Year 3 Calculation Policy

- Addition –Strategies
- Addition – Resources and Vocabulary
- Subtraction –Strategies
- Subtraction – Resources and Vocabulary
- Multiplication –Strategies
- Multiplication – Resources and Vocabulary
- Division –Strategies
- Division – Resources and Vocabulary

Alderman Richard Hallam Primary School

Addition – Mental Strategies and Jottings

The Bar model

Aggregation

Augmentation

Addition – Written Strategies

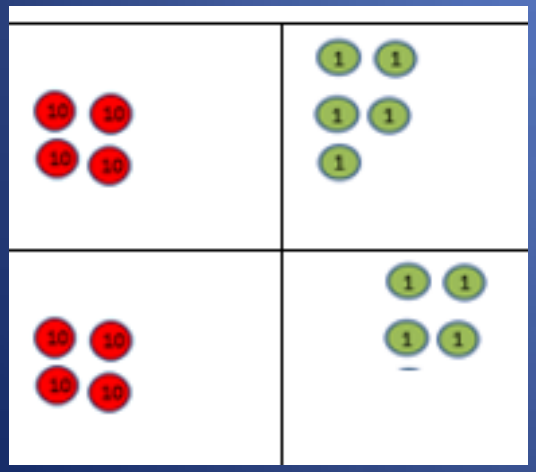
- Children need to estimate an answer and use the inverse operations to check answers.
- Children need to solve problems using missing numbers.
- Partition numbers into 10's and 1's

  e.g. 367 + 185 = 552
- **Horizontal Method**:
- 300 + 60 + 7
- 100 + 80 + 5
- 400 +140+12 = 552

Addition – Vocabulary and Resources

Resources:

Place value counters to practise exchanging and laying out columns



Vocabulary:

- Add
- Plus
- Total
- Altogether
- Combine
- Sum
- Also
- as well as
- how many more
- Increase
- Partition
- Calculate
- Largest
- Smallest

Vocabulary:

- Operation
- Double
- near double
- Half
- Extra
- Inverse
- Estimate
- re-order
- More
- Equal
- Balance
- Jumps
- Steps
- Forwards
- backwards
- Mentally

Subtraction – Mental strategies and jottings

Children should practise subtracting numbers mentally including three-digit numbers + ones, three-digit number + tens, three digit numbers + hundreds.

Find a small difference by counting up

Continue as in Year 2 but with appropriate numbers e.g. 102 – 97 = 5

Subtract mentally a 'near multiple of 10' to or from a two-digit number

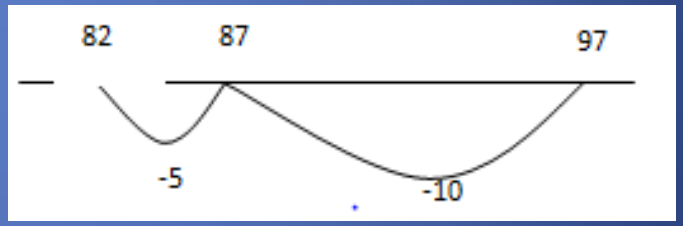
Continue as in Year 2 but with appropriate numbers e.g. 78 – 49 is the same as 78 – 50 + 1

Use known number facts and place value to subtract

Continue as in Year 2 but with three-digit numbers e.g.

97

97 – 15 = 72



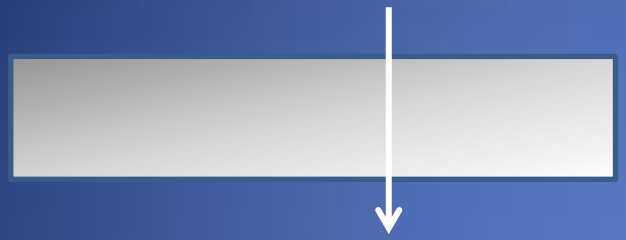
With practice, children will need to record less information and decide whether to count back or forward. It is useful to ask children whether counting up or back is the more efficient for calculations such as 57 – 12, 86 – 77 or 43 – 28.

Continued use of the bar model to aid confidence with problems There are 96 children in Year 3 and 4, in Year 3 there are 45 children. How many children are in Y4?

96	
45	How many in Y4?

Subtraction – Mental Strategies and Jottings

The Bar model



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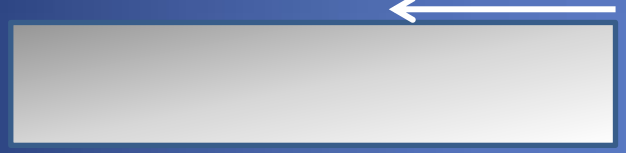
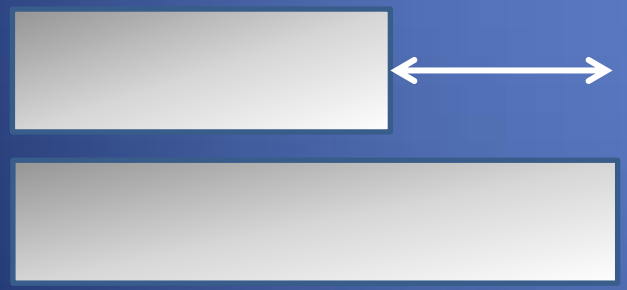
Partitioning into two groups



Reduction – by a quantity or amount



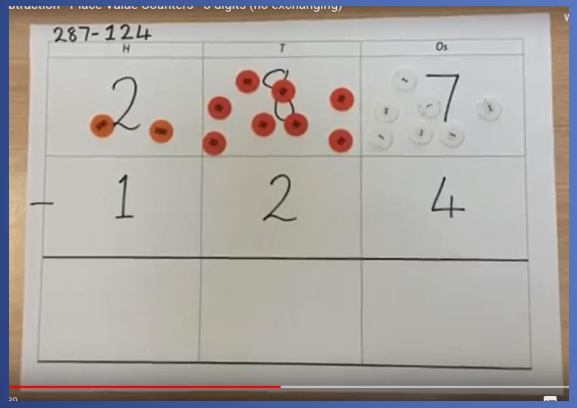
Comparison – of the difference

Inverse – how much more

Subtraction – Written strategies

- **<u>Formal Written Methods</u>**

Without exchanging



https://www.youtube.com/watch?v=o9J9hWpawSc

With exchanging

https://www.youtube.com/watch?v=nqVjoR1yXdY

Subtraction – Vocabulary and Resources

Resources:

Base ten

Leading to place value counters when confident with exchanging

Vocabulary:

- Difference
- subtract,
- Minus
- take away
- Decrease
- count back
- count back from/ in, count up
- Take
- Less
- how many fewer
- how many more
- Partition
- Calculate
- Largest

Vocabulary:

- Smallest
- Operation
- half
- Double
- near
- Double
- Extra
- Inverse
- Estimate
- re-order
- Equal
- balance
- Jumps
- Steps
- Forwards
- Backwards
- mentally

Multiplication – Mental strategies and jottings

- Children should understand that multiplication can be done in any order

e.g. 4 x 12 x 5 = 4 x 5 x 12 = 20 x 12 = 240

x = signs and missing numbers

Continue using a range of equations as in Year 2 but with appropriate numbers.

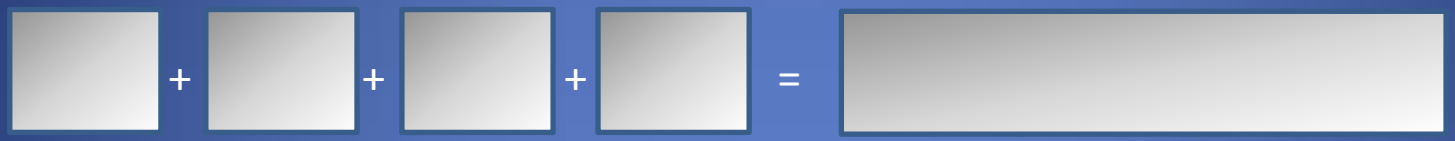
Arrays and repeated addition

Continue to understand multiplication as repeated addition and continue to use arrays (as in Year 2).

Multiplication – Mental Strategies and Jottings

The Bar model

Repeated Aggregation



Scaling

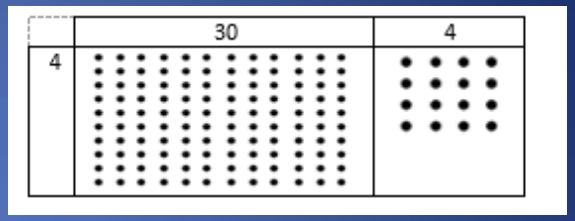
Multiplication – Written strategies

Formal Written Methods

Children are expected to move onto short multiplication by the end of Year 3. Grid method can be used as an introduction to this. Children are expected to multiply TU x U.

Partitioning and the Grid Method

X	30	5	
2	60	10	=70

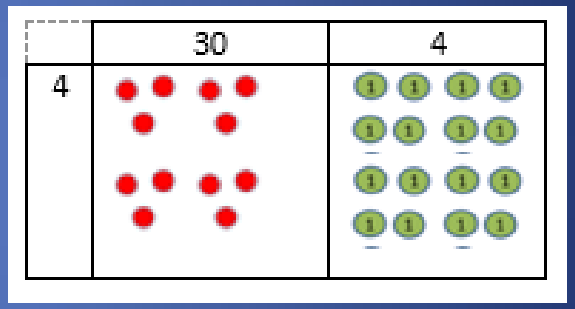


Use known facts and place value to carry out simple multiplications

Expanded Short Multiplication

24 x 6 = 144

	24
	x 6
(6 x 4)	24
(6 x 20)	+ 120
	144



Simplified to:	30	4
4	120	16

- **Times Tables**

Children must know their 3, 4 and 8 times tables.

They should understand that the 4 times tables are double the 2 times tables and that the 8 times tables are double the 4 times tables.

- **Correspondence/Combination Problems**

Children should understand how to use multiplication to solve these problems e.g. 3 hats and 4 coa… how many different outfits? 3 x 4 = 12

Multiplication – Vocabulary and Resources

Resources:

Place value counters

Base ten

Counters for arrays

Numicon for counting understanding of repeated addition

Vocabulary:

Multiplication, equal groups of, multiplied by, lots of, pairs, array (rows and columns) half, double, inverse, repeated addition, repeated subtraction, count on/ up, how many.., calculate, operation, estimate, re-order, equal, balance, jumps, steps, forwards, backwards, double, near double, mentally

Division – Mental strategies and jottings

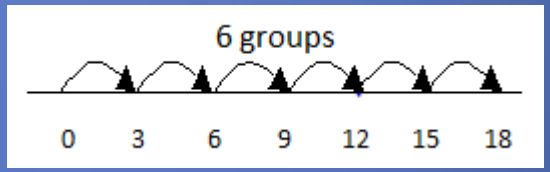
Children should understand that division must be done in the order it is presented 3 ÷ 4 ǂ 4 ÷ 3

÷ = signs and missing numbers

Continue using a range of equations as in Year 2 but with appropriate numbers.

Understand division as sharing and grouping

18 ÷ 3 can be modelled as both sharing and grouping. By year 3, children should be grouping in order to divide but should understand that if you share 18 sweets between 3 or split 18 into groups of 3.

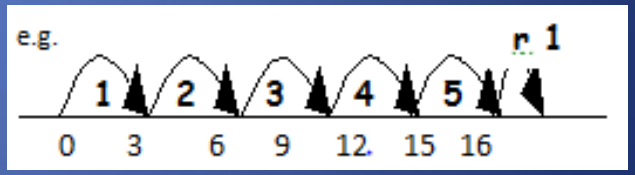


Remainders

16 ÷ 3 = 5 r1

Sharing - 16 shared between 3, how many left over?

Grouping – How many 3's make 16, how many left over?



Continued use of the bar model to aid confidence with problems

Four children collected £16 in their book sale, how much did they earn each?

16			
Child 1	2	3	4

Division – Mental strategies and jottings

Division Tables

Alongside the times tables, children must also know the related division tables.

They must know their 3, 4 and 8 division tables.

Fractions

Children should be able to find a tenth of a given number by dividing by 10.

Children should be able to add and subtract fractions with the same denominator within one whole

e.g. ⅕+⅗=⅘

Children should be able to order and compare fractions with the same denominators.

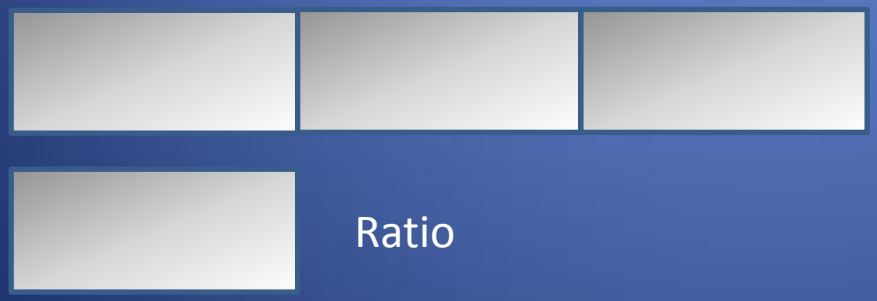
Division – Mental Strategies and Jottings

The Bar model

Sharing equally

Repeated subtraction

Repeated addition



Ratio

Division – Written Strategies

- Bus stop method for division with equipment

  e.g. 72 ÷ 3 =

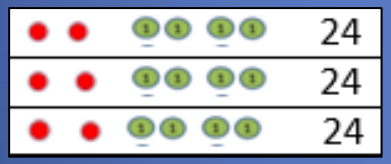
Using Base 10

$$\begin{array}{r} 20 + 4 \\ 3\overline{)\,60 + 10 + 2} \end{array}$$

Leading to

$$\begin{array}{r} 2\ 4 \\ 3\overline{)\,{}^{6}\cancel{7}{}^{1}2} \end{array}$$

Using place value counters



$$\begin{array}{r} 20 + 4 \\ 3\overline{)\,60 + 10 + 2} \end{array}$$

Division – Vocabulary and Resources

Resources:

Counters for arrays and sharing

Base ten when moving on to written division

Place value counters when confident with exchanging

Vocabulary:

Divide, division, share, sharing with/ between, equal groups of, group, grouping, pairs, array, half, double, inverse, repeated subtraction, repeated addition, count back, count back from/ in, how many.., calculate, operation, left over/ extra, fractions- half, quarter, third, estimate, re-order, equal, balance, jumps, steps, forwards, backwards, mentally