with increasingly large numbers to aid fluency.</p> <p>Estimate and use inverse operations to check answers</p> <p>Solve subtraction of two-step problems in contexts, deciding which operations and methods to use and why.</p> <p><u>Compact columnar subtraction with decomposition</u></p> $ \begin{array}{r} 6 \quad 14 \\ \cancel{7} \quad \cancel{4} \\ - 2 \quad 7 \\ \hline 4 \quad 7 \end{array} $	jottings reduce difference deduct partition place value thousands, hundreds, tens, ones digit inverse exchange regroup subtrahend minuend difference	number lines, dienes bar model place value counters
	<div style="text-align: center;"> <p>$4,357 - 2,735 = 1,622$</p> </div>			
Year 5	<ul style="list-style-type: none"> Subtract numbers with increasingly large numbers to aid fluency e.g. 12 462 - 2 300 = 10 162 Use rounding to check answers and determine, levels of accuracy 	<p>Subtract whole numbers with up to 7 digits using efficient column written methods including decomposition e.g. 754 - 86</p> $ \begin{array}{r} 6 \quad 4 \quad 14 \\ \cancel{7} \quad \cancel{5} \quad 4 \\ - 8 \quad 6 \\ \hline 6 \quad 6 \quad 8 \end{array} $	decimal point integer inverse positive, negative numbers subtrahend	number lines, bar model place value counters place value grid

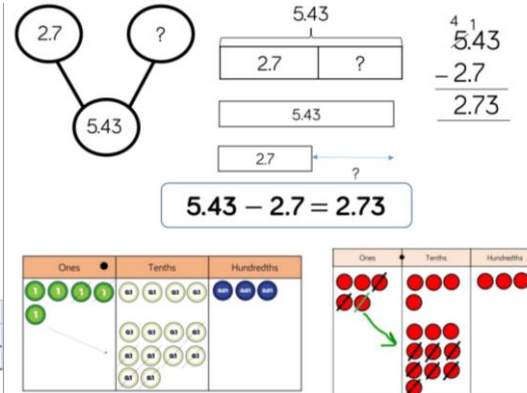
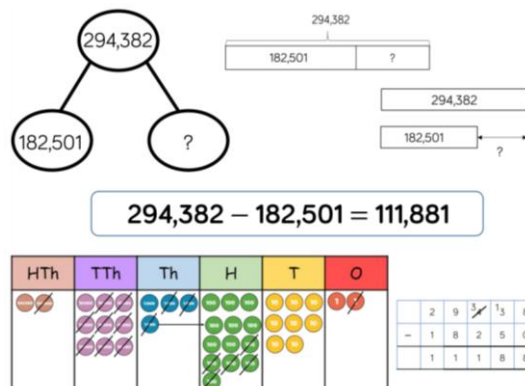
- Subtract a pair of two or three-digit multiples of 10, e.g. $80 - 30$, $45 - 36$ and $450 - 360$
- Subtract a near multiple of 10 or 100 from any two-digit or three-digit number, e.g. $235 - 199$
- Subtract pairs of decimal fractions each with ones and tenths, e.g. $5.7 - 2.5$, $6.3 - 4.8$
- Interpret negative number in contexts, counting forwards and backwards with positive and negative numbers
- Counting back steps of 0.1, 1, 10, 100 or 1000
- Use known facts and place value to subtract
- Find a difference by counting on through the next multiple of 10, 100 or 1,000
- Subtract by counting up from the smaller to the larger number where this is the most efficient method
- Subtract the nearest multiple of 1, 10 or 100 then adjust
- Use knowledge of place value and related calculations e.g. $4.5 - 3.6$ using $45 - 36$
- Use the relationship between addition and subtraction

With decimals in the context of money or measures
e.g. £26.31 - £18.06

$$\begin{array}{r} \overset{1}{\cancel{2}}\ 16\ \overset{2}{\cancel{3}}\ 11 \\ - 18.06 \\ \hline 8.25 \end{array}$$

Solve multi-step problems in contexts, deciding which operations and methods to use and why.

minuend
difference



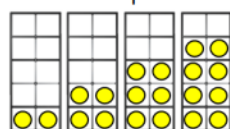
Year 6	<ul style="list-style-type: none"> • Consolidate all mental strategies from previous year groups. • Use negative numbers in context and calculate intervals across zero. • Counting back in powers of tens, including tenths, hundredths and thousandths. • Use knowledge of place value and related calculations • Subtract a power of ten, or a whole number and adjust. • Find the difference by counting up through the nearest multiple of 0,1, 10, 100 or 1,000 then adjust. • Continue to use the relationship between addition and subtraction. 	Practise subtraction for numbers up to 10,000,000, using efficient written methods	integer positive, negative numbers subtrahend minuend difference	
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MULTIPLICATION

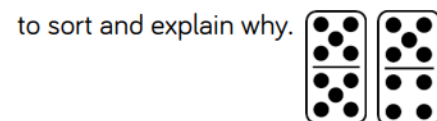
EYFS - nursery and reception

The children will learn that double means 'twice as many'. They should be given opportunities to build doubles using real objects and mathematical equipment. Building numbers using the pair-wise patterns on 10 frames helps the children to see the doubles.

Mirrors and barrier games are a fun way for children to see doubles as they build and to explore early symmetry. Encourage children to say the doubles as they build them, e.g. Double 2 is 4. Provide examples of doubles and non-doubles for the children

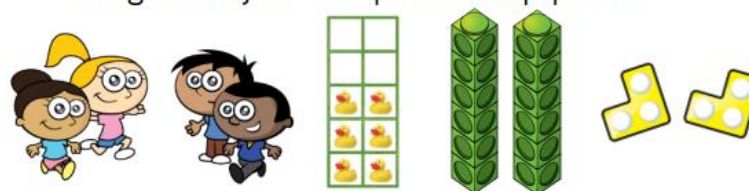


Pair-wise pattern





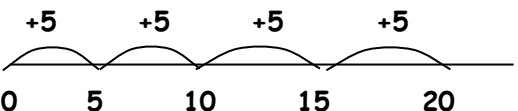
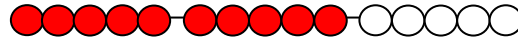

to sort and explain why.

Allow the children to explore different ways to build doubles using real objects and practical equipment.

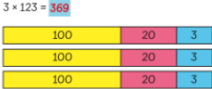
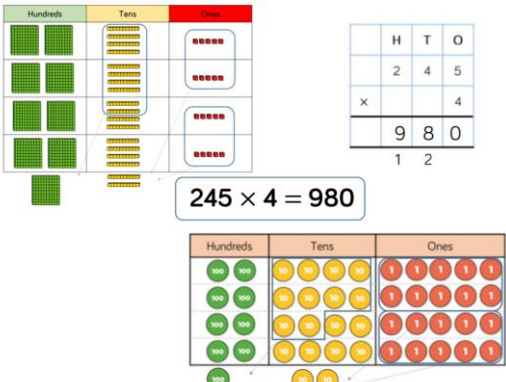


Children will be encouraged to find doubles within their surroundings e.g. finding matching numicon or tens frames, looking at ladybirds and butterflies and drawing their own - concentrating on doubles. Children will use stem sentences such as double 5 is 10, 10 is double 5

	Mental strategies	Written methods	Vocabulary	Models, Images and resources
Year 1	<ul style="list-style-type: none"> Count on from and back to zero in ones, twos, fives or tens Make connections and spot patterns between arrays, number patterns, and counting in twos, fives and tens. Introduce the symbol for multiplication x Repeated addition Links to doubling 	<p>Solve simple problems calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher</p> <p>Practical problem solving activities involving equal sets or groups. Through grouping and sharing small quantities, pupils should begin to understand multiplication; doubling numbers and quantities.</p> <p>How many legs will 5 children have?</p>  <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> $2 + 2 + 2 + 2 + 2$ </div>  <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> There are _ groups of _ flowers. There are _ flowers altogether. </div>	sets groups, equal groups array doubles pairs	100 square number lines number tracks practical equipment bead strings arrays
Year 2	<ul style="list-style-type: none"> Become fluent in recall and use of multiplication facts for the 2, 5 and 10 multiplication tables, (connect the 	Calculate mathematical statements and write them using the multiplication (x) and equals (=) signs	lots of groups of multiply multiplied	100 square practical equipment number lines

	<p>10x table to place value, and the 5x table to the divisions on the clock face)</p> <ul style="list-style-type: none"> Using doubling and understanding that this is the same as multiplying by 2 Double any multiple of 5 up to 50, eg. double 35 Find the total number of objects when they are organised into groups of 2, 5 or 10 Recognise odd and even numbers Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot Repeated addition Use of arrays 	<p>Solve one-step x problems using materials, arrays, repeated addition and x facts, include problems in contexts.</p> <p><u>Understand multiplication as repeated addition</u></p> <p><i>There are 5 pencils in one packet. How many pencils in 4 packets?</i></p> <p>$5 + 5 + 5 + 5$ 4 lots of 5 or 5×4</p> <p><u>On a number line:</u></p>  <p>0 5 10 15 20</p> <p><u>and on a bead bar:</u></p> <p>$5 \times 3 = 5 + 5 + 5$</p>  <p><u>Understand x as an Array (of objects)</u></p>  <p>$5 \times 4 = 20$</p> <p>$4 \times 5 = 20$</p> <p>Begin to use other x tables and recall facts in written calculation Recognise and use the inverse relationship between multiplication and division in checking calculations.</p>	<p>symbol x times repeated addition times as big ...as wide ...as long commutative inverse</p>	<p>bead strings arrays</p>
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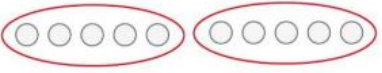
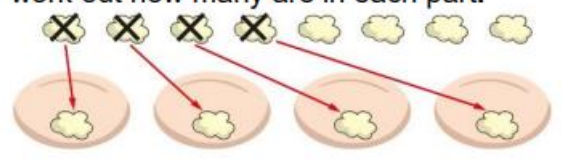
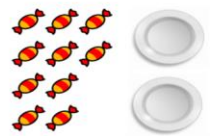
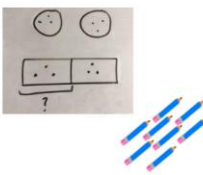
Year 3	<ul style="list-style-type: none">Continue to recall multiplication facts for 2, 5 and 10 times tables from year 2Recall and use multiplication facts for the 3, 4, 11 and 8 multiplication tablesPractise mental recall of x tables to improve fluency. Use doubling to connect the 2, 4 and 8 x tables.Use x facts to derive related facts and write mathematical statements e.g. using $3 \times 2 = 6$ to derive $30 \times 2 = 60$Develop efficient mental methods using commutativity e.g. $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$Double any two-digit number, e.g. double 39 and any multiple of 5 , 10 or 100, e.g. double 340, double 800,Multiply one-digit or two-digit numbers by 10 or 100 and understand the effect e.g. 7×100, 46×10, 54×100	<p>Count on a number line and/or a 100 square in various multiples</p> <p>0 3 6 9 12</p> <p>Understand multiplication <u>represented as an array</u></p> <p>$5 \times 3 = 15$</p> <p>$3 \times 5 = 15$</p> <p>Develop reliable methods for TO X O progressing to efficient <u>short multiplication</u> (see below for strategies that build to this)</p> <p>$\begin{array}{r} 26 \\ \times 4 \\ \hline 104 \end{array}$</p> <p>Solve problems and decide which operation to use and why, inc.</p> <ul style="list-style-type: none">missing number problemsinteger scaling problems eg double or treble 50p or 5x60cmcorrespondence problems in which m objects are connected to n objects eg finding all possibilities '3 hats and 4 coats, how many different outfits?'	<p>multiply partition hundreds, tens, ones, digit multiple inverse factor product</p>	<p>jottings partly marked number lines empty number line arrow card 100 square dienes apparatus bar model grouping squares place value counters</p>																																																																																
	<p><u>Partitioning (recorded informally)</u> e.g. $34 \times 5 = (30 \times 5) + (4 \times 5)$</p> <div><div><table><tr><th></th><th>H</th><th>T</th><th>O</th></tr><tr><td></td><td></td><td>3</td><td>4</td></tr><tr><td>x</td><td></td><td></td><td>5</td></tr><tr><td colspan="4"><hr/></td></tr><tr><td></td><td>1</td><td>7</td><td>0</td></tr></table><p>1 2</p></div><div><table><tr><th></th><th>H</th><th>T</th><th>O</th></tr><tr><td></td><td></td><td>3</td><td>4</td></tr><tr><td>x</td><td></td><td></td><td>5</td></tr><tr><td colspan="4"><hr/></td></tr><tr><td></td><td>1</td><td>7</td><td>0</td></tr></table><p>1 2</p></div><div><p>$34 \times 5 = 170$</p></div><div><table><tr><th></th><th>H</th><th>T</th><th>O</th></tr><tr><td></td><td></td><td>3</td><td>4</td></tr><tr><td>x</td><td></td><td></td><td>5</td></tr><tr><td colspan="4"><hr/></td></tr><tr><td></td><td>1</td><td>7</td><td>0</td></tr></table><p>1 2</p></div><div><table><tr><th></th><th>H</th><th>T</th><th>O</th></tr><tr><td></td><td></td><td>3</td><td>4</td></tr><tr><td>x</td><td></td><td></td><td>5</td></tr><tr><td colspan="4"><hr/></td></tr><tr><td></td><td>1</td><td>7</td><td>0</td></tr></table><p>1 2</p></div></div>					H	T	O			3	4	x			5	<hr/>					1	7	0		H	T	O			3	4	x			5	<hr/>					1	7	0		H	T	O			3	4	x			5	<hr/>					1	7	0		H	T	O			3	4	x			5	<hr/>					1	7	0
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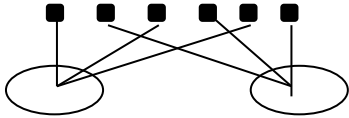
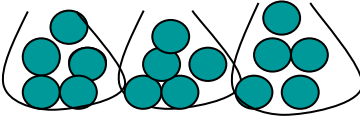
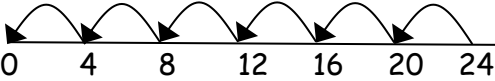
<p>Year 4</p>	<ul style="list-style-type: none"> Recall and practise multiplication facts for tables up to 12×12 to aid fluency. Counting in 6s, 7s, 9s, 25s and 100s Use place value, known and derived facts to multiply mentally, including multiplying <ul style="list-style-type: none"> by 0 and 1 TO by 4 or 8, eg. 26×4 by doubling three numbers together (e.g. $4 \times 2 \times 7$) numbers to 20 by a one eg. 17×3 using distribution numbers to 1000 by 10 and 100 (whole-number answers) eg. 325×10, 42×100 Recognise and use factor pairs e.g. give the factor pair associated with a multiplication fact (if $2 \times 3 = 6$ then 6 has the factor pair 2 and 3) Partitioning: multiplying hundreds, tens and ones separately and then recombining. Using understanding of when a number is multiplied by 10, 100 or 1,000. Using knowledge of number facts and place value e.g. $7 \times 8 = 56$ to find 70×8, 7×80 etc. 	<p>Develop fluency in written methods of <u>short multiplication</u></p> <div style="display: flex; justify-content: space-around;"> <div> $\begin{array}{r} 304 \\ \times 9 \\ \hline 36 \\ 2700 \\ \hline 2736 \end{array}$ </div> <div> $\begin{array}{r} 304 \\ \times 9 \\ \hline 2736 \end{array}$ </div> </div> <p><u>Multiply using partitioning</u> (recorded informally)</p> <div style="display: flex; align-items: center;"> <div> $43 \times 6 =$ $40 \times 6 = 240$ $3 \times 6 = 18$ $240 + 18 = 258$ </div> <div style="margin: 0 20px;">or</div> <div> $\begin{array}{r} 43 \\ 40 + 3 \\ \downarrow \quad \downarrow \\ 240 + 18 = 258 \end{array}$ </div> </div> <p>Where appropriate introduce grid multiplication for T0 x 0 and HTO X O</p> <div style="display: flex; align-items: center;"> <div> 38×7 $\begin{array}{r l} \times & 3 \\ 100 & 300 \\ 20 & 60 \\ \hline 3 & 9 \\ \hline & 369 \end{array}$ </div> <div> 123×3  </div> </div> <p>Write statements using the distributive law $39 \times 7 = 30 \times 7 + 9 \times 7$ and associative law $(2 \times 3) \times 4 = 2 \times (3 \times 4)$</p> <p>Solve two step problems with increasingly harder numbers and in which n objects are connected to m objects eg. finding all possibilities '6 hats and 5 coats, how many different outfits?'</p>	<p>multiply partition digit inverse short multiplication brackets factor product multiplicand multiplier</p>	<p>jottings arrow cards dienes apparatus bar model place value counters bar model</p>
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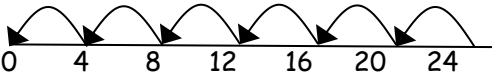
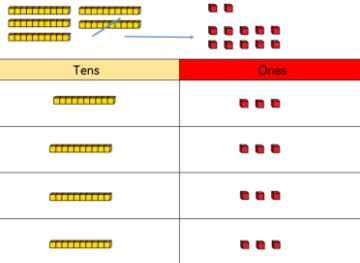
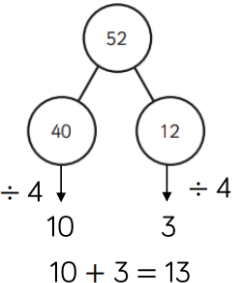

Year 5	<ul style="list-style-type: none">Continue to recall known facts for all multiplication tables to 12 x 12 numbers to support fluency or more complex multiplication and division questionsIdentify multiples and factors, including finding all factor pairs for numbers to 100, e.g. 30 has the factor pairs 1 x 30, 2 x 15, 3 x 10 and 5 x 6Establish whether a number up to 100 is prime and recall prime numbers up to 19Recognise and use square and cube numbers, and notation for squared² and cubed³Multiply integers and decimals by 10, 100 and 1000Multiply pairs of multiples of 10, e.g. 60 x 30, and multiples of 100 by a single digit e.g. 900 x 8Counting in steps of powers of 10Use commutativity and tables to multiplyUse the relationship between multiplication and division.	<p>Solve problems including understanding the meaning of the equals sign e.g. 34 x <input type="text"/> = 287 including scaling by simple fractions</p> <p>Use multiplication and division as inverses to support the introduction of ratio e.g. if there are 6 blue beads for every 10 red beads, calculate number of blue beads for 348 red bead</p> <p>Multiply up to 4 digits by a one- or two-digit number using a formal written method - Children may be introduced to grid method to support their understanding before learning long and short formal strategies)</p> <p><u>Long multiplication for two-digit numbers, moving on to short multiplication (see below)</u></p> <div><div><div><div>3</div><div>2</div><div>4</div></div><div><div>x</div><div>2</div><div>5</div></div><div><div>2</div><div>0</div><div>(5 x 4)</div></div><div><div>1</div><div>0</div><div>0</div><div>(5 x 20)</div></div><div><div>1</div><div>5</div><div>0</div><div>0</div><div>(5 x 300)</div></div><div><div>8</div><div>0</div><div>(20 x 4)</div></div><div><div>4</div><div>0</div><div>0</div><div>(20 x 20)</div></div><div><div>+ 6</div><div>0</div><div>0</div><div>0</div><div>(20 x 300)</div></div><div><div>8</div><div>1</div><div>0</div><div>0</div></div><div><div>1</div><div>1</div></div></div></div> <div><div>partition</div><div>product</div><div>multiple</div><div>multiply</div><div>add</div><div>total</div><div>factor</div><div>factor</div><div>pairs</div><div>common</div><div>factor</div><div>prime</div><div>square</div><div>number</div><div>cube</div><div>numbers</div></div> <div><div>bar model</div><div>place value</div><div>counters</div></div>
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Year 6	<ul style="list-style-type: none"> Continue to recall known facts for all multiplication tables to 12 x 12 numbers to support fluency or more complex multiplication and division questions Multiply two-digit decimals such as 0.81×7 and pairs of multiples of 10 and 100 e.g. 50×30, 600×20 Double decimals up to 3 decimal places e.g. double 7.6 Scale up and down using known facts, e.g. given that three oranges cost 24p, find the cost of four oranges Identify numbers with an odd number of factors (square numbers), even numbers of factors and no factor pairs other than 1 and themselves (prime numbers) Explore the order of operations using brackets; eg. $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$ 	<p>Use efficient written methods confidently, reducing the recording further and extending to larger numbers</p> <table border="1" data-bbox="1155 268 1525 746"> <tr> <th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr> <tr> <td></td><td>2</td><td>7</td><td>3</td><td>9</td></tr> <tr> <td>×</td><td></td><td></td><td>2</td><td>8</td></tr> <tr> <td>2</td><td>1</td><td>9</td><td>1</td><td>2</td></tr> <tr> <td>2</td><td>5</td><td>3</td><td>7</td><td></td></tr> <tr> <td>5</td><td>4</td><td>7</td><td>8</td><td>0</td></tr> <tr> <td>1</td><td></td><td>1</td><td></td><td></td></tr> <tr> <td>7</td><td>6</td><td>6</td><td>9</td><td>2</td></tr> </table> <p style="text-align: center;">1</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> $2,739 \times 28 = 76,692$ </div>	TTh	Th	H	T	O		2	7	3	9	×			2	8	2	1	9	1	2	2	5	3	7		5	4	7	8	0	1		1			7	6	6	9	2	partition product multiple multiply add total factor factor pairs common factor prime square number cube numbers	bar model place value counters
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DIVISION

<p>EYFS - nursery and reception</p>	<p>Grouping Learn to make equal groups from a whole and find how many equal groups of a certain size can be made.</p> <p>Sort a whole set people and objects into equal groups.</p>  <p><i>There are 10 children altogether. There are 2 in each group. There are 5 groups.</i></p>	<p>Grouping Represent a whole and work out how many equal groups.</p>  <p><i>There are 10 in total. There are 5 in each group. There are 2 groups.</i></p> <p>Sharing Share a set of objects into equal parts and work out how many are in each part.</p> 		
	<p>Mental strategies</p>	<p>Written methods</p>	<p>Vocabulary</p>	<p>Models, Images and resources</p>
<p>Year 1</p>	<ul style="list-style-type: none"> Share objects into equal groups and count how many in each group and consider 'left over'. Count on from and back to zero in ones, twos, fives or tens Make connections between arrays, number patterns, and counting in twos, fives and tens. Link to halving Introduce the symbol for division \div Through grouping and sharing small quantities, children will begin to understand division and finding simple fractions of objects, numbers and quantities 	<p>Practical problem solving activities involving equal sets or groups. Begin to understand division through grouping and sharing and halving small quantities</p> <p><i>Can you cut the cake in half? How many pieces are there? How many cakes are there in the box? Take <u>half</u> of them out.</i></p> <p>Solve simple problems using concrete objects, pictorial representations and find simple fractions of objects, numbers and quantities. with the support of the teacher</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div data-bbox="918 1212 1176 1396">  <p>Share the sweets equally between the two plates. ... sweets shared equally between 2 is ...</p> </div> <div data-bbox="1209 1173 1478 1428">  <p>How many equal groups of 2 can you make with the pencils? If you had 12 pencils, how many groups of 2 would be able to make?</p> </div> </div>	<p>share sharing grouping equal groups left over half halving each</p>	<p>practical equipment arrays</p>

Year 2	<ul style="list-style-type: none"> • Become fluent in recall and use of multiplication and division facts for the 2, 5 and 10 multiplication tables. • Halve any multiple of 10 up to 100, e.g. halve 90 • Find half of even numbers to 40 • Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot • Identify odd and even numbers to 100 • Links to arrays • Using knowledge that halving is in the inverse of doubling and the same as dividing by 2. • Use known facts and place value to divide. 	<p>Calculate mathematical statements and write using division (\div) and equals (=) signs</p> <p>Solve problems using materials, arrays, repeated subtraction and division facts, including problems in contexts.</p>  <p>Understand as <u>sharing</u> equally <i>6 sweets are shared equally between 2 people. How many sweets does each one get?</i></p>  <p>Understand as <u>grouping</u> (repeated subtraction). <i>There are 15 apples in a box. How many bags of 5 apples can be filled? How many groups of 5 can you make from 15?</i></p>  <p><u>Model repeated subtraction using a number line</u> $24 \div 4 = 6$</p>  <p>Begin to use other x tables and division facts to perform written calculation.</p> <p>Relate to fractions and measures eg. $40 \div 2 = 20$, 20 is a half of 40</p> <p>Check calculations using the inverse relationship between x and \div</p>	<div>divide</div> <div>divisible</div> <div>share</div> <div>equally, one</div> <div>each, two</div> <div>each...,</div> <div>grouping</div> <div>equal</div> <div>groups, how</div> <div>many lots</div> <div>of, groups</div> <div>of...</div> <div>array</div> <div>odd</div> <div>even</div> <div>repeated</div> <div>subtraction</div>	<div>practical</div> <div>equipment</div> <div>arrays</div> <div>number line</div>
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<div>Year 3</div>	<ul style="list-style-type: none">• Halve any multiple of 10 up to 200, e.g. halve 170• Find unit fractions of numbers and quantities involving halves, thirds, quarters, fifths and tenths• Recall and use division facts for the 3, 4, 11 and 8 x tables• Counting in 2s, 5s, 10s, 3s, 4s and 8s• Use known facts and place value to divide by 2, 3, 4, 5, 8 or 10 •• Using knowledge that halving is in the inverse of doubling and the same as dividing by 2. Use this to link to $\div 2$, $\div 4$ and $\div 8$.• Using known facts/partition in different ways to become more efficient in mental calculations: e.g. $39 \div 3$ by taking 3 lots of 10 away mentally, then 3 lots of 3 to get 13 as the answer.• Use the relationship between multiplication and division.• Scaling down using known facts.• Calculate and write mathematical statements for division using related x tables facts, including for $TO \div O$ mentally• Develop efficient mental methods using facts e.g. $6 \div 3 = 2$ and $2 = 6 \div 3$ to derive related facts $60 \div 3 = 20$ and $20 = 60 \div 3$• Identify remainders when dividing by 2, 5 or 10	<div><div>Develop reliable written methods for $TO \div O$ progressing to efficient written</div><div>Use practical methods and jottings, including remainders</div><div>Sharing: If £20 is shared between 4 people, how much would each get? <i>or</i></div><div>Grouping: There are 20 children and they sit in tables of 4. How many tables will we need?</div><div><u>Repeated subtraction using a number line</u> $24 \div 4 = 6$ </div><div><u>Written methods and jottings</u> <div><div>52 <table><tr><td>?</td><td>?</td><td>?</td><td>?</td></tr></table></div><div>$52 \div 4 = 13$ </div><div></div></div></div></div>	?	?	?	?	<div><div>divide short division</div><div>share group equal groups regroup remainder left over repeated subtraction</div></div>	<div>number line practical equipment bar model place value counters arrays grouping square</div>
?	?	?	?					

Year 4

- Recall division facts for \times tables up to 12×12 use place value, known and derived facts to aid fluency.
- Counting in 6s, 7s, 9s, 25s and 1000s.
- Practise and extend mental methods to three-digit numbers to derive facts e.g. $200 \times 3 = 600$ into $600 \div 3 = 200$
- Divide numbers to 1000 by 10 and then 100 (whole-number answers), e.g. $120 \div 10$, $600 \div 100$, $850 \div 10$
- Use understanding of place value and what happens to the value of each digit when it is divided by 10, 100 or 1,000.
- Divide larger numbers by 4 or 8, by halving and halving again ...
- Identify remainders when dividing by 1 to 12
- Find halves of larger numbers
- Find unit and simple non-unit fractions of numbers and quantities eg $\frac{3}{8}$ of 24
- Use known facts and place value to solve calculations and to become more efficient in mental calculations e.g. $92 \div 4$ by taking away 20 lots of 4, to be left with 12, then taking away 4×3 to get the answer of 23.
- Use factor pairs to divide
- Scaling down using known facts
- Use the relationship between multiplication and division

Develop fluency in efficient strategies for short division

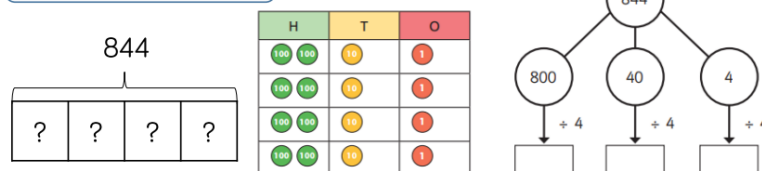
Introduce dividing using subtracting 10 lots of divisor and asking 'how many more left over?'

$$52 \div 4$$

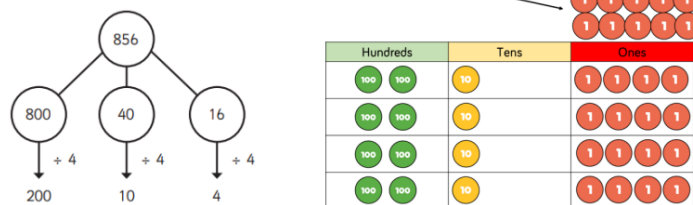
I know that 10 lots of 4 are 40, there will be 12 left over which is another 3 lots of 4 so there are 13 lots of 4 in 52

Efficient strategies and representations

$$844 \div 4 = 211$$



$$844 \div 4 = 211$$



inverse
divide
quotient
divisor
dividend
remainder
short
division

Year 5	<ul style="list-style-type: none"> Divide numbers mentally using known facts for all multiplication tables to 12 x 12 Counting in steps of powers of 10 Use understanding of place value and what happens to the value of each digit when it is divided by 10, 100 or 1,000 Find the whole number remainder after dividing a two-digit number by a single-digit number, e.g. $27 \div 4 = 6 \text{ R } 3$ Find 50%, 25% or 10% of whole numbers or quantities, e.g. 25% of 20 kg, 10% of £80 Use factor pairs to divide Scaling down using known facts Use knowledge of division facts e.g. when carrying out a division to find a remainder Use the relationship between multiplication and division. 	<p>Practise and extend efficient written methods applying X tables and related facts confidently</p> <p>Interpret remainders through consideration of the question at hand.</p> <p>Divide up to ThHTO by O number using efficient <u>short division</u></p> <p>Solve problems including scaling by simple fractions</p> <p>Use x and \div as inverses to support dividing by powers of 10 in scale drawings or in converting units e.g km to m</p>	decimal point remainder	
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$856 \div 4 = 214$

$8,532 \div 2 = 4,266$

$432 \div 12 = 36$

$7,335 \div 15 = 489$

15	30	45	60	75	90	105	120	135	150
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Year 6	<ul style="list-style-type: none">Counting in steps of powers of 10.Recall division facts for all the times tables, up to 12x12Use understanding of place value and what happens to the value of each digit when it is divided by 10, 100 or 1,000Use known facts and place value to solve calculations.Use knowledge of division facts e.g. when carrying out a division to find a remainder. Use factor pairs to divideUse the relationship between multiplication and divisionConsolidate all previously taught strategies.Divide TO by O number, eg. 68 ÷ 4Divide two-digit decimals eg. 4.8 ÷ 6 and find halves of decimals with ones and tenths, eg. half of 15.2Divide multiples of 100 by a multiple of 10 or 100 (whole number answers), e.g. 600 ÷ 20, 800 ÷ 400, 2100 ÷ 300Simplify fractions by cancelling and relating common factors to equivalent fractions.Scale up and down using known facts, e.g. given that six oranges cost 24p, find the cost of four oranges	<p>Divide numbers up to ThHTO by a TO whole number using efficient written method of long division, and interpret remainders as whole numbers, fractions, decimals fractions or by rounding as appropriate for the context</p> <div><table><tr><td></td><td></td><td>0</td><td>3</td><td>6</td></tr><tr><td>1</td><td>2</td><td>4</td><td>3</td><td>2</td></tr><tr><td></td><td></td><td>-</td><td>3</td><td>6</td></tr><tr><td></td><td></td><td></td><td></td><td>0</td></tr><tr><td></td><td></td><td></td><td>7</td><td>2</td></tr><tr><td></td><td></td><td>-</td><td></td><td>7</td></tr><tr><td></td><td></td><td></td><td></td><td>2</td></tr><tr><td></td><td></td><td></td><td></td><td>0</td></tr></table><div>(x30) (x6)</div><div>12 × 1 = 12 12 × 2 = 24 12 × 3 = 36 12 × 4 = 48 12 × 5 = 60 12 × 6 = 72 12 × 7 = 84 12 × 8 = 96 12 × 9 = 108 12 × 10 = 120</div><div>432 ÷ 12 = 36</div></div> <div><table><tr><td></td><td>0</td><td>4</td><td>8</td><td>9</td></tr><tr><td>15</td><td>7</td><td>3</td><td>3</td><td>5</td></tr><tr><td>-</td><td>6</td><td>0</td><td>0</td><td>0</td></tr><tr><td></td><td>1</td><td>3</td><td>3</td><td>5</td></tr><tr><td>-</td><td>1</td><td>2</td><td>0</td><td>0</td></tr><tr><td></td><td></td><td>1</td><td>3</td><td>5</td></tr><tr><td>-</td><td></td><td>1</td><td>3</td><td>5</td></tr><tr><td></td><td></td><td></td><td></td><td>0</td></tr></table><div>(x400) (x80) (x9)</div><div>1 × 15 = 15 2 × 15 = 30 3 × 15 = 45 4 × 15 = 60 5 × 15 = 75 10 × 15 = 150</div><div>7,335 ÷ 15 = 489</div></div> <div><table><tr><td></td><td></td><td></td><td>2</td><td>4</td><td>r</td><td>1</td><td>2</td></tr><tr><td>1</td><td>5</td><td>3</td><td>7</td><td>2</td><td></td><td></td><td></td></tr><tr><td>-</td><td></td><td>3</td><td>0</td><td>0</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td>7</td><td>2</td><td></td><td></td><td></td></tr><tr><td>-</td><td></td><td></td><td>6</td><td>0</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td>1</td><td>2</td><td></td><td></td><td></td></tr></table><div>1 × 15 = 15 2 × 15 = 30 3 × 15 = 45 4 × 15 = 60 5 × 15 = 75 10 × 15 = 150</div><div>372 ÷ 15 = 24 r12</div></div> <div><table><tr><td></td><td></td><td></td><td>2</td><td>4</td><td>$\frac{4}{5}$</td></tr><tr><td>1</td><td>5</td><td>3</td><td>7</td><td>2</td><td></td></tr><tr><td>-</td><td></td><td>3</td><td>0</td><td>0</td><td></td></tr><tr><td></td><td></td><td></td><td>7</td><td>2</td><td></td></tr><tr><td>-</td><td></td><td></td><td>6</td><td>0</td><td></td></tr><tr><td></td><td></td><td></td><td>1</td><td>2</td><td></td></tr></table><div>4 5</div><div>372 ÷ 15 = 24 $\frac{4}{5}$</div></div>			0	3	6	1	2	4	3	2			-	3	6					0				7	2			-		7					2					0		0	4	8	9	15	7	3	3	5	-	6	0	0	0		1	3	3	5	-	1	2	0	0			1	3	5	-		1	3	5					0				2	4	r	1	2	1	5	3	7	2				-		3	0	0							7	2				-			6	0							1	2							2	4	$\frac{4}{5}$	1	5	3	7	2		-		3	0	0					7	2		-			6	0					1	2		<p>Short division Long division remainder</p>
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