



Thorndon CE Primary School

Believe & Achieve



Maths Calculation Policy

Thorndon CE Primary School



Written Methods in Mathematics Guidance in progression

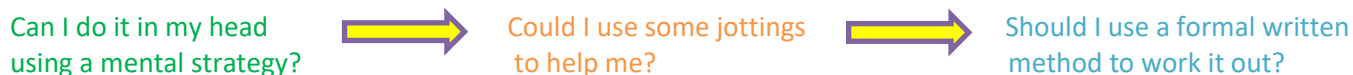
The following calculation policy has been devised to meet requirements of the National Curriculum Jan 2021 for the teaching and learning of mathematics, and is also designed to give pupils a consistent and smooth progression of learning in calculations across Thorndon Primary School. As a school we follow the Mathematical plans from White Rose Maths and therefore many of these methods have been chosen to follow in line with the methods taught within this scheme of work.

Age stage expectations: The calculation policy is organised according to age stage expectations as set out in the National Curriculum 2021 and the method(s) shown for each year group should be modelled to the vast majority of pupils. However, it is vital that pupils are taught according to the stage that they are currently working at, being moved onto the next level as soon as they are ready, or working at a lower stage until they are secure enough to move on.

Choosing a calculation method: At Thorndon Primary School we believe that children should be:

- Introduced to the processes of calculation through practical, oral and mental activities.
- Taught to develop ways of recording to support their concrete, pictorial and abstract thinking using jottings.
- Taught a formal calculation method when numbers are large or problem solving is more difficult mentally.

Before pupils opt for a written method they should first consider these steps:



Whilst every calculation will be taught in the same way, consideration must be given to the fact that children learn in different ways and may need to deviate from our agreed main strategies. All strategies are welcomed into our lessons and discussed as the children present them. If they are reliable and understood by the child then they will not be changed.

Calculation Variation: Providing children with a rich array of a variety of different calculation number sentences is an important part of our Maths curriculum at Thorndon Primary School. The document 'Operation Arithmetic' outlines the variation for all 4 calculations (addition, subtraction multiplication and division) for key stage 2 that should be taught throughout the year. Children will be taught to approach these different variations and will be familiar and confident with them all when they encounter the Arithmetic paper in year 6 during their end of year Sats. Each class in Key stage 2 will receive a 15 minute arithmetic maths meeting daily to practice their methods and become confident in their approaches.

Calculation methods are extremely important to us at Thorndon Primary School as it forms the basis of all that we do in our Maths work. Without mental and formal calculations children do not have the 'tools' to reason and problem solve. The aim of the following guidance therefore is to ensure:

'that every child has reliable mental and written methods to solve calculations and apply methods to problem solve and reason by the end of year 6.'



Year Reception – Maths Calculation Policy

Year Reception group coverage:

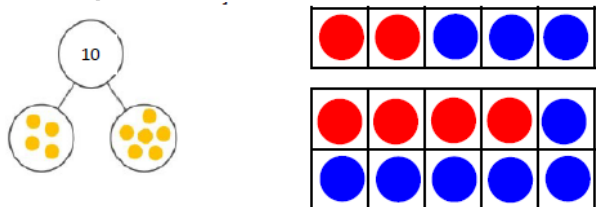
- Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer [within 10]
- Say one more and one less than a number

What adults could do:

- Use mathematical vocabulary and demonstrate methods of recording, using standard notation where appropriate
- Encourage children to make up their own story problems for other children to solve.

Addition

Have a deep understanding of number to 10, including the composition of each number, Composing numbers using concrete apparatus/natural materials/toys, such as five / ten frames [working within 10]



Addition as increasing by combining two or more groups using concrete apparatus. Children construct calculations verbally or using cards [encourage notations when appropriate]. Automatic recall of numbers bonds up to 5 and some number bonds to 10.



$$3 + 1 = 4$$

(Note children practice subitising numbers as they play)

Subitise (recognise quantities without counting) up to 5



Subitising

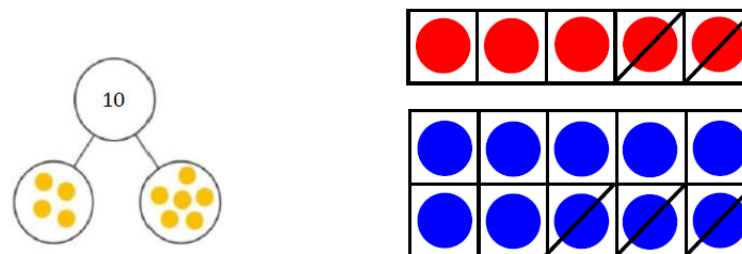
Number tracks can be used to support finding one more than a given number.



Vocabulary: add, plus, and, altogether, more, make, sum, total, how

Subtraction

Decomposing numbers using concrete apparatus/natural materials/toys, such as five / ten frames [within 10]



Subtraction as decreasing, taking away and finding the difference using concrete apparatus. Children construct calculations verbally or using cards [encourage notations when appropriate]



$$5 - 2 = 3$$

Number tracks can be used to support finding one less than a given number.



Vocabulary: add, plus, and, altogether, more, make, sum, total, how



Year Reception – Maths Calculation Policy

NON-negotiable year group coverage:

- Solve problems, including doubling, halving and sharing.

What adults can do:

- Use mathematical vocabulary and demonstrate methods of recording, using standard notation where appropriate.
- Talk about the methods children use to answer a problem they have posed, e.g. ‘Get one more, and then we will both have two.’
- Encourage children to extend problems, e.g. “Suppose there were three people to share the bricks between instead of two.”

Multiplication

Multiplication can be introduced through repeated addition and doubling related to real life contexts.

Can you double the amount of spots on the ladybird?



This can be extended to writing the calculation by using addition [$5+5=10$].

Exceeding expectation - Children solve practical problems that involve combining groups of 2, 5, or 10.

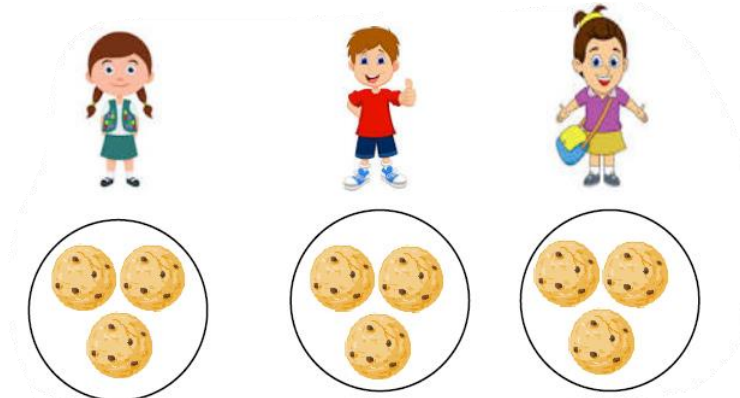
How many wheels are there altogether?



Division

Dividing by sharing into equal groups related to real life contexts.

There are 3 children and 12 biscuits. How many will each child have?



Dividing by practically halving an amount.



(children can show division using concrete apparatus and pictorial representations)

Vocabulary: Doubles, groups, ___ times , once, twice, lots of, groups of

Vocabulary: Doubles, groups, ___ times , once, twice, lots of, groups of



Year 1 – Mental Calculations

Year 1 coverage:

- number bonds ['story of' 2, 3, 4, 5, 6, 7, 8, 9 and 10]
- count forwards and backwards in ones from a given two-digit number
- count forwards and backwards in tens from any given two-digit number
- add and subtract ten from any given number
- add and subtract one single digit with another single digit
- add three single digits, spotting pairs which make 10
- find one more and one less
- count to and across 100, forwards and backwards
- add by putting the largest number first

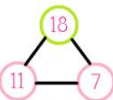
- represent and use number bonds and related subtraction facts within 20
- Understand the concept of equality for the = sign [$2 = 1 + 1$ / $2 + 3 = 4 + 1$] begin to count in multiples of 2s, 5s and 10s
- begin to say what three times 5 is by counting in 5s
- double numbers to 10
- find half of even numbers up to 12 and know it is hard to halve odd numbers
- find half of even numbers by sharing
- Begin to use concrete and pictorial representations of 'groups of' to find how many sets of a small number make a greater number

Addition

Using place value

1	2	3	4	5	6
11	12	13	14	15	16
21	22	23	24	25	26
31	32	33	34	35	36
41	42	43	44	45	46

$23 + 10 = 33$



Using number facts

$$\begin{array}{l} 11 + 7 = 18 \\ 7 + 11 = 18 \\ 18 - 11 = 7 \\ 18 - 7 = 11 \end{array}$$

Counting on

Count on in ones eg. $11 + 2$

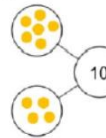
Count on in tens eg. $45 + 20$ as 45, 55, 65



(Ten frames / part-part whole)



$$\begin{array}{l} 6 + 4 = 10 \\ 4 + 6 = 10 \\ 10 - 4 = 6 \\ 10 - 6 = 4 \end{array}$$



$$\begin{array}{l} 6 + 4 = 10 \\ 4 + 6 = 10 \\ 10 - 4 = 6 \\ 10 - 6 = 4 \end{array}$$

Multiplication

Counting in steps

 Count in 2s and 10s

Doubling and halving

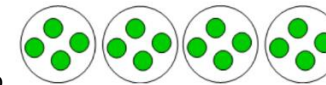
Find doubles to double 6 using fingers

Grouping

Begin to use visual and concrete apparatus to

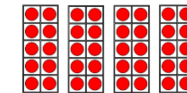
answers to

'3 lots of 4'



or

'4 lots of 10' etc.



find the

Subtraction

Using place value

2	3	4	5	6
12	13	14	15	16
22	23	24	25	26
32	33	34	35	36
42	43	44	45	46

$24 - 10 = 14$

Taking away

Count back in ones eg. $14 - 5$

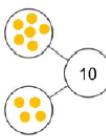
Count back in tens eg. $35 - 20$ as 35, 25, 15



(Ten frames / part-part whole)



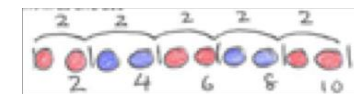
$$\begin{array}{l} 6 + 4 = 10 \\ 4 + 6 = 10 \\ 10 - 4 = 6 \\ 10 - 6 = 4 \end{array}$$



$$\begin{array}{l} 6 + 4 = 10 \\ 4 + 6 = 10 \\ 10 - 4 = 6 \\ 10 - 6 = 4 \end{array}$$

Division

Counting in steps

 Count in 2s and 10s

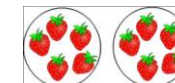
Doubling and halving

 Find half of numbers up to 12

Grouping

Begin to use visual and concrete arrays and 'sets of' objects to find the answers to 'How many towers of 3 can I make with 12 cubes?'

Sharing Begin to find $\frac{1}{2}$ of a quantity using sharing eg. I have 10 strawberries and share them with my friend. How many do we have each?





Year 1 – Maths Calculation Policy

Year 1 group coverage:

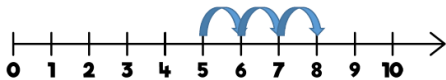
- read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one step problems that involve addition and subtraction, using concrete apparatus and pictorial representations

Addition

Number line to add the smallest number to the greatest number.

(number lines are marked and jumps are made on the top of the number line – number lines start from 0)

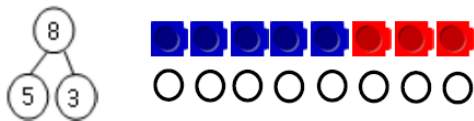
$$5 + 3 = 8$$



Part-part whole circles and concrete apparatus to add.

Children begin with using concrete apparatus to represent a given calculation eg. Unifix cubes [0-10] and base ten [11-100]. Once this is secure, children can move on to drawing pictorial representations. Children will combine two sets of objects (aggregation) and move on to adding to a set (augmentation).

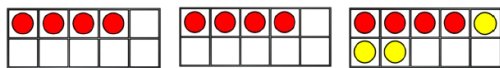
$$5 + 3 = 8$$



First

Then

Now



$$4 + 3 = 7$$

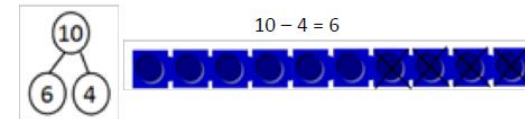


$$18 + 2 = 20$$

Vocabulary: add, and, altogether, more, total, whole number, partition, is the same as/ equal to [equals sign], tens and ones, part-part whole circles, number bonds, how many more to make?

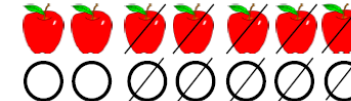
Subtraction

Part-part whole circles and concrete apparatus to subtract.

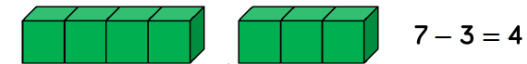


Pictorial representations using crossing out.

$$7 - 5 = 2$$



Physically moving object to take away an amount.

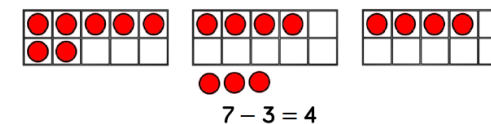


$$7 - 3 = 4$$

First

Then

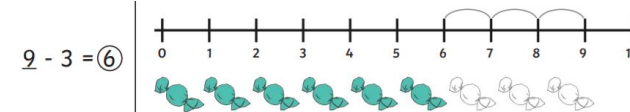
Now



$$7 - 3 = 4$$

Number line to subtract by counting backwards from the greatest number

(when subtracting, backwards jumps are made)



$$9 - 3 = 6$$

Vocabulary: subtract, take away, minus, leave, less, left over, tens and one, how many are left? How many are gone? Find the difference.



Year 1 – Maths Calculation Policy

Year 1 group coverage:

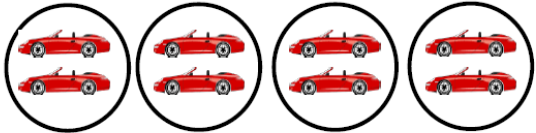
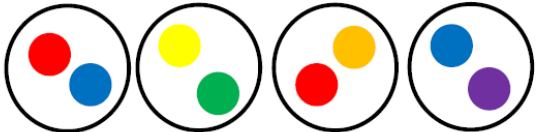
- count in multiples of twos, fives and tens
- show that multiplication of two numbers can be done in any way (commutative) and division of one number can by another cannot
- solve one step problems involving multiplication and division, by calculating the answer using concrete apparatus, pictorial representation and arrays with the support of the teacher

Multiplication


Making equal groups to multiply a one-digit number by 2, 5 and 10.

(children start off with concrete apparatus and pictorial representations and move on to abstract concrete apparatus)


$4 \times 2 = 8$


$3 \times 5 = 15$



$4 \times 5 = 20$



$5 \times 10 =$

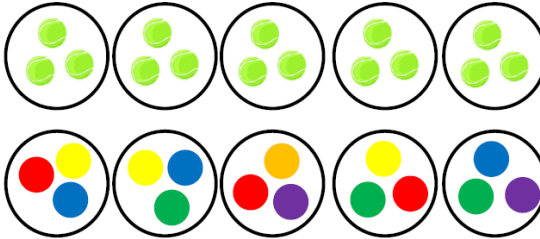


Division

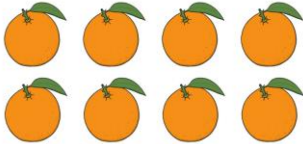
Sharing into equal groups to divide by 2, 5 and 10.

(children start off with concrete apparatus and pictorial representations and move on to abstract concrete apparatus)

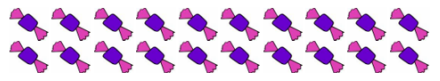
$15 \div 5 = 3$




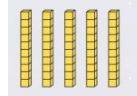
Two friends share these oranges, how many do they get each?



Divide these sweets into 5 equal groups.



$20 \div 5 =$

How many 10's are there in 40?

Vocabulary: multiply, multiplication, lots of, groups of, repeat, same size

Vocabulary: multiply, multiplication, lots of, groups of, repeat, same size



Year 2 – Mental Calculations

Year 2 coverage:

- number bonds [‘story of’ up to 12, and pairs with a total of 20]
- add and subtract numbers mentally, including: a two digit number and ones [which includes bridging the tens]; a two digit number and tens; two two digit numbers; adding three one digit numbers
- add and subtract 10 and small multiples of 10 from any given number
- partitioning a number in different ways to support addition and subtraction [taken from Place Value]
- use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- count in steps of 2 and 5 starting from zero; count in steps of 10 from any number forwards and backwards
- begin to count in 3s

- begin to learn the 2x 3x, 5x and 10x tables, seeing these as ‘lots of’ eg. 5 lots of 2
- using fingers, say where a given number is in the 2s, 5s or 10s times tables
- double and halve numbers to 20
- begin to double multiples of 5, to 100
- begin to double two-digit numbers less than 50 with ones digits of 1, 2, 3, 4 or 5
- show that multiplication of two numbers can be done in any way (commutative) and division of one number can by another cannot
- relate division to grouping [how many groups of 5 in 15?]

Addition

Using place value

55 + 37 is 50 + 30 and 5 + 7, combining the two totals.

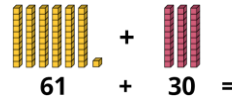
$$\begin{array}{|c|c|} \hline 5 & 0 \\ \hline \end{array} + \begin{array}{|c|c|} \hline 3 & 0 \\ \hline \end{array} = 80$$

$$\begin{array}{|c|} \hline 5 \\ \hline \end{array} + \begin{array}{|c|} \hline 7 \\ \hline \end{array} = 9$$

Counting on

Add multiples of 10 eg. 61 + 30 as 61, 71, 81, 91

Add two-digit numbers by counting on in tens and ones eg. 38 + 23

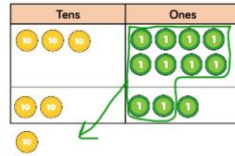


Using number facts

Patterns of known facts eg. If 6 + 3 = 9 then we know 16+3=19, 26+3=29,

Bridging tens eg. 57 + 5 as 57 + 3 + 2

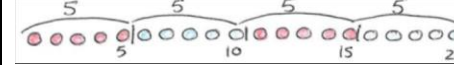
Adding three single digits by spotting number bonds to 10 or doubles eg. 6 + 7 + 4 + 2 = 10 + 7 + 2



Multiplication

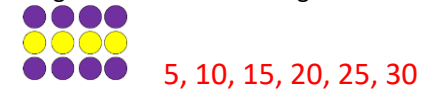
Counting in steps

Count in 2s, 5s and 10s Begin to count in 3s



Doubling and halving Begin to know double of multiples of 5 to 100 eg. double 35 is 70

Grouping Use arrays to find answers to multiplication and relate to times tables eg. 3 x 4 as three lots of four things and 6 x 5 as counting in fives six times.



Using number facts Know doubles to double 20

Start learning 2x, 5x and 10x times tables eg. 2 x 5 = 10, 3 x 5 = 15, 4 x 5 = 20

Subtraction

Using place value

55 - 32 is 50 - 30 and 5 - 2, combining the two totals

Taking away

Subtract multiples of 10 eg. 76-20 as 76, 66, 56

Subtract two-digit numbers by counting **back** in tens and ones eg. 67 - 32

Using number facts Patterns of known facts

eg. If 9 - 6 = 3 then we know 39+6=33, 69-6=63,

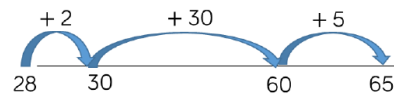
Bridging tens eg. 34 - 6 as 34 - 2 - 4

Counting up Find a difference between two numbers on a line by counting on eg. 65-28.

$$\begin{array}{|c|c|} \hline 5 & 0 \\ \hline \end{array} - \begin{array}{|c|c|} \hline 3 & 0 \\ \hline \end{array} = 20$$

$$\begin{array}{|c|} \hline 5 \\ \hline \end{array} - \begin{array}{|c|} \hline 2 \\ \hline \end{array} = 3$$

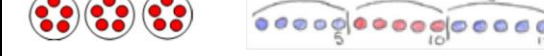
$$34 - 6 \text{ as } 34 - 4 - 2$$



Division

Counting in steps

Count in 2s, 5s and 10s



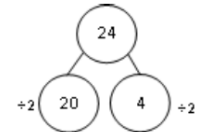
Doubling and halving Find half of numbers up to 40

Begin to know half of multiples of 10 to 100 eg. half of 50 is 35

Grouping Relate division to multiplication by using arrays or towers of cubes to find answers to division eg. how many towers of 5 cubes can I make from 20 cubes as $5 \times 20 = 20$ is the same as $20 \div 5 = ?$

Sharing Find $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ of small quantities eg. $\frac{1}{4}$ of 16 cubes by sorting the cubes into 4 piles

Using number facts Know halves of even numbers to 24 Know 2x, 5x and 10x division facts and begin to know 3x division facts.





Year 2 – Maths Calculation Policy

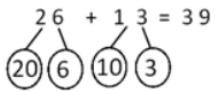
Year 2 group coverage:

- add and subtract numbers using concrete objects and pictorial representations, including: a two-digit numbers and ones; a two-digit number and tens; two two-digit numbers [recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers]
- solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures; applying their increasing knowledge of mental and formal methods.

Addition

Partitioning numbers in different ways to add two two-digit numbers.

Without exchanging



$$6 + 3 = 9$$

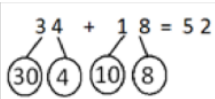
$$20 + 10 = 30$$



$$30 + 9 = 39$$

(children must be taught to always start with the ones)

With exchanging



$$4 + 8 = 12$$

$$30 + 10 = 40$$



$$40 + 12 = 52$$

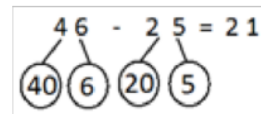
Children will use any apparatus familiar to them, place value counters or dienes. Learning to exchange when the number exceeds 10

Vocabulary: plus, altogether, sum, total, increase, partition, inverse, greatest, smallest, exchange, is the same as/equal to [equals sign], part part whole circles.

Subtraction

Partitioning numbers in different ways to subtract two-digit numbers from two-digit numbers.

Without exchanging



$$6 - 5 = 1$$

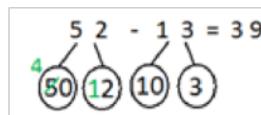
$$40 - 20 = 20$$



$$20 + 1 = 21$$

(children must be taught to always start with the ones)

With exchanging



$$2 - 3 = 9$$

$$40 - 10 = 30$$



$$30 + 9 = 39$$

(children make the greatest number and subtract the smallest number)

Children will use any apparatus familiar to them, place value counters or dienes. Learning to exchange when a number crosses the ten.

Vocabulary: subtract, subtraction, minus, take, less, inverse, decrease, greatest, smallest, difference, fewer than., exchange, part-part whole circles.
Borrowing should not be used as a term because it implies that the borrowed number needs to go back. Instead please use the term 'take'



Year 2 – Maths Calculation Policy

Year 2 group coverage:

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) signs
- solve problems involving multiplications and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in contexts
- recognise and use the inverse relationship between multiplication and division and use this to check calculations and solve missing number problems.

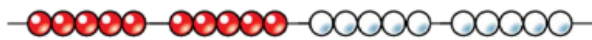
Multiplication

Grouping to multiply within known times tables.

$$3 \times 6 = 18$$



$$4 \times 5 = 20$$



$$4 \times 10 = 40$$



Children can move on to creating arrays to show multiplication. This can be used to show how multiplication and division link.



$$4 \times 3 = 12 \quad 12 \div 3 = 4$$

$$12 = 4 \times 3 \quad 12 \div 4 = 3$$

$$3 \times 4 = 12 \quad 3 = 12 \div 4$$

Vocabulary: lots of, groups of, repeat, times, multiply, multiplied by, multiple of, array, row, column, double.

Division

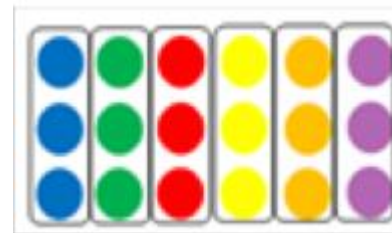
Grouping/sharing to divide within known times tables. Children to use counters/materials as a concrete apparatus and move on to drawing a pictorial representation.

$$18 \div 3 = 6$$

Sharing out to three groups.



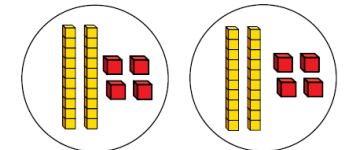
Grouping into 3's



(ensure that children understand that grouping and sharing produce the same answer)

Sharing using dienes/place value counters.

$$48 \div 2 = 24$$



Vocabulary: sharing, into groups, halve, share, one each... two each... three each etc. divided by, divided onto, left over, how many groups?



Year 3 – Mental Calculations

Year 3 coverage:

- number bonds [‘story of’ numbers up to 20]
- number bonds of multiples of 10 with a total of 100
- partitioning a number of different ways to support addition and subtraction [$300 + 8 + 50 = 358$ / $536 - 30 = 506$]
- find 10 or 100 more or less than a given number
- add and subtract numbers mentally, including: a three-digit number and ones, tens and hundreds.
- subtract two-digit number from numbers >100 by counting up when appropriate
- add and subtract 9 and 11 by adjustment
- add pairs of ‘friendly’ three-digit numbers [$320 + 450$]
- Use addition and subtraction facts [$9 - 7 = 2$] to derive related facts [$89 - 7 = 82$] start with greatest first in adding.

- count for 0 in steps of 4, 8, 50 and 100 [*pupils should now know and use multiples of 2, 3, 4, 5, 8, 10, 50 and 100*]
- through doubling, they connect the 2, 4 and 8 multiplication tables
- multiply and divide whole numbers by 10 and 100
- use place value and number facts in mental multiplication and division [20×5 is 15×10 / $84 \div 4$ is half of 42]
- partition teen numbers to multiply by a single digit [3×14 is 3×10 add 3×4]
- show that multiplication of two numbers can be done in any way (commutative) and division cannot
- double numbers up to 50
- halve even numbers to 100, halve odd numbers to 20
- use multiplication and division facts [$3 \times 2 = 6$ so $6 \div 3 = 2$] to derive related facts [$30 \times 2 = 60$ so $60 \div 3 = 20$]

Addition

Using place value

Count in hundreds eg. knowing $475 + 200$ as 475, 575, 675

Add multiples of 10, 100 and £1 eg. $746 + 200$ or $746 + 40$

$68 + 74$ as $60 + 70$ and $8 + 4$, combining the two totals.

$$\begin{array}{r} 60 + 70 = 130 \\ 8 + 4 = 12 \\ \hline = 142 \end{array}$$

Counting on

Add a three-digit and two-digit numbers by adding h, t and o eg. $125 + 34$ as $100 + 20 + 30 + 5 + 4$

Add near multiples of 10 and 100 eg. $67 + 39$ as $(67 + 40) - 1$

Using number facts

Number bonds to 100 eg. $65 + 35$, $47 + 53$, $71 + 29$ etc.

Adjustment when adding 9 and 11 eg. $27 + 9$ as $(27 + 10) - 1$ or $36 + 11$ as $(36 + 10) + 1$

15	80	20	70	30	50
50	40	60	10	90	0
100	30	70	80	20	45
55	15	85	35	65	95
5	55	45	5	95	15
85	25	75	45	55	75
25	95	5	15	85	75

Number bonds to 100

Multiplication

Count in steps – sequences

Count in 2s, 3s, 4s, 5s, 8s and 10s daily

eg. Colour the multiples on a 100 square or jumps on a landmarked number line.

Multiples of 3

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Doubling and halving

Find doubles to double 50 using partitioning

Use doubling as a strategy in multiplying by 2 eg. 18×2 is double 18.

Grouping

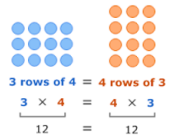
Recognise that multiplying is commutative eg. $8 \times 4 = 4 \times 8$

Multiply multiples of 10 by a single-digit eg. $30 \times 8 = 240$ ($3 \times 8 = 24$)

Multiply friendly two-digit numbers by single digit numbers eg. 13×4

Using number facts Know 2x, 3x, 4x, 5x, 8x and 10x

Commutative law



Subtraction

Using place value Count back in hundreds eg. knowing $372 - 200$ as 372, 272, 172 Subtract multiples of 10, 100 and £1 eg. $476 - 40 = 436$ or $436 - 300 = 136$

$348 - 143$ as $300 - 100$, $40 - 40$ and $8 - 3$, combining three totals.

Counting back

Subtract two three-digit numbers by counting back in h, t and o eg. $763 - 121$ as $763 - 100 - 20 - 1$

Subtract near multiples of 10 and 100 eg. $648 - 199$ as $(648 - 200) + 1$

Counting up

Find the difference between two numbers by counting up from the smaller to larger eg. 121-87

Using number facts

Number bonds to 100 eg. $100 - 35 = 65$, $100 - 48 = 52$ etc.

$$\begin{array}{r} 300 - 100 = 200 \\ 40 - 40 = 0 \\ 8 - 3 = 5 \\ \hline = 205 \end{array}$$

Nearest multiple of 10

68	-	11	=	7
68	-	10	=	58
58	-	1	=	57

Division

Count in steps – sequences

Count in 2s, 3s, 4s, 5s, 8s and 10s eg. colour the multiples on a 100 square or make jumps on a landmarked number line

Doubling and halving

Find half of even numbers to 100, using partitioning. Use halving as a strategy in dividing by 2 eg. $36 \div 2$ is half of 36

Grouping

Recognise that dividing is not commutative eg. $16 \div 2$ is not equal $2 \div 16$

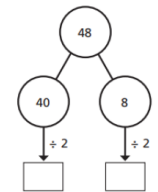
Relate division to multiplication ‘with holes in’ eg. $x \times 5 = 30$ is the same as $30 \div 5 = ?$ therefore we can count in 5s to find the answer

Divide multiples of 10 by a single-digit eg. $240 \div 8 = 30$ ($24 \div 8 = 3$)

Using number facts

Know half of even numbers to 40 and of 0 to 200 eg. half of 170 is 85

Know 2x, 3x, 4x, 5x, 8x and 10x division facts





Year 3 – Maths Calculation Policy

Year 3 group coverage:

- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.
- estimate the answer to a calculation and use inverse operations to check answers.
- solve problems, including missing number problems, using number facts, place value and more complex addition and subtraction.

Addition

Compact column addition to add numbers with up to 3 digits. Children build the numbers using dienes/place value counters. Demonstrate the column addition alongside the visual representation of the numbers.

Without exchanging

	h	t	o
	2	1	5
+	1	3	2
<hr/>			
	3	4	7

	h	t	o
	■	■	■
+	■	■	■
<hr/>			
=	3	4	7

With exchanging.

Hundreds	Tens	Ones
● ● ●	● ● ● ● ● ● ● ●	● ● ● ●
● ●	● ● ●	● ● ● ● ● ●

Hundreds	Tens	Ones
● ●	● ● ●	● ● ● ● ● ●

	h	t	o
	3	8	3
+	1	3	7
<hr/>			
	4	1	0

Subtraction

Compact column subtraction to subtract numbers with up to 3 digits. Children build the numbers using dienes/place value counters. Demonstrate the column subtraction alongside the visual representation of the numbers.

Without exchanging

Hundreds	Tens	Ones
● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●
● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●

Hundreds	Tens	Ones
● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●
● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●

	h	t	o
	6	5	2
-	1	3	7
<hr/>			
	4	4	5

With exchanging

Hundreds	Tens	Ones
● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●
● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●

Hundreds	Tens	Ones
● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●
● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●

	h	t	o
	3	7	3
-	1	3	5
<hr/>			
	2	3	8

Vocabulary: Add, addition, plus, and, altogether, more, sum, total, increase, number line, count on, partition, inverse, how many more to make? How many more is ___ than ___? Hundreds, tens, ones, column method.

Vocabulary: subtract, subtraction, take away, less, how many are left/left over? Inverse, decrease, difference, fewer than, more than, hundreds, tens, ones, boundary, how much less is ___ than ___? written method.

Borrowing should not be used as a term because it implies that the borrowed number needs to go back. The term 'take' should be used instead



Year 3 – Maths Calculation Policy

Year 3 group coverage:

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables they know, including a two digit number times a one digit number, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems which n objects are connected to m objects

Multiplication

$15 \times 3 = 45$

 $10 \times 3 = 30$
 $5 \times 3 = 15$

Multiply by expanded column method first, followed by short multiplication when confident.

	H	T	O	
		3	4	
x			5	
		2	0	(5 x 4)
+	1	5	0	(5 x 30)
	1	7	0	

	H	T	O
		3	4
x			5
	1	7	0
	1	2	

VIB

- 6
- 12
- 18
- 24
- 30
- 36
- 42

Introduce a VIB to the children who find times tables recall difficult. Children write out the list of multiples in their VIB to 'offload' some of the difficult processing when multiplying. Using finger counting if needed.

Vocabulary: lots of groups, repeat, times, multiply, multiplied by, multiple of, double, part-part whole circles.

Division

Grouping to divide two-digit numbers by one-digit numbers.

Sharing with exchanges

Tens	Ones
10	1 1 1
10	1 1 1
10	1 1 1
10	1 1 1

Bus stop introduced with no exchanges or remainders if confident.

$$3 \overline{) 96}$$

Sharing with a remainder

Tens	Ones
10	1 1 1
10	1 1 1
10	1 1 1
10	1 1 1

Simple exchanges added in when confident

$$4 \overline{) 52}$$

Vocabulary: equal, halve, equal groups of, divided by, divided into, how many groups? regrouping, part-part whole circles.



Year 4 – Mental Calculations

Year 4 coverage:	
<ul style="list-style-type: none"> • know by heart/quickly derive number bonds to 100 and to £1 [add to the next hundred and pound] • find 1000 more or less than a given number • count backwards through zero to include negative numbers • round any number to the nearest 10, 100 or 1000 • add and subtract any two-digit numbers by partitioning or counting on • add and subtract multiples of 10, 100 and 1000 to two-digit and three-digit numbers • add and subtract £1, 10p and 1p to amounts of money • derive quickly doubles of multiples of 10 up to 500 eg. 360+360 • use place value and number facts to add one, two, three and four-digit numbers with a mental calculation. • subtract by counting up • count from 0 in steps of 6, 7, 9 25 and 1000 [<i>children should know all the multiplication facts up to 12x12</i>] 	<ul style="list-style-type: none"> • use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; • multiplying by 10 and 100; dividing by 1; multiplying three numbers. multiply multiples of 10, 100, 1000 by single digit numbers [300 x 6 or 4000 x 8] • use distributive law to multiply larger numbers [36 x 5 could be 30 x 5 and 6 x 5] • adjustment by spotting 'nearly' numbers eg 6 x 19 is nearly 6 x 20 • recognise factors up to 12 of two-digit numbers. • use understanding of place value and number facts in mental multiplication [36 x 5 is half of 36 x 10 and 50 x 60 = 3000] • partition 2-digit numbers to multiply by a single-digit number mentally [4 x 24 as 4 x 20 and 4 x 4] • multiply near multiples using rounding [33 x 19 as 33 x 20 – 33] • find doubles to double 100 and beyond using partitioning • begin to double amounts of money [£35.60 doubled = £71.20] • show that multiplication is commutative and division is not.
Addition	Multiplication
<p>Using place value <i>Count in thousands</i> eg. knowing 1475+2000 as 1475, 2475, 3475. <i>Add multiples of 10, 100 and £1</i> eg. 746+200 or 746+40 <i>Partitioning</i> eg. 746 + 203 as 700 + 200 and 46 + 3 or 746 + 200 + 3</p> <p>Counting on <i>Add a three-digit and four-digit numbers by adding th, h, t, o</i> eg. 2452 + 321 as 2452 + 300 + 20 + 1 <i>Add near multiples of 10, 100 and 1000</i> eg. 3462 + 2999 as (3462 + 3000) – 1</p> <p>Using number facts <i>Number bonds to 100 and to the next multiple of 100</i> eg. 1353 + 47. <i>Adjustment when adding 9 and 11</i> eg. 27 + 9 as (27 + 10) – 1 or 36 + 11 as (36 + 10) + 1</p>	<p>Count in steps – sequences <i>Count in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 11s, 12s, 25s, 50s, 100s and 1000s</i></p> <p>Doubling and halving <i>Find doubles to double 100 and beyond using partitioning, using derived facts</i> <i>Begin to double amounts of money</i> eg. £3.50 doubled is £7 <i>Use doubling as a strategy in multiplying by 2, 4 and 8</i> eg. 34 x 4 is double 34 and double again.</p> <p>Grouping <i>Use partitioning to multiply two-digit numbers by single-digit numbers</i> <i>Multiply multiples of 100 by single-digit numbers using table facts</i> eg. 400 x 8 = 3200 (4 x 8 = 32) <i>Multiply using near multiples by rounding</i> eg. 24 x 19 as (24x20) = 24</p> <p>Using number facts <i>Know times tables up to 12x12</i></p>
<p>Partitioning method</p> <p>2452 + 321</p> <p>2452 + 300</p> <p>2752 + 20</p> <p>2772 + 1</p> <p>2773</p>	<p>Multiply multiples of 100</p> <p>400 x 8</p> <p>4 x 8 = 32</p> <p>So 400 x 8 is</p> <p>3200</p>
Subtraction	Division
<p>Using place value <i>Count back in thousands</i> eg. 4378-3000 as 4378, 3378, 2378, 1378 <i>Take away multiples of 10, 100, 1000 and £1</i> eg. 8392-50 or 6723-3000 <i>Partitioning</i> eg. £5.87 - £3.04 as £5 - £3 and 7p – 4p or 7493 – 2020 as 7000-2000 and 90-20</p> <p>Counting back <i>Count back</i> eg. 6482 – 1301 as 6482 – 1000 then – 300 then - 1 <i>Subtract near multiples of 10, 100 and 1000</i> eg. 3522 - 1999 as (3522 - 2000) + 1</p> <p>Counting up <i>Find a larger difference between two numbers by counting up from the smaller number to the larger number</i> eg. 1506 – 387</p> <p>Using number facts <i>Number bonds to 100 and to the next multiple of 100</i> eg. 100-76 = 24 <i>Adjustment when adding 9 and 11</i> eg. 27 - 9 as (27 - 10) +1 or 36 - 11 as (36 - 10) - 1</p>	<p>Count in steps – sequences <i>Count in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 11s, 12s, 25s, 50s, 100s and 1000s</i></p> <p>Doubling and halving <i>Find halves of even numbers to 200 and beyond using partitioning, using derived facts</i> <i>Begin to halve amounts of money</i> eg. £9 halved is £4.50 <i>Use halving as a strategy in dividing by 2, 4 and 8</i> eg. 164 ÷ 4 is half of 164 and halved again.</p> <p>Grouping <i>Use multiples of 10 times the divisor to divide by numbers <10</i> eg. 45 ÷ 3 as 30 ÷ 3 and 15 ÷ 3. <i>Divide multiples of 100 by single digits numbers using division facts</i> eg. 3200 ÷ 8 = 400</p> <p>Using number facts <i>Know times tables up to 12x12 and all related division facts</i> <i>Use division facts to find unit and non-unit fractions of amounts</i></p>



Year 4 – Maths Calculation Policy

Year 4 group coverage:

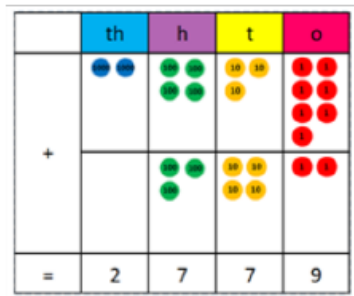
- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

Addition

Compact column addition to add numbers with up to 4 digits.

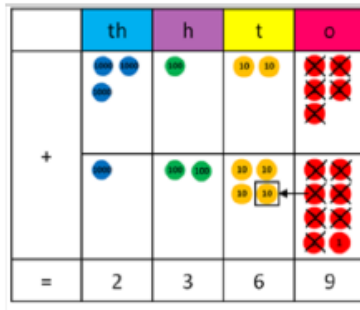
Without exchanging

	th	h	t	o
	2	4	3	7
+		3	4	2
	2	7	7	9



With exchanging

	th	h	t	o
	3	1	2	5
+	1	2	3	6
	4	3	6	1



Lower ability children encouraged to use fingers to count up.

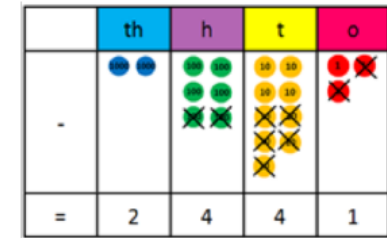
Vocabulary: add, addition, plus, make, more, sum, total, increase, inverse, altogether, how many more to make __? How many more is ___ than ___? partition, thousands, hundreds, tens, ones, count on, exchange, column method.

Subtraction

Compact column subtraction to subtract numbers with up to 4 digits.

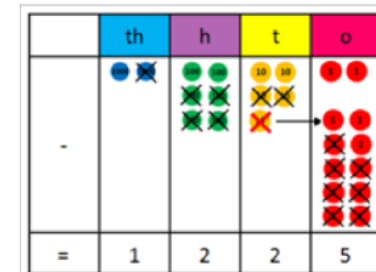
Without exchanging (crossing out)

	th	h	t	o
	2	6	9	3
-		2	5	2
	2	4	4	1



With exchanging

	th	h	t	o
	2	6	5	2
-	1	4	2	7
	1	2	2	5



Lower ability children encouraged to use fingers to find a difference through counting up.

Vocabulary: subtract, subtraction take away, minus, decrease, leave, how many are left/left over? More than, fewer than, difference, tens/hundreds boundary, how much more/less is __?, inverse, column method.

Borrowing should not be used as a term because it implies that the borrowed number needs to go back. Use the term 'take' instead.



Year 4 – Maths Calculation Policy

Year 4 group coverage:

- recall multiplication and division facts for multiplication tables up to 12×12
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- divide a three-digit number by a one-digit number
- estimate and use inverse operations to check answers to a calculation
- solve problems involving multiplying and dividing, including the distributive law to multiply a two-digit number by a one digit number, integer scaling problems and harder correspondence problems such as n objects are connecting to m objects.

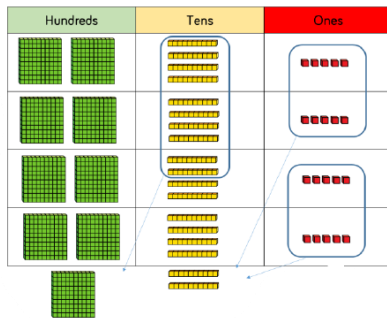
Multiplication

Multiply 2 and 3 digit numbers by a unit using short multiplication.

	H	T	O	
		3	4	
x			5	
	1	7	0	
	1	2		

	H	T	O	
	2	4	5	
x			4	
	9	8	0	
	1	2		

<u>VIB</u>	
	8
	16
	24
	32
	40
	48
	56



Introduce a VIB to the children who find times tables recall difficult. Children write out the list of multiples in their VIB to 'offload' some of the difficult processing when multiplying. Using finger counting if needed.

Vocabulary: lots of, groups, repeat, times, multiply, steps of, multiplied by, multiple of, double, product, expanded short multiplication.

Division

Short division of 2-digit and 3-digit number by single digit numbers.

Without regrouping

$$\begin{array}{r} 213 \\ 3 \overline{) 639} \end{array}$$

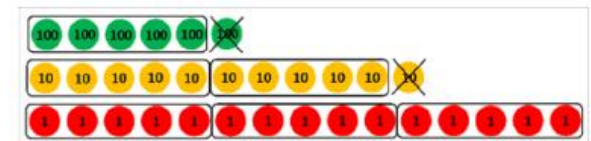


(ensure children are grouping not sharing)

<u>VIB</u>	
	7
	14
	21
	28
	35
	42
	49

With regrouping

$$\begin{array}{r} 123 \\ 5 \overline{) 615} \end{array}$$



(children could use concrete counters or draw working out as a pictorial representation)

NB Children can be exposed to remainders at this stage but it should not act as a specific teaching point until Year 5. Use a VIB for more difficult times tables.

Vocabulary: sharing, share equally, into groups, equal, divided by, divided into, left over, remainder, how many groups, divisible by, how many ___ go into ___? inverse, quotient, divider, short division, regrouping



Year 5 – Mental Calculations

Year 5 coverage:	
<ul style="list-style-type: none"> • add and subtract numbers mentally with increasingly large numbers • know number bonds to 1 and to the next whole number • add to the next 10 from a decimal number, e.g. $13.6 + 6.4 = 20$ • add and subtract numbers with two significant digits only, using mental strategies [3.4 + 4.8 or 23,000 + 47,000 / 6.2-4.5 or 72,000-47,000] • add and subtract one or two-digit multiples of 10, 100, 1000, 10,000 and 100,000 [8000 + 7000 or 600,000 + 700,000 / 8000-3000 or 600,000-200,000] • add and subtract near multiples of 10, 100, 1000, 10,000 and 100,000 to other numbers [82,472 + / - 30,004] • add and subtract decimal numbers which are near multiples of 1 or 10, including money [6.34 + / - 1.99 or £34.59 + / - £19.95] • use counting up subtraction with knowledge of number bonds to 10/100 or £1 [£10-£3.45] • use place value and number facts to add two or more friendly numbers including money and decimals. [3 + 8 + 6 + 4 + 7, 0.6 + 0.7 + 0.4, or 2,056 + 44] 	<ul style="list-style-type: none"> • know by heart all of the multiplication and division facts up to 12x12 • multiply and divide whole numbers and those involving decimals by 10, 100, 1000 and 10,000 • recognise and use square numbers and cube numbers, and the notation for squared and cubed • use doubling and halving as mental multiplication and division strategies [58x5 is equal to (58x10) ÷ 2 / 34 ÷ 5 is equal to (34 ÷ 10) x 2] • identify and use knowledge of multiples and factors, including finding all factor pairs of a number, and common factors of two numbers • use partitioning to double and halve, including money • partition two-digit numbers, including decimals, to multiply by a single-digit number mentally [6x27 as 6x20 + 6x7 / 6.3x7 as 6x7 + 0.3x7] • divide larger numbers mentally by subtracting the 10th and 100th multiple as appropriate [96÷10 is 10x6=60 and 6x6=36] • use common factors to simplify fractions; use common multiples to express fractions in the same denomination
Addition	Multiplication
<p>Using place value Count in steps of 10, 100, 1000, 0.1s, 0.01s from any given number. Partitioning eg. 7348 + 2187 as 7348 + 2000 + 100 + 80 + 7 or 2.4 + 5.8 as 2 + 5, 0.4 + 0.8 and combine the totals together.</p> <p>Counting on Count on from the greatest number eg. 6834 + 3005 as 9834 + 5 Add near multiples eg. 82,472 + 30,004 as (82,472 + 30,000) + 4 Add two decimal numbers by adding the o then ths then hths eg. 5.72 + 3.05 as 5.72 + 3 + 0.5</p> <p>Using number facts Know number bonds to 1 and to the next whole number eg. 0.4 + 0.6 or 5.7 + 0.3 Add to the next 10 from a decimal number eg. 7.8 + 2.2 = 10</p>	<p>Doubling and halving Use double and halving strategies when multiplying by 2, 4, 8, 5 and 20 Double amounts of money using partitioning eg. £6.73 doubled is double £6 plus double 73p</p> <p>Grouping Multiply decimals by 10, 100 and 1000 eg. 3.4 x 100 = 340 Use partitioning to multiply friendly two-digit and three-digit numbers by single digits eg. 402 x 6 as (400x6) + (2 x 6) Use partitioning to multiply decimal numbers x single digit numbers eg. 4.5 x 3 as (4x3) + (4x0.5) Multiply using near multiples by rounding eg. 32 x 29 as (32 x 30) – 32</p> <p>Using number facts Use times tables facts up to 12x12 to multiply multiples of the multiplier eg. 6 x 4 = 24 so 60 x 4 = 240 and 600 x 4 = 2400. Know square numbers and cube numbers</p>
Subtraction	Division
<p>Taking away Use place value to subtract decimals eg. 4.58 – 0.08 or 6.26 – 0.2 etc. Take away multiples of power of 10 eg. 15,672 – 300 or 4.82-2 Partition or count back eg. 3964 – 1051 or 5.72 – 2.01 Subtract near multiples eg. 86,456 – 9999 or 3.58 – 1.99</p> <p>Counting up Find a difference between two numbers by counting up from the smaller to the greater number eg. 2009 – 869. Find change using shopkeepers' addition eg. buy toy for £6.89 using £10</p> <p>Using number facts Derived facts from number bonds to 10 and 100 eg. 2 – 0.45 using 45 + 55 = 100 Number bonds to £1, £10 and £100 eg. £4.00 - £3.86 = 14p</p>	<p>Doubling and halving Halve amounts of money using partitioning eg. half of £14.84 is half of £14 and half of 84p Use doubling and halving as a strategy in dividing by 2, 4, 8, 5 and 20 eg. 115 ÷ 5 as double 115 ÷ 10</p> <p>Grouping Divide numbers by 10, 100, 1000 to obtain decimal answers with up to three places eg. 340 ÷ 100 = 3.4 Use 10th, 20th, 30th multiples of the divisor to divide friendly two-digit and three-digit numbers eg. 186 ÷ 6 as 180 ÷ 6 plus 6 ÷ 6 Find unit and non-unit fractions of large amounts eg. 3/5 of 265 is 3 x (265 ÷ 5)</p> <p>Using number facts Use division facts up to 12x12 to divide numbers by single-digit numbers eg. 3600 ÷ 9 as 36 ÷ 9 Know square numbers and cube numbers</p>



Year 5 – Maths Calculation Policy

Year 5 group coverage:

- add and subtract whole numbers within a million, including using formal written methods (columnar addition and subtraction)
- add and subtract decimal numbers, including amounts of money
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Addition

Estimate answer by rounding prior to written strategy.

$$52,894 + 39,515 \longrightarrow 50,000 + 40,000 \longrightarrow 90,000 \text{ (see answer below)}$$

Compact column addition to add numbers with up to 5 digits.

$$\begin{array}{r}
 52894 \\
 + 39515 \\
 \hline
 92409 \\
 \hline
 \end{array}$$

1 1 1

Compact column addition to add decimal numbers.

$$\begin{array}{r}
 52.15 \\
 + 29.57 \\
 \hline
 81.72 \\
 \hline
 \end{array}$$

1 1

*NB The use of concrete apparatus can be used as a scaffold for ALL children (see Year 4)
Lower ability children encouraged to use fingers to count up.*

Vocabulary: add, addition, plus, make, more, sum, total, increase, partition, column boundary, exchange, decimal

Subtraction

Estimate answer by rounding prior to written strategy.

$$67,792 - 48,253 \longrightarrow 70,000 - 50,000 \longrightarrow 20,000 \text{ (see answer below)}$$

Compact column subtraction to subtract numbers with up to 5 digits.

$$\begin{array}{r}
 67792 \\
 - 48253 \\
 \hline
 19539 \\
 \hline
 \end{array}$$

“TAKE A PENNY”

...To this 2 step process

4000	-1	3999
- 2896	-1	- 2895
1104		

Do you notice something?

NO REGROUPING!!!

Compact column subtraction to subtract decimal numbers.

$$\begin{array}{r}
 67.15 \\
 - 18.74 \\
 \hline
 48.41 \\
 \hline
 \end{array}$$

*NB The use of concrete apparatus can be used as a scaffold for ALL children (see Year 4)
Lower ability children encouraged to use fingers to find a difference through counting up.*

Vocabulary: subtract, subtraction, take away, minus, difference, decrease, exchange, decimal



Year 5 – Maths Calculation Policy

Year 5 group coverage:

- multiply numbers up to 4 digits by a one or two-digit number using a formal written method, including long multiplication for two-digit numbers
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates

Multiplication

Compact short multiplication of a four-digit number by a one digit number.

$$\begin{array}{r}
 2403 \\
 \times \quad \quad \quad 6 \\
 \hline
 14418 \\
 \hline
 2 \quad \quad 1
 \end{array}$$

Long multiplication of a four-digit number by a two-digit number

$$\begin{array}{r}
 2894 \\
 \times \quad \quad \quad 15 \\
 \hline
 14470 \\
 28940 \\
 \hline
 43410 \\
 \hline
 1 \quad 1 \quad 1
 \end{array}$$

(2894 x 5)

(2894 x 10)

VIB

6
12
18
24
30
36

VIB

8
16
24
32
40
48

(Please note the placement of the digits when the column boundary is crossed. Use of different colours is a useful strategy.)

NB Expanded short multiplication provides a scaffold for ALL children if having difficulties. A double VIB may be needed when multiplying by two difficult digits.

Vocabulary: lots of, groups, times, multiply, multiplied by, multiple of, product, short multiplication, long multiplication.

Division

Short division of a four-digit number by a one-digit number, using remainders when necessary.

$$\begin{array}{r}
 0567 \\
 9 \overline{) 51603} \\
 \underline{5} \\
 1 \\
 \underline{9} \\
 2 \\
 \underline{18} \\
 3 \\
 \underline{27} \\
 0 \\
 \underline{0} \\
 3
 \end{array}$$

VIB

9
18
27
36
45
54
63

$$\begin{array}{r}
 1694 \text{ r}2 \\
 5 \overline{) 8472} \\
 \underline{5} \\
 3 \\
 \underline{15} \\
 4 \\
 \underline{10} \\
 4 \\
 \underline{10} \\
 2
 \end{array}$$

(Please ensure that children place zero's as placeholders in any division where the number will not 'fit')

NB The use of concrete apparatus can be used as a scaffold for ALL children (see Year 4). Encourage children to use a VIB with larger multiples.

Vocabulary: sharing, share equally, into groups, divided by, divided into, left over, remainder, how many groups, factor, divisible by, divisibility, inverse, quotient.



Year 6 – Mental Calculations

Year 6 coverage:	
<ul style="list-style-type: none"> perform mental calculations, including with mixed operations and large numbers know by heart all number bonds to 100 and use these to derive related facts [$3.46 + 0.54 = 4$] use number bonds to 100 to support subtraction through complementary addition [$1000 - 654$ as $46 + 300$] and quickly derive bonds to 1000 add small and large whole numbers, using place value [$34,000 + 8000$] add negative numbers in context such as temperature add two one-place decimal numbers or two-place decimal numbers less than 1 [$4.5 + 6.3$ or $0.24 + 0.33$] use number bonds to 1 and 10 to mentally subtract any pair of one-place or two-place decimal numbers using complementary addition [$10 - 3.65$ as $0.35 + 6$] use number facts and place value to perform mental subtraction of large numbers or decimal numbers with up to two places [$467,900 - 3,005$ or $4.63 - 1.02$] add and subtract positive and negative numbers [calculate rise in temperature or continue a sequence] 	<ul style="list-style-type: none"> identify common factors, common multiples and prime numbers and use factors in mental multiplication [326×6 is 652×3] and division [$438 \div 6$ is $219 \div 3$] use place value and number facts as mental strategies [$40,00 \times 6 = 240,000$ or $0.03 \times 6 = 0.18$] use tests for divisibility to aid mental calculations use doubling and halving to multiply and divide by 2, 4, 8, 5, 20, 50 and 25 [28×25 is $\frac{1}{4}$ of 28×100] use rounding to support mental multiplication [34×19 is $(34 \times 20) - 34$] multiply and divide one and two-place decimal numbers up to and including 10 using place value and partitioning [3.6×4 is $12 + 2.4 / 2.4 \div 6$ is $(24 \div 6) \div 10$] double and halve decimal numbers with up to two places using partitioning [36.73×2 is double 36 plus double 0.73 / half of 36.86 is half of 36 plus half of 86] know and use equivalence between simple fractions, decimals and percentages, including in different contexts recognise a given ratio and reduce it to its lowest terms
Addition	Multiplication
<p>Using place value <i>Count in 0.1s, 0.01s, and 0.001s</i> eg. knowing what 0.001 more than 6.725 is <i>Partitioning</i> eg. $9.54 + 3.25$ as $9 + 3$ and $0.5 + 0.2$ and $0.04 + 0.05$ to get 12.79</p> <p>Counting on <i>Add two decimal numbers by adding the o then ths then hths or tths</i> eg. $6.31 + 3.46$ as $6.31 + 3 + 0.4 + 0.06$ <i>Add near multiples to 1 and 10</i> eg. $6.75 + 9.95$ as $(6.75 + 10) - 0.05$ or $6.35 + 0.99$ as $(6.35 + 1) - 0.01$</p> <p>Using number facts <i>Number bonds to 1 and to the next multiple of 1</i> eg. $0.63 + 0.37$ or $2.35 + 0.645$ <i>Add to the next ten</i> eg. $4.62 + 0.38$</p>	<p>Doubling and halving <i>Use doubling and halving as strategies in mental multiplication.</i> <i>Double decimal numbers with up to 2 places using partitioning</i> eg. 36.73 doubled is double 36 (72) plus double 0.73 (1.46)</p> <p>Grouping <i>Use partitioning as appropriate</i> eg. 3060×4 as $(3000 \times 4) + (60 \times 4)$ or 8.4×8 as $(8 \times 8) + (0.4 \times 8)$ <i>Use factors in mental multiplication</i> eg. 421×6 as 421×3 and doubled or 3.42×5 is half of 3.42×10 <i>Multiply decimal numbers using near multiples by rounding</i> eg. 4.3×19 as $(4.3 \times 20) - 4.3$</p> <p>Using number facts <i>Use times tables facts up to 12x12 in mental multiplication of large numbers or numbers with up to two-decimal places</i> eg. $6 \times 4 = 24$ so $0.06 \times 4 = 0.24$</p>
Subtraction	Division
<p>Taking away <i>Use place value to subtract decimal numbers</i> eg. $7.78 - 0.08$ or $16.26 - 0.2$ etc <i>Take away multiples of power of 10</i> eg. $123,956 - 400$, $686,109 - 40,000$ or $7.82 - 0.5$ <i>Partition or count back</i> eg. $3964 - 1051$ or $5.72 - 2.01$ <i>Subtract near multiples</i> eg. $360,078 - 99,998$ or $12.83 - 0.99$</p> <p>Counting up <i>Count up to subtract numbers from multiples of 10, 100, 1000, 10,000</i> <i>Find a difference between two decimal numbers by counting up from the smaller the greater number</i> eg. $1.2 - 0.87$</p> <p>Using number facts <i>Derive facts from number bonds to 10 and 100</i> eg. $5 - 0.65$ <i>Number bonds to £1, £10 and £100</i> eg. $£7.00 - £4.37$</p>	<p>Doubling and halving <i>Use doubling and halving as strategies in mental division.</i> <i>Halve decimal numbers with up to two-places using partitioning</i> eg. half of 38.86 is half of 38 plus half of 0.86.</p> <p>Grouping <i>Use 10th, 20th, 30th ... 100th, 200th etc. multiples of the divisor to divide larger numbers</i> eg. $378 \div 9$ as $360 \div 9$ and $18 \div 9$. <i>Use tests for divisibility</i> eg. 135 divides by 3 as $1+3+5 = 9$ and 9 is in the 3x tables.</p> <p>Using number facts <i>Use division facts up to 12x12 to divide decimal numbers by single-digit numbers</i> eg. $1.17 \div 3$ $\frac{1}{100}$ of $117 \div 3$ (0.39)</p>



Year 6 – Maths Calculation Policy

Year 6 group coverage:

- use their knowledge of the order of operations to carry out calculations involving the four operations
- use column addition to add and subtract numbers with up to 6 digits
- use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve problems involving addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Addition

Estimate by calculating prior to written strategy.

$$328,751 + 123,595 \longrightarrow 300,000 + 100,000 \longrightarrow 400,000 \text{ (see answer below)}$$

Compact column addition to add numbers with up to 6 digits.

	3	2	8	7	5	1	
+	1	2	3	5	9	5	
<hr/>							
	4	5	2	3	4	6	
<hr/>							
		1	1	1			

Compact column addition to add decimal numbers with up to 2 places.

	1	4	•	9	5	
+	1	2	•	3	5	
<hr/>						
	2	7	•	3	0	
<hr/>						
		1		1		

NB Expanded column addition provides a scaffold for ALL children.

Vocabulary: add, addition, sum, total, increase, inverse, altogether, compact column addition, column boundary

Subtraction

Estimate by calculating prior to written strategy.

$$328,751 + 123,595 \longrightarrow 300,000 + 100,000 \longrightarrow 400,000 \text{ (see answer below)}$$

Column subtraction to subtract numbers with up to 6 digits.

	5	8	² 3	¹ 4	³ 4	¹ 1	
-	1	4	2	7	3	5	
<hr/>							
	4	4	0	7	0	6	
<hr/>							

“TAKE A PENNY”

...To this 2 step process

4000	-1	3999
-2896	-1	-2895
<hr/>		
		1104

Do you notice something?
NO REGROUPING!!!

Compact column subtraction to subtract decimal numbers with up to 2 places.

	3	⁶ 7	•	¹⁰ 1	¹ 2	
-	2	5	•	3	5	
<hr/>						
	1	1	•	7	7	
<hr/>						

NB Expanded column subtraction provides a scaffold for ALL children.

Vocabulary: subtract, subtraction, minus, decrease, leave, difference, column boundary



Year 6 – Maths Calculation Policy

Year 6 group coverage:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4-digits by a two-digit whole number using the formal written method of short division where appropriate for the context
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- use their knowledge of the order of operations to carry out calculations involving the four operations
- use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve problems involving multiplication and division

Multiplication

Estimate by calculating prior to written strategy.

$$5586 \times 12 \longrightarrow 6000 \times 10 \longrightarrow 60,000 \text{ (see answer below)}$$

Long multiplication of a 4-digit number by a two-digit number.

$$\begin{array}{r} 5586 \\ \times 12 \\ \hline 11172 \\ 55860 \\ \hline 67032 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 476 \\ \times 23 \\ \hline 1428 \\ 9520 \\ \hline 10948 \end{array}$$

VIB

6
12
18
24
30
36

VIB

7
14
21
28
35
42

(Please note the placement of the digits when the column boundary is crossed. Use of different colours is a useful strategy. A double VIB may be needed when multiplying by two difficult digits.)

Vocabulary: lots of, groups of, repeat, times, multiply, multiplied by, multiple of, factor, prime number, product, short multiplication, long multiplication.

Division

Short division of 3-digit and 4-digit number by single digit numbers, and 2-digit where applicable.

$$\begin{array}{r} 1264 \\ 6 \overline{) 7584} \\ \underline{6} \\ 15 \\ \underline{12} \\ 38 \\ \underline{36} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

$$\begin{array}{r} 045r1 \\ 11 \overline{) 495} \\ \underline{44} \\ 55 \\ \underline{55} \\ 0 \end{array}$$

VIB

15
30
45
60

(Children also taught to continue a division to gain the decimal number with a remainder.)

Long division of 3-digit and 4-digit divided by 2-digit number.

$$\begin{array}{r} 0103 \\ 32 \overline{) 3296} \\ \underline{32} \\ 0096 \\ \underline{0096} \\ 00 \end{array}$$

$$\begin{array}{r} 028r12 \\ 15 \overline{) 432} \\ \underline{30} \\ 132 \\ \underline{120} \\ 012 \\ \underline{012} \\ 0 \end{array}$$

LONG DIVISION

DIVIDE (D)

MULTIPLY (M)

SUBTRACT (S)

BRING DOWN (B)

REPEAT or REMAINDER (R)

(the remainder can be interpreted as $\frac{12}{15} \rightarrow \frac{4}{5}$ or 0.8)

(use of long division family to remember the steps)

Larger multiple VIBS may be needed when dividing by a larger integer.

Vocabulary: divided by, divided into, left over, remainder, how many groups, factor, divisible by, divisibility, inverse, divider, dividend, quotient, short division, long division.

