

Churchfields' Calculation Policy

Addition

EYFS

Mental methods

Children use a variety of concrete and pictorial representations to :

- Count
- Subitise (recognise the number of objects in a group without counting)
- Find one more/less
- Find number bonds
- Combine groups of numbers

Describe addition number sentences in different ways "five add three is eight" "eight is three plus five"

Written methods

Children record in pictures, words or symbols and can relate different representations to each other. Children form numbers correctly.

Year 1/2

Mental methods

Counting and combining

Combining two sets of objects (aggregation) which will progress onto adding on to a set (augmentation). Understand that this can be done in any order (commutative).



Using a number line, number track or bead string

Children progress from a number line with every number shown to number lines with significant numbers shown.

Using a number square

Count on in tens and ones

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

Number bonds

Learn number bonds and related addition and subtraction facts to 20

Use these to find related facts to 100

Partition and recombine

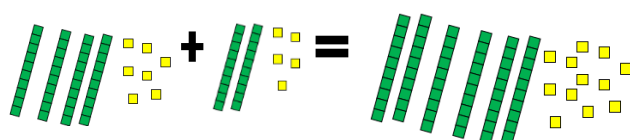
Partitioning in different ways and recombine

47+25

47

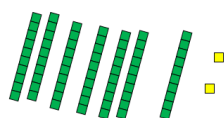
25

60 + 12



Leading to exchanging:

72

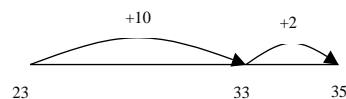


Written methods

Number line

Counting on in tens and ones

$$\begin{aligned} 23 + 12 &= 23 + 10 + 2 \\ &= 33 + 2 \\ &= 35 \end{aligned}$$

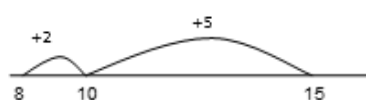


Partitioning and bridging through 10.

The steps in addition often bridge through a multiple of 10

e.g. Children should be able to partition the 7 to relate adding the 2 and then the 5.

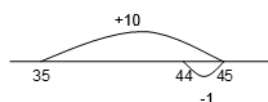
$$8 + 7 = 15$$



Adding 9 or 11 by adding 10 and adjusting by 1

e.g. Add 9 by adding 10 and adjusting by 1

$$35 + 9 = 44$$



Expanded written method

This will be supported with Dienes and place value counters with children encouraged to show their working vertically

$$\begin{array}{r} 40 + 7 \\ + 20 + 5 \\ \hline 60 + 12 = 72 \end{array}$$

Year 3/4

Mental methods

Use a number line mentally to partition and bridge numbers through 10

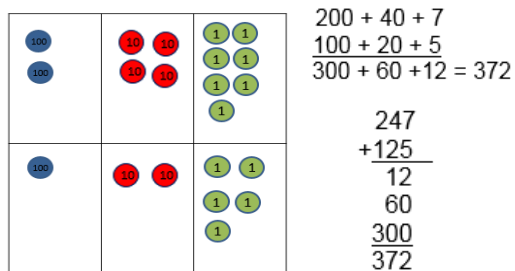
Round numbers to the nearest 10 and adjust e.g. $57 + 21 = 57 + 20 + 1$

Count on by partitioning the second number only e.g. $74 + 32 = 74 + 30 + 2$

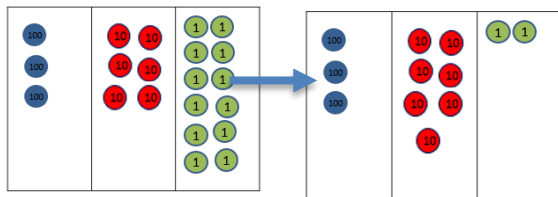
Use understanding of place value to add multiples of 100 and 10 to any 3 digit number e.g. $345 + 40 = 385$

Written methods

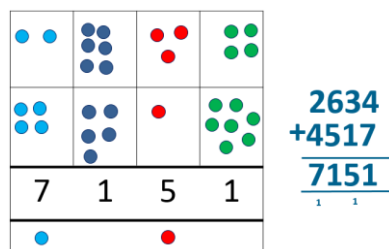
Introduce expanded column addition modelled with place value counters or Dienes blocks



Leading to children understanding the exchange between tens and ones.



Compact written method – for numbers up to four digits.



Year 5/6

Mental methods

Build on methods from Y3/4 extending to larger numbers and decimals

Written methods

Children add large numbers and decimals using the compact written method, including different numbers of decimals

Subtraction

EYFS

Mental methods

Children use a variety of concrete and pictorial representations to :

- Take away
- Find out how many are left

Read number sentences aloud in different ways “five subtract one leaves four” “four is equal to five subtract one”

Written methods

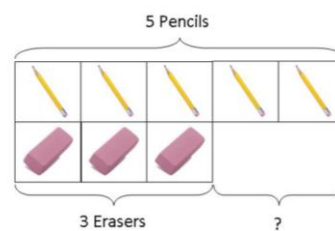
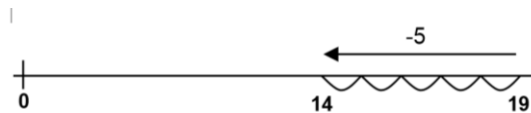
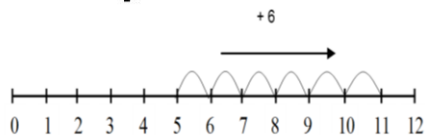
Children record in pictures, words or symbols

Year 1/2

Mental methods

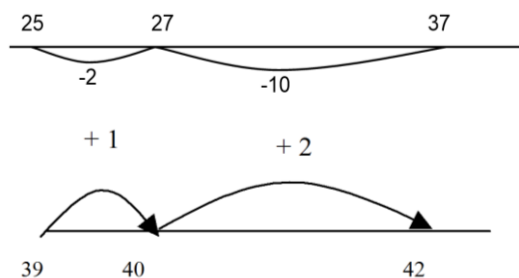
Use concrete objects and pictorial representations

Children understand subtraction as take away and as counting on



Written methods

Use number lines to represent taking away and counting on



Year 3/4

Mental methods

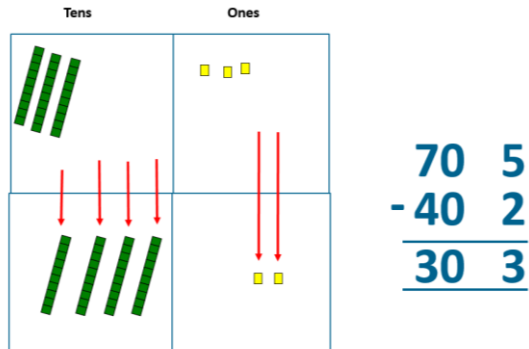
Make choices about whether to count on or count back, depending on numbers involved

Use number line mentally

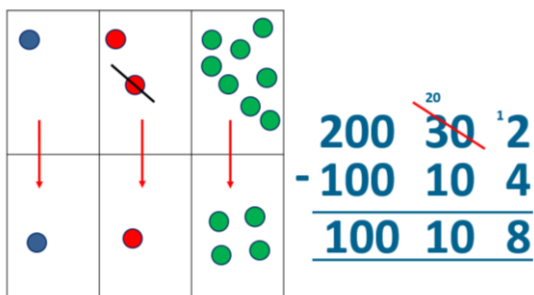
Written methods

Expanded column subtraction, modelled with Dienes and then with place value counters.

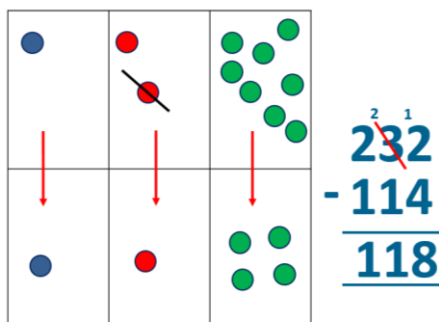
Initially without decomposition



Then introduce exchanging



Children can then move on to compact subtraction for calculations up to 4 digits



Year 5/6

Mental methods

Build on methods from Y3/4 extending to larger numbers and decimals

Written methods

Children subtract large numbers and decimals using the compact written method, including different numbers of decimals

Multiplication

EYFS

Mental methods

Use concrete objects and pictorial representations to show and count in groups

Count in twos, fives, tens chanting, and with objects

Double simple numbers

Read number sentences aloud in different ways “five lots of two makes ten”, “ten is equal to five multiplied by two”

Written methods

Children record in pictures, words or symbols

Year 1/2

Mental methods

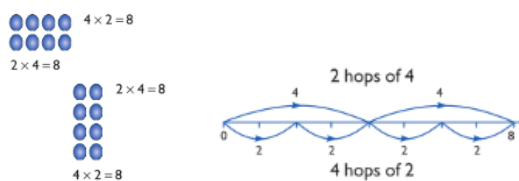
Double numbers up to 20

Use known doubles to work out others e.g. double 15 = double 10 + double 5

Children represent problems with concrete objects, cuisinaire and arrays

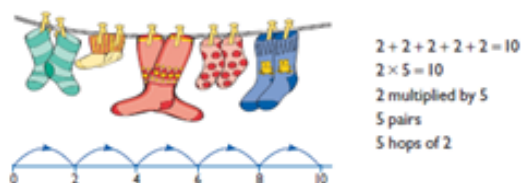
Represent problems as repeated addition and as arrays.

They understand that multiplication can be done in any order (commutative)

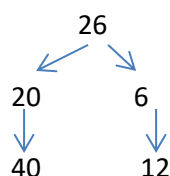


Written methods

Record multiplication on a number line



Double two digit numbers by partitioning



Year 3/4

Mental methods

Double two digit numbers by partitioning

Count in multiples of 3, 4, 6, 7, 9, 25 and 1000

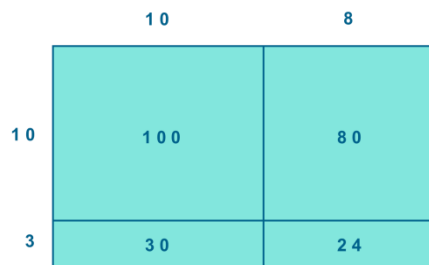
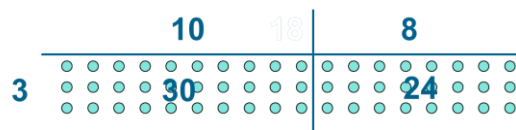
Recall times tables up to 12×12

Multiply numbers by 10 and by 100

Understand that $39 \times 7 = 30$ lots of 7 plus 9 lots of 7 (distributive law) and that $39 \times 7 = 7 \times 39$ (commutative law)

Written methods

Use the grid method to multiply up to TU x TU and HTU x U



Year 5/6

Mental methods

Double numbers by partitioning

Quickly recall times tables up to 12×12

Multiply numbers by 10, 100, 1000, 0.1, 0.01

Combine known facts to solve more complex calculations e.g. $45 \times 7 = (40 \times 7) + (5 \times 7)$

Identify multiples and factors and find factor pairs for numbers

Written methods

Use long multiplication to multiply numbers up to 4 digits by a 2 digit number

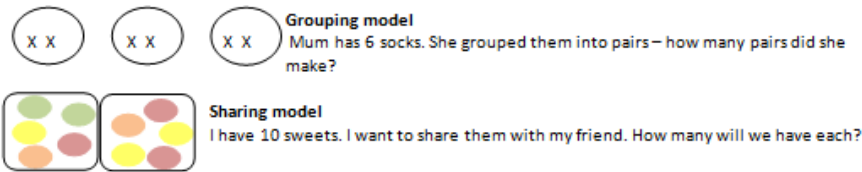
$$\begin{array}{r} 2 3 1 \\ 1342 \\ \times 18 \\ \hline 13420 \\ 10736 \\ \hline 24156 \end{array}$$

Division

EYFS

Mental methods

Use concrete objects and pictorial representations to show sharing and grouping



Read number sentences aloud in different ways “ten shared between five friends is two”, “six makes three groups of two”.

Children begin to halve even numbers.

Written methods

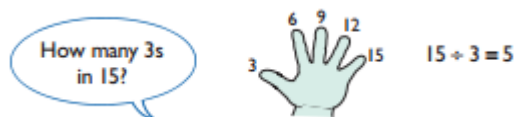
Children record in pictures, words or symbols

Year 1/2

Mental methods

Children share and group using concrete objects.

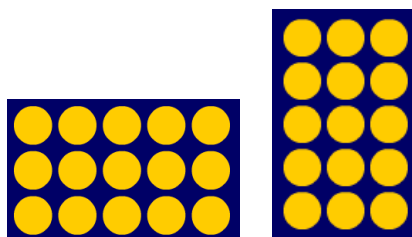
They count in different groups.



Arrays are used as a pictorial representation for division.

$15 \div 3 = 5$ There are 5 groups of 3.

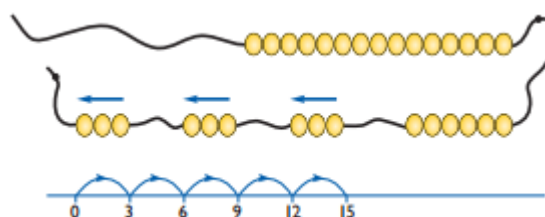
$15 \div 5 = 3$ There are 3 groups of 5



Children should be able to find $\frac{1}{2}$ and $\frac{1}{4}$ and simple fractions of objects, numbers and quantities. They understand division as the inverse of multiplication

Written methods

Use bead strings and numberlines to jump in repeated groups



Year 3/4

Mental methods

Recall tables up to 12×12

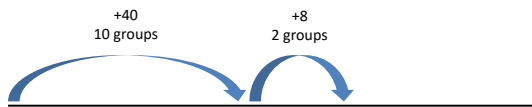
Children half numbers, including odd numbers

Written methods

Numberline

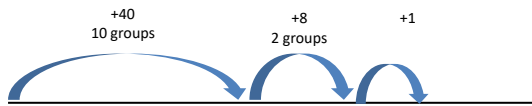
Children become more efficient at jumping on the numberline in groups

$$48 \div 4 = 12$$



They solve sums with remainders

$$49 \div 4 = 12 \text{ r}1$$



Chunking

Children set their work out vertically, without the use of a numberline

$$496 \div 4$$

$$\begin{array}{r} 496 \\ - 400 \text{ (100 lots of 4)} \\ \hline 96 \\ - 80 \text{ (20 lots of 4)} \\ \hline 16 \\ - 16 \text{ (4 lots of 4)} \\ \hline 0 \end{array}$$

$$496 \div 4 = 124$$

Year 5/6

Mental methods

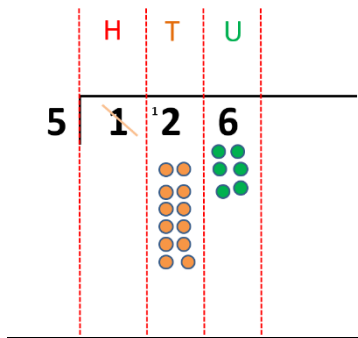
Children are able to halve 3 digit numbers mentally by partitioning

Children using chunking method mentally, or use jottings on the numberline to help them.

Remainders are interpreted in different ways dependent on context

Written methods

Children are introduced to short division method using place value counters initially.



Leading on to the written method

A handwritten short division problem on a piece of paper. The divisor 6 is written on the left, and the dividend 239 is written above the division bar. The quotient 39 is written above the dividend, and the remainder 1 is written to the right of the dividend. The calculation shows 6 times 3 is 18, which is subtracted from 23 to leave 5, then 6 times 9 is 54, which is subtracted from 59 to leave 5. The final result is 39 r 1.

And to long division

A handwritten long division problem on a piece of paper. The divisor 15 is written on the left, and the dividend 2364 is written above the division bar. The quotient 157 is written above the dividend, and the remainder 6 is written to the right of the dividend. The calculation shows 15 times 1 is 15, which is subtracted from 23 to leave 8, then 15 times 5 is 75, which is subtracted from 86 to leave 11, then 15 times 7 is 105, which is subtracted from 114 to leave 9. The final result is 157 r 6.