



Harry Gosling Calculation Policy 2016-17

This policy should be used in conjunction with the Maths Unit Overviews for your year group.
Changes for 2016-17 in turquoise

Mental Calculation methods

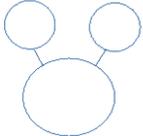
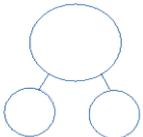
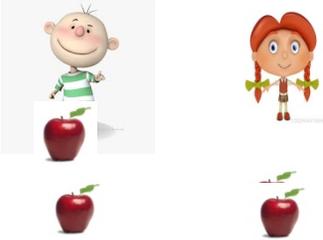
Year group	Addition	Subtraction	Multiplication	Division
Year 1	<p>Expectation</p> <ul style="list-style-type: none"> - given a number, identify one more - memorise and reason with number bonds to 10 and 20 - add one-digit and two-digit numbers to 20, including zero <p>Methods</p> <ul style="list-style-type: none"> - count on after tapping head and saying the larger number 	<p>Expectation</p> <ul style="list-style-type: none"> - given a number, identify one less - memorise and reason with number bonds to 10 and 20 - add and subtract one-digit and two-digit numbers to 20, including zero <p>Methods</p> <ul style="list-style-type: none"> - count backwards after tapping head and saying the larger number - count up to find the difference when it is a 'finding the difference' problem, or the numbers are close together e.g. 11 - 9 	<p>Expectation</p> <ul style="list-style-type: none"> - count in multiples of twos, fives and tens - derive doubles to 9x2 <p>Methods</p> <ul style="list-style-type: none"> - use fingers to keep track of the number of multiples counted 	<p>Expectation</p> <p>N/A</p> <p>Methods</p> <p>N/A</p>
Year 2	<p>Expectation</p> <ul style="list-style-type: none"> - count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward - recall and use addition facts to 20 fluently, and derive and use related facts up to 100 e.g. $20 + 50 = 70$ - mentally add: <ul style="list-style-type: none"> • a two-digit number and ones • a two-digit number and tens • three one-digit numbers • two two-digit numbers below 50 <p>Methods</p> <ul style="list-style-type: none"> - count on after tapping 	<p>Expectation</p> <ul style="list-style-type: none"> - count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward - recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100 e.g. $90 - 40 = 50$ - mentally subtract: <ul style="list-style-type: none"> • a two-digit number and ones • a two-digit number and tens • two two-digit numbers below 50 <p>Methods</p> <ul style="list-style-type: none"> - count backwards after tapping head and saying the larger number, then use fingers to keep track of the number of ones/multiples counted - count up to find the difference when it is a 'finding the difference' problem, the numbers are close together e.g. $11 - 9$ or the larger number (minuend) is a multiple of 10 e.g. $50 - 27$ 	<p>Expectation</p> <ul style="list-style-type: none"> - count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward - recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables - count forwards and backwards in halves and quarters - derive doubles to 15x2 <p>Methods</p> <ul style="list-style-type: none"> - use fingers to keep track of the number of multiples counted - when pupils cannot recall multiplication facts, use fingers to count in multiples until the desired number of multiples are counted 	<p>Expectation</p> <ul style="list-style-type: none"> - recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables - halve even numbers to 20 <p>Methods</p> <ul style="list-style-type: none"> - when pupils cannot recall division facts, count up to the dividend in multiples of the divisor, using fingers to keep track e.g. $20 \div 5$, count up to 20 in multiples of five then count the number of fingers to find the answer (quotient)

	<p>head and saying the larger number, then use fingers to keep track of the number of ones/multiples counted</p> <ul style="list-style-type: none"> - use partitioning to add larger numbers 			
Year 3	<p>Expectation</p> <ul style="list-style-type: none"> - find 10 or 100 more or less than a given number - add and subtract numbers mentally, including: <ul style="list-style-type: none"> • a three-digit number and ones • a three-digit number and tens • a three-digit number and hundreds • two two-digit numbers where the answer is >100 <p>Methods</p> <ul style="list-style-type: none"> - pupils should identify the column that changes and those that don't, then count on or backwards, using fingers to keep track if needed - count on after tapping head and saying the larger number, then use fingers to keep track of the number of ones/multiples counted - use partitioning to add larger numbers - start to use compensation for mentally adding numbers like 9 and 99. 	<p>Expectation</p> <ul style="list-style-type: none"> - find 10 or 100 more or less than a given number - add and subtract numbers mentally, including: <ul style="list-style-type: none"> • a three-digit number and ones • a three-digit number and tens • a three-digit number and hundreds • two two-digit numbers <p>Methods</p> <ul style="list-style-type: none"> - pupils should identify the column that changes and those that don't, then count on or backwards, using fingers to keep track if needed - count backwards after tapping head and saying the larger number, then use fingers to keep track of the number of ones/multiples counted - count up to find the difference when it is a 'finding the difference' problem, the numbers are close together e.g. 31 – 29 or the larger number (minuend) is a multiple of 10 or 100 e.g. 500 - 327 - start to use compensation for mentally subtracting numbers like 9 and 99. 	<p>Expectation</p> <ul style="list-style-type: none"> - count from 0 in multiples of 4, 8, 50 and 100 - recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables - count up and down in tenths - derive other multiplication and division facts using times table knowledge e.g. 3 x 20 can be derived from 2 x 3 = 6 - multiply 2 and 3 digit numbers by 10 - derive doubles to 19x2 and doubles of multiples of 10 <p>Methods</p> <ul style="list-style-type: none"> - use fingers to keep track of the number of multiples counted - when pupils cannot recall multiplication facts, use fingers to count in multiples until the desired number of multiples are counted OR use other known facts to find the answer e.g. 10 x 5 = 50 so count on in fives twice more to find 12 x 5 - when multiplying or dividing by 10, children should move the digits to the left or right NEVER move the decimal place or 'add a 0' 	<p>Expectation</p> <ul style="list-style-type: none"> - recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables - derive other multiplication and division facts using times table knowledge e.g. 60 ÷ 3 can be derived from 2 x 3 = 6 - halve even numbers to 100 <p>Methods</p> <ul style="list-style-type: none"> - when pupils cannot recall division facts, count up to the dividend in multiples of the divisor, using fingers to keep track e.g. 20 ÷ 5, count up to 20 in multiples of five then count the number of fingers to find the answer (quotient)
Year 4	<p>Expectation</p> <ul style="list-style-type: none"> - find 1000 more or less than a given number - add mentally with 	<p>Expectation</p> <ul style="list-style-type: none"> - find 1000 more or less than a given number - count backwards through zero to include 	<p>Expectation</p> <ul style="list-style-type: none"> - count in multiples of 6, 7, 9, 25 and 1000 - recall multiplication and division 	<p>Expectation</p> <ul style="list-style-type: none"> - recall multiplication and division facts for multiplication tables up to 12 x 12

	<p>increasingly large numbers</p> <p>Methods</p> <ul style="list-style-type: none"> - pupils should identify the column that changes and those that don't, then count on or backwards, using fingers to keep track if needed - use compensation for mentally adding numbers like 9 and 99 - use partitioning to add larger numbers - when children have a pencil to hand, use jottings for multi-step mental calculations 	<p>negative numbers</p> <ul style="list-style-type: none"> - subtract mentally with increasingly large numbers <p>Methods</p> <ul style="list-style-type: none"> - pupils should identify the column that changes and those that don't, then count on or backwards, using fingers to keep track if needed - count backwards after tapping head and saying the larger number, then use fingers to keep track of the number of ones/multiples counted - count up to find the difference when it is a 'finding the difference' problem, the numbers are close together e.g. 54 – 49 or the larger number (minuend) is a multiple of 10 e.g. 500 - 327 - use compensation for mentally subtracting numbers like 9 and 99 - when children have a pencil to hand, use jottings for multi-step mental calculations 	<p>facts for multiplication tables up to 12 × 12</p> <ul style="list-style-type: none"> - derive other multiplication and division facts using times table knowledge e.g. 6 x 300 can be derived from 6 x 3 = 18 - multiply three numbers together e.g. 4 x 6 x 2 - recall and derive factor pairs for numbers - count up and down in hundredths - multiply any number by 10 - multiply 2 and 3 digit numbers by 100 - double any 2 digit number and derive doubles for multiples of 10 and 100 <p>Methods</p> <ul style="list-style-type: none"> - use fingers to keep track of the number of multiples/fractions counted - when pupils cannot recall multiplication facts, use fingers to count in multiples until the desired number of multiples are counted OR use other known facts to find the answer e.g. 10 x 5 = 50 so count on in fives twice more to find 12 x 5 - start to use partitioning to multiply larger numbers e.g. 82x4 - start to use compensation for calculations such as 19 x 5 (20 x 5 – 5) - when children have a pencil to hand, use jottings for multi-step mental calculations - when multiplying or dividing by 10, children should move the digits to the left or right NEVER move the decimal place or 'add a 0' 	<ul style="list-style-type: none"> - derive other multiplication and division facts using times table knowledge e.g. 1200÷4 can be derived from 4 x 3 = 12 - recall and derive factor pairs for numbers - divide 2 and 3 digit numbers by 10 or 100 - halve any number to 100 and even numbers to 1000 <p>Methods</p> <ul style="list-style-type: none"> - when pupils cannot recall division facts, count up to the dividend in multiples of the divisor, using fingers to keep track e.g. 20÷5, count up to 20 in multiples of five then count the number of fingers to find the answer (quotient) - start to use partitioning to divide larger numbers e.g. 408÷4 - when children have a pencil to hand, use jottings for multi-step mental calculations - when multiplying or dividing by 10, children should move the digits to the left or right NEVER move the decimal place or 'add a 0'
Year 5	<p>Expectation</p> <ul style="list-style-type: none"> - count forwards or backwards in steps of 	<p>Expectation</p> <ul style="list-style-type: none"> - count forwards or backwards in steps of powers of 10 for any given number up to 1 	<p>Expectation</p> <ul style="list-style-type: none"> - Continue practise counting forwards and backwards in simple 	<p>Expectation</p> <ul style="list-style-type: none"> - identify multiples and factors, including finding all factor pairs of a

	<p>powers of 10 for any given number up to 1 000 000</p> <ul style="list-style-type: none"> - count forwards and backwards with positive and negative whole numbers, including through zero - add mentally with increasingly large numbers e.g. $14\ 564 + 3400$ <p>Methods</p> <ul style="list-style-type: none"> - pupils should identify the column that changes and those that don't, then count on or backwards, using fingers to keep track if needed - use compensation for mentally adding numbers like 9 and 99 - use partitioning to add larger numbers - when children have a pencil to hand, use jottings for multi-step mental calculations - 	<p>000 000</p> <ul style="list-style-type: none"> - count forwards and backwards with positive and negative whole numbers, including through zero - subtract mentally with increasingly large numbers e.g. $12\ 462 - 2\ 300$ <p>Methods</p> <ul style="list-style-type: none"> - count backwards after tapping head and saying the larger number, then use fingers to keep track of the number of ones/multiples counted - count up to find the difference when it is a 'finding the difference' problem, the numbers are close together e.g. $54 - 49$ or the larger number (minuend) is a multiple of 10 e.g. $5000 - 2397$ - use compensation for mentally subtracting numbers like 9 and 99 - when children have a pencil to hand, use jottings for multi-step mental calculations - 	<p>fractions</p> <ul style="list-style-type: none"> - identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers - multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 - multiply and divide numbers mentally drawing upon known facts - double any number up to 1000 <p>Methods</p> <ul style="list-style-type: none"> - use fingers to keep track of the number of multiples/fractions counted - when multiplying or dividing by 10, children should move the digits to the left or right NEVER move the decimal place or 'add a 0' - use partitioning for calculations such as 82×4 - use compensation for calculations such as 68×6 ($70 \times 6 - 12$) - 	<p>number, and common factors of two numbers</p> <ul style="list-style-type: none"> - multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 - establish whether a number up to 100 is prime and recall prime numbers up to 19 - multiply and divide numbers mentally drawing upon known facts - halve any number to 1000 and even numbers to 10 000 <p>Methods</p> <ul style="list-style-type: none"> - when multiplying or dividing by 10, children should move the digits to the left or right NEVER move the decimal place or 'add a 0' - use partitioning to divide larger numbers e.g. $408 \div 4$
<p>Year 6</p>	<p>Expectation</p> <ul style="list-style-type: none"> - perform mental calculations, including with mixed operations and large numbers <p>Methods</p> <ul style="list-style-type: none"> - use partitioning and compensation confidently - when children have a pencil to hand, use jottings for multi-step mental calculations - 	<p>Expectation</p> <ul style="list-style-type: none"> - perform mental calculations, including with mixed operations and large numbers <p>Methods</p> <ul style="list-style-type: none"> - use compensation confidently - when children have a pencil to hand, use jottings for multi-step mental calculations - recognise when to count up to find a difference 	<p>Expectation</p> <ul style="list-style-type: none"> - perform mental calculations, including with mixed operations and large numbers - identify common factors, common multiples and prime numbers - double any number up to 1000 including decimals <p>Methods</p> <ul style="list-style-type: none"> - use partitioning and compensation confidently - when children have a pencil to hand, use jottings for multi-step mental calculations 	<p>Expectation</p> <ul style="list-style-type: none"> - perform mental calculations, including with mixed operations and large numbers - identify common factors, common multiples and prime numbers - halve any number <p>Methods</p> <ul style="list-style-type: none"> - use partitioning confidently - when children have a pencil to hand, use jottings for multi-step mental calculations

Written Calculation methods

Year group	Addition	Subtraction	Multiplication	Division
<p>Reception</p>	<p>Children are encouraged to develop a mental picture of the number system in their heads to use for calculation.</p> <p>Children use practical methods to make discoveries about addition.</p> <p>Combining two sets.</p>  <p>Three cakes on one plate and two on the other. If I put them all on one plate, how many cakes altogether? (Count all method)</p>  <p>Use Numicon and other visual models and images to support children's understanding of addition.</p>  <p>Count on using bead strings or bead bars, or number tracks or beadstrings</p>	<p>Children are encouraged to develop a mental picture of the number system in their heads to use for calculation by handling Numicon and other structured apparatus.</p> <p>Children use practical methods to explore the different situations of subtraction in everyday real life problems.</p> <p>Partitioning a large set into two smaller sub-sets.</p>  <p>Taking away – removing items from a set.</p> <p>Count a set of objects and remove one (or more). Find out how many are left?</p> <p>$6 = 4 + 2$ $6 - 2 = 4$</p> <p>e.g. fruits on a plate.</p>  <p>$5 - 1 = 4$</p> <p>Recognise that there are fewer objects when objects are removed from a set.</p>	<p>Listen to stories about multiplication. Sing songs and listen to rhymes.</p> <p>Children build equal sets e.g. 3 and 3. Link this to doubling.</p>  <p>Use circles model to show equal addition Combine one set of 3 and another set of 3. e.g. $3 + 3 = 6$. Double 3 is 6.</p> <p>Record activities using objects, pictures, diagrams or mark making</p> <p>Count groups of objects in practical contexts:</p> <p>Count in 5's or 10's using gloves.</p> 	<p>Children 'share' objects in play.</p> <p>Children hand out two at a time (leading to grouping).</p>  <p>Provide opportunities for children to group and share in daily routines eg fruit time</p>  <p>Model halving in a mathematical sense e.g. count how many to begin with. Share objects using one for you, one for me, and count how many each person has at end. Model writing the number sentence using real life objects.</p>



Put biggest number first and count on. Using numbers on a washing line or jumping along a number track



Use language of one more and two more.

Children can remember how many objects are out of sight and include these in their calculation



Teacher demonstrates how to write a simple number sentence e.g. $5+2=7$.

Children concentrate on adding numbers to 5 extending to 10.

Record activities using objects, pictures, diagrams mark making and or take photos of activity and record pupil talk.

Record activities using objects, pictures, diagrams or idiosyncratic numbers or words.

Use fingers and Numcion to solve subtraction problems.



Counting back.

Use Bead strings or bars and count back on a number track (moving to the left) to count back in ones.



Find one less than a number by counting back. Using numbers on a washing line or jumping back on a number track



One less than 5 is 4.

Teacher demonstrates how to write a simple number sentence e.g. $5 - 1 = 4$



Drop two-sided counters.

Count how many are yellow and how many are not yellow.

Count in 2's using socks



Count in multiples using numicon



Provide opportunities for children to play with commercial arrays e.g. bun tins, egg boxes, packaging inserts.

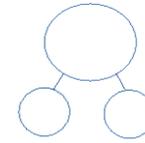


Use the language of twice as big (double the size).

Count each hop as they say 2, 4, 6, 8, 10 by putting up a finger for each hop.



Record activities using objects, pictures, diagrams mark making and or take photos of activity and record pupil talk.



8 shared equally between two makes 4 each.

$$8 \div 2 = 4$$

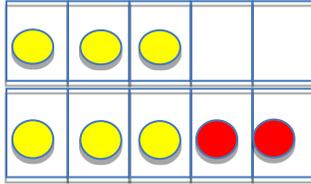
Model the language of grouping e.g. give each doll 2 spoons of jelly at a time.



Ask how many jumps of 2 are needed to reach 10?

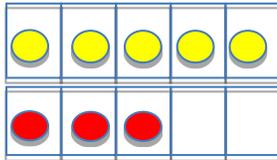
Record activities using objects, pictures, diagrams mark making and or take photos of activity and record pupil talk.

Find out how many more to make.....



e.g. I have three counters. How many more to make 5?

Compare two quantities



Use language more/less/fewer....fewer than.....extending to finding how many more/less to measure the difference.

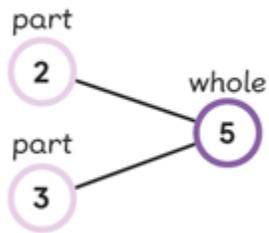
Children concentrate on numbers to 5 extending to 10.

Record activities using objects, pictures, diagrams mark making and or take photos of activity and record pupil talk.

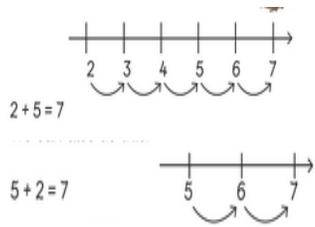
Year 1 *

Use methods in 'Maths No Problem' maths textbooks, including:

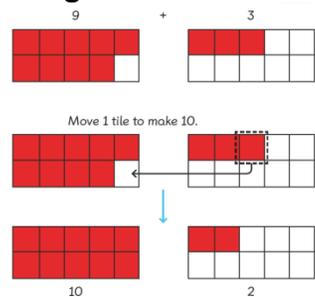
Part-part-whole diagrams:



Number lines:



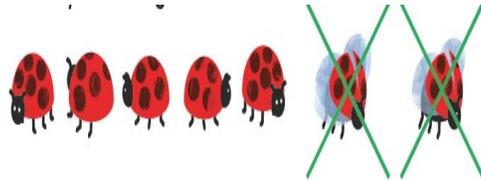
Ten grids:



Use methods in 'Maths No Problem' maths textbooks, including:

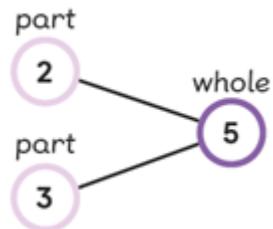
Subtract by crossing out:

$$7 - 2 = 5$$



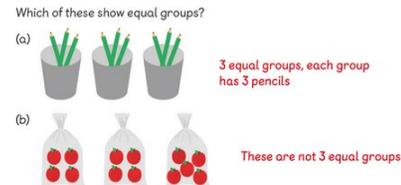
Part-part-whole diagrams:

$$5 - 2 = 3$$



Subtract by counting back:

Use methods in 'Maths No Problem' maths textbooks, including:
Developing an understanding of equal groups:



Adding equal groups:



Making equal rows:



Use methods in 'Maths No Problem' maths textbooks, including:
Grouping equally:

Ravi has 18 pencils.
He puts 6 pencils in each box.
How many boxes does Ravi need?



Ravi needs 3 boxes.

Sharing equally:

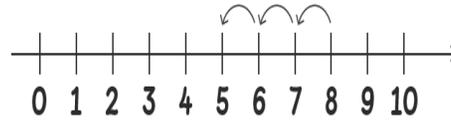
Put 12 cherries equally on 3 slices of cake.
How many cherries are there on each slice of cake?



There are 4 cherries on each slice of cake.

Adding by adding ones:

$$\begin{array}{c} 15 \\ \swarrow \searrow \\ 10 \quad 5 \end{array} + 4 = 19$$



$$8 - 3 = 5$$

Subtract by subtracting ones:

$$\begin{array}{c} 16 \\ \swarrow \searrow \\ 10 \quad 6 \end{array} - 4$$

$$6 - 4 = 2$$

$$10 + 2 = 12$$

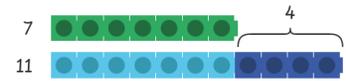
Subtracting from 10:

$$\begin{array}{c} 14 \\ \swarrow \searrow \\ 4 \quad 10 \end{array} - 8$$

$$10 - 8 = 2$$

$$4 + 2 = 6$$

Visual models to aid children's understanding of difference:



$$11 - 7 = 4$$

The difference between 11 and 7 is 4.

Making doubles:

Let's Learn

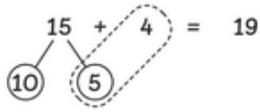
1 Double 2 = 4 2 twos

2 Double 5 = 10 2 fives

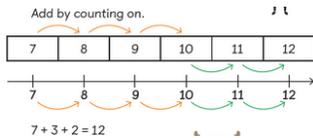
Year 2 *

Use methods in 'Maths No Problem' maths textbooks, including:

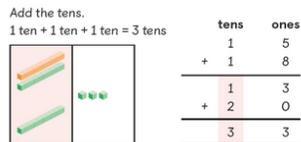
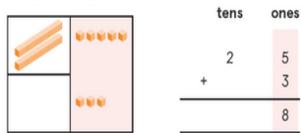
Adding by adding ones:



Number lines:



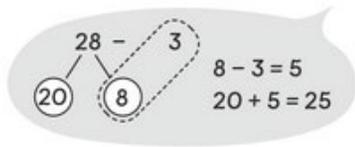
Use dienes to introduce concept of column addition and exchanging:



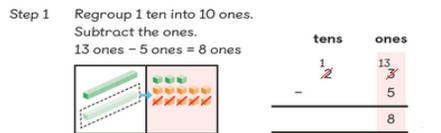
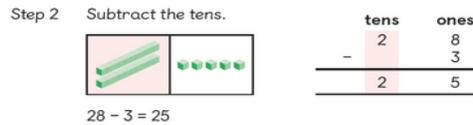
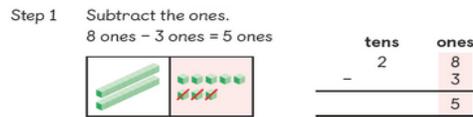
15 + 18 = 33

Use methods in 'Maths No Problem' maths textbooks, including:

Subtract by subtracting ones:



Use dienes to introduce concept of column subtraction and exchanging:



Use methods in 'Maths No Problem' maths textbooks, including:

Multiplication as equal groups:



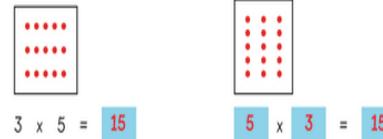
Objects set out as arrays:



5 x 10 = 50
10 x 5 = 50
They are equal.
There are 50 flowers.



Arrays:



Use methods in 'Maths No Problem' maths textbooks, including:

Grouping equally:

Ravi has 18 pencils.
He puts 6 pencils in each box.
How many boxes does Ravi need?



Ravi needs 3 boxes.

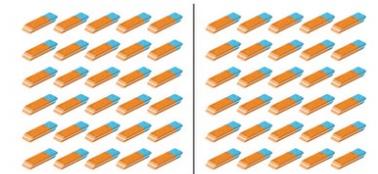
Sharing equally:

Put 12 cherries equally on 3 slices of cake.
How many cherries are there on each slice of cake?



There are 4 cherries on each slice of cake.

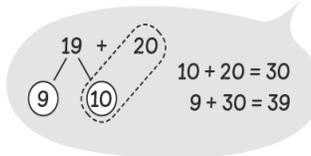
Objects set out as arrays:



Put into groups of 5. There are 6 groups.
Put into 5 equal groups. There are 6 in each group.

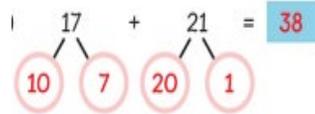
30 ÷ 5 = 6

Adding by adding tens:

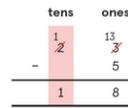
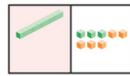


$19 + 20 = 39$

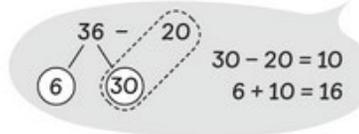
Partitioning:



Step 2 Subtract the tens.



Subtract by subtracting tens:



Year 3

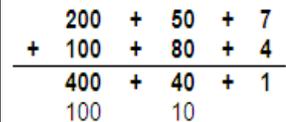
Concrete resources to support understanding:

Dienes
Place value counters

Up to: 999+999

Expanded column method:

$257 + 184 = 441$

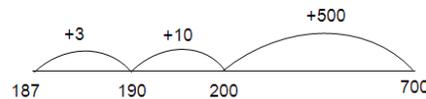


Use dienes or place value counters to support those who are still struggling with the concept of column addition.

Up to: 999-999

Counting up to find a difference:

$700 - 187 = 513$



Up to: 99x9

Grid method:

$123 \times 5 = 615$



$500 + 100 + 15 = 615$

Up to: 99÷9

Use times table knowledge:

$28 \div 7 = \underline{\quad}$
 $\rightarrow 7 \times 4 = 28$
 $\rightarrow 28 \div 7 = 4$

Support this method using arrays to enhance understanding of relationship between multiplication and division

Compact column method:

$$\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \\ \hline 11 \end{array}$$

Year 3 team to decide at what point in the year to introduce the method. Support understanding with dienes/PV chips when first introducing.

Expanded column method:

$$254 - 172 = 82$$

$$\begin{array}{r} 100 \\ 200 + 150 + 4 \\ - 100 + 70 + 2 \\ \hline 0 + 80 + 2 \end{array}$$

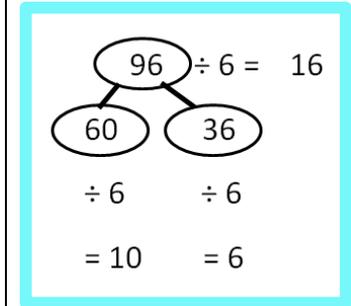
Pupils should be taught to use their number sense to decide when to use which method. For example, the counting up method should be used when the minuend is a multiple of 100 or 1000 as it is much quicker than the column method, which would involve too much exchanging.

Compact column method:

$$\begin{array}{r} 8 \quad 12 \quad 1 \\ \cancel{9} \quad \cancel{3} \quad 2 \\ - 4 \quad 5 \quad 7 \\ \hline 4 \quad 7 \quad 5 \end{array}$$

Year 3 team to decide at what point in the year to introduce the method. Support understanding with dienes/PV chips when first introducing.

Part-part-whole diagrams:



Year 3 team to decide at what point in the year to introduce the method. Support understanding with dienes/PV chips when first introducing.

Year 4

Concrete resources to support understanding:

Place value counters

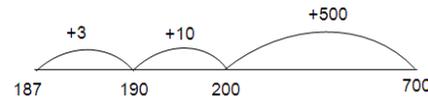
Up to: 9 999+9 999**Compact column method:**

$$\begin{array}{r} 7 \ 8 \ 9 \\ + 6 \ 4 \ 2 \\ \hline 1 \ 4 \ 3 \ 1 \\ \hline 1 \quad 1 \end{array}$$

Use place value counters to support those who are still struggling with the concept of column addition.

Up to: 9 999-9 999**Counting up to find a difference:**

$$700 - 187 = 513$$

**Compact column method:**

$$\begin{array}{r} 8 \quad 12 \quad 1 \\ 9 \quad 3 \quad 2 \\ - 4 \quad 5 \quad 7 \\ \hline 4 \quad 7 \quad 5 \end{array}$$

Use this link for ideas on how to use place value counters to develop a conceptual understanding of column subtraction:

<https://www.ncetm.org.uk/resources/46918>

Pupils should be taught to use their number sense to decide when to use which method. For example, the counting up method should be used when the minuend (first number in a subtraction) is a multiple of 100 or 1000, as it is much quicker than the column method, which would involve too much exchanging.

Up to: 999x9**Grid method:**

$$123 \times 5$$

$$\begin{array}{r|c|c|c} \times & 100 & 20 & 3 \\ \hline 5 & 500 & 100 & 15 \end{array}$$

$$\begin{array}{r} 500 \\ + 100 \\ + 15 \\ \hline 615 \end{array}$$

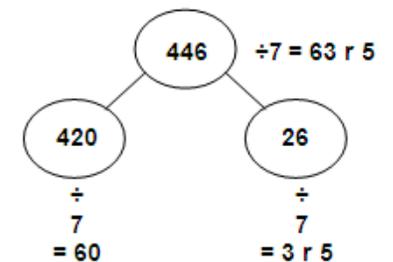
Summer term – Extended column method:

$$\begin{array}{r} 34 \\ \times 5 \\ \hline 20 \\ + 150 \\ \hline 170 \end{array}$$

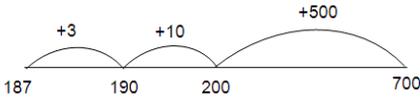
Up to 999÷9**Use times table knowledge:**

$$\begin{aligned} & 28 \div 7 = \underline{\quad} \\ \rightarrow & 7 \times 4 = 28 \\ \rightarrow & 28 \div 7 = 4 \end{aligned}$$

Support this method using arrays if children are still unsure about the relationship between multiplication and division.

Part-part-whole diagrams:**Summer term – Short division:**

$$\begin{array}{r} 1 \ 4 \\ 7 \overline{) 9 \ 8} \end{array}$$

				<p>Use this link for ideas on how to use place value counters to embed a concrete understanding of short division: https://www.ncetm.org.uk/resources/47393</p>
<p>Year 5</p> <p>Concrete resources to support understanding:</p> <p>Place value counters</p>	<p>Up to: 1 000 000 + 1 000 000</p> <p>Compact column method:</p> $\begin{array}{r} 7 \ 8 \ 9 \\ + 6 \ 4 \ 2 \\ \hline 1 \ 4 \ 3 \ 1 \\ \hline 1 \ 1 \end{array}$ <p>Use place value counters to support those who are still struggling with the concept of column addition.</p>	<p>Up to: 1 000 000 - 1 000 000</p> <p>Counting up to find a difference:</p> <p>$700 - 187 = 513$</p>  <p>Compact column method:</p> $\begin{array}{r} 8 \ 12 \ 1 \\ 9 \ 3 \ 2 \\ - 4 \ 5 \ 7 \\ \hline 4 \ 7 \ 5 \end{array}$ <p>Use this link for ideas on how to use place value counters to develop a conceptual understanding of column subtraction: https://www.ncetm.org.uk/resources/4691</p>	<p>Up to: 9 999 x 99</p> <p>Compact column methods:</p> <p>Short multiplication:</p> $\begin{array}{r} 2 \ 7 \ 4 \ 1 \\ \times \qquad \qquad 6 \\ \hline 1 \ 6 \ 4 \ 4 \ 6 \\ \hline 4 \ 2 \end{array}$ <p>Use this link for ideas on how to use place value counters to develop a conceptual understanding of short multiplication: https://www.ncetm.org.uk/resources/47171</p> <p>Long multiplication:</p> $\begin{array}{r} Q. \ 9 \ 5 \ 8 \\ \times 7 \ 3 \\ \hline 2 \ 8 \ 7 \ 4 \\ + 6 \ 7 \ 0 \ 6 \ 0 \\ \hline 6 \ 9 \ 9 \ 3 \ 4 \end{array}$	<p>Up to: 9 999 ÷ 9</p> <p>Short division:</p> $\begin{array}{r} 8 \ 6 \ r \ 2 \\ 5 \overline{) 4 \ 3 \ 2} \end{array}$ <p>Answer: 86 remainder 2</p> $\begin{array}{r} 4 \ 5 \ r \ 1 \\ 1 \ 1 \overline{) 4 \ 9 \ 6} \end{array}$ <p>Answer: $45 \frac{1}{11}$</p> <p>Use this link for ideas on how to use place value counters to develop a conceptual understanding of short division: https://www.ncetm.org.uk/resources/47393</p>

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Pupils should be taught to use their number sense to decide when to use which method. For example, the counting up method should be used when the minuend is a multiple of 100 or 1000 as it is much quicker than the column method, which would involve too much exchanging.

Year 6

Concrete resources to support understanding:

Place value counters

Up to:
10 000 000 + 10 000 000

Compact column method:

$$\begin{array}{r} 7 \quad 8 \quad 9 \\ + 6 \quad 4 \quad 2 \\ \hline 1 \quad 4 \quad 3 \quad 1 \\ \quad 1 \quad 1 \end{array}$$

Use place value counters to support those who are still struggling with the concept of column addition.

Up to:
10 000 000 - 10 000 000

Counting up to find a difference:

$$700 - 187 = 513$$

Compact column method:

$$\begin{array}{r} 8 \quad 12 \quad 1 \\ \cancel{9} \quad \cancel{3} \quad 2 \\ - 4 \quad 5 \quad 7 \\ \hline 4 \quad 7 \quad 5 \end{array}$$

Up to:
9 999 x 99

Compact column methods:
Short multiplication:

$$\begin{array}{r} 2 \quad 7 \quad 4 \quad 1 \\ \times \quad \quad \quad 6 \\ \hline 1 \quad 6 \quad 4 \quad 4 \quad 6 \\ \quad 4 \quad 2 \end{array}$$

Use this link for ideas on how to use place value counters to develop a conceptual understanding of short multiplication:
<https://www.ncetm.org.uk/resources/47171>

Up to:
9999 ÷ 99

Short division:

$$\begin{array}{r} 4 \quad 5 \quad r \quad 1 \\ 1 \quad 1 \overline{) 4 \quad 9 \quad 6} \\ \underline{4 \quad 9 \quad 6} \end{array}$$

Answer: $45 \frac{1}{11}$

$$\begin{array}{r} 8 \quad 6 \quad r \quad 2 \\ 5 \overline{) 4 \quad 3 \quad 2} \\ \underline{4 \quad 3 \quad 2} \end{array}$$

Answer: 86 remainder 2

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***Images in Year 1 and 2 sections are from Maths No Problem! Textbooks 1A, 1B, 2A and 2B**

Key Vocabulary by Year group

Year Group	Addition	Subtraction	Multiplication	Division
R	add, more, and, make, sum, total, altogether, score, double, one more, two more, ten more.	How many more to make? How many more is.....? One less, two less, ten less, fewer, difference between,	Sort, group, set, double, twice as big as.....	Half, share groups of, lots of.

Y1	add, more, plus, and, make, altogether, total, equal to, equals, double (equal addition), most, put together, more than, digit, number bonds, count on, number track, number line.	take, take away, less, minus, equal to, subtract, leaves, distance between, difference between, how many more, how many fewer / less than, most, least, count back , how many left, how much less is..?	groups of, lots of, times, array, altogether, multiply, count, twice as big, double	Half , share, share equally, one each, two each...., group, groups of, lots of, array, halve
Y2	add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary,inverse	equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back , how many left, how much less is_?difference, count on, strategy, partition, tens, units,inverse	groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated, double addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times... inverse	Half , share, share equally, one each, two each...., group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse
Y3	add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, vertical, _carry', expanded, compact,inverse	equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back , how many left, how much less is_? difference, count on, strategy, partition, tens, units exchange, decrease, hundreds, value, digit,inverse	groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, double column, row, commutative, sets of, equal groups, times, _times as big as, once, twice, three times..., partition, grid method, multiple, product, tens, units, value,inverse	Half , share, share equally, one each, two each...., group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple,inverse
Y4	add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on,number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary,increase, vertical, „carry“, expanded, compact, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths	equal to, take, take away, less, minus, subtract, leaves, distance between, inverse how many more, how many fewer / less than, most, least, count back , how many left, how much less is_? difference, count on, strategy, partition, tens, units exchange, decrease, hundreds, value, digit, decimal places, decimal point, tenths, hundredths, thousandths	groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated, double addition, array, column, row, commutative, groups of, sets of, lots of, equal groups, times, multiply, times as big as, once, twice, three times... partition, grid method, total, multiple, product, sets of, inverse , decimal places, decimal point, tenths, hundredths,	Half , share, share equally, one each, two each...., group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, „carry“, remainder, multiple, divisible by, factor, inverse , decimal places, decimal point, tenths, hundredths, thousandths

			thousandths	
Y5	<p>add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on ,inverse number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, „carry“, expanded, compact , vertical, thousands, hundreds, digits, inverse & decimal places, decimal point, tenths, hundredths, thousandths</p>	<p>equal to, take, take away, less, minus, subtract, leaves, distance, inverse between, how many more, how many fewer / less than, most, least, count back , how many left, how much less is_? difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point, decimal</p>	<p>groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, inverse, double column, row, commutative, sets of, equal groups, _times as big as, once, twice, three times..., partition, grid method, total, multiple, product, inverse, square, factor, integer, decimal, short/long multiplication, carry, cubed, digit, decimal places, decimal point, tenths, hundredths, thousandths</p>	<p>Half, share, share equally, one each, two each..., group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, „carry“, remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors, scaling composite number (non-prime) digit, decimal places, decimal point, tenths, hundredths, thousandths</p>
Y6	<p>add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, inverse, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, „carry“, expanded, compact , vertical, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths, millions</p>	<p>equal to, take, take away, less, minus, subtract, leaves, distance, inverse between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_? difference, count on, strategy, partition, tens, units exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point, decimal ,decimal point, tenths, hundredths, thousandths, millions</p>	<p>groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition ,inverse, double array, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times... partition, grid method, total, multiple, product, inverse, square, factor, integer, decimal, short / long multiplication, „carry“, tenths, hundredths, decimal, decimal places, decimal point, tenths, hundredths,</p>	<p>Half , share, share equally, one each, two each..., group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, „carry“, remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors, composite number (non-prime) common factor, percentages decimal places, decimal point, tenths, hundredths, thousandths, millions</p>

			thousandths, millions	
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