Parents' Calculation Policy Workshop

Key Stage 1

11th November 2019

Miss Jane and Miss Sally

Whiterose and the Calculation Policy

- Mastery of Maths
- Adapted Whiterose
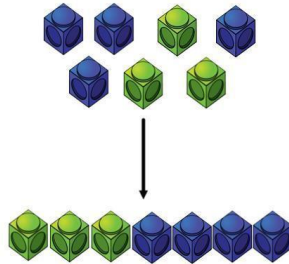- Concrete
- Pictorial
- Abstract

Addition

Key language: sum, total, parts and wholes, plus, add, altogether, more, 'is equal to' 'is the same as
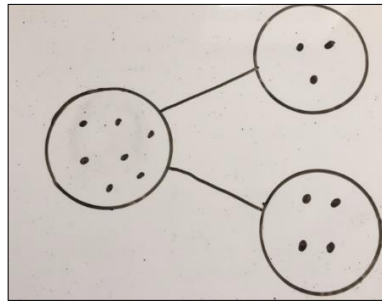
1	Concrete	2	Pictoral	3	Abstract

Combining two parts to make a whole
(use other resources too e.g. eggs, shells, teddy bears, cars).
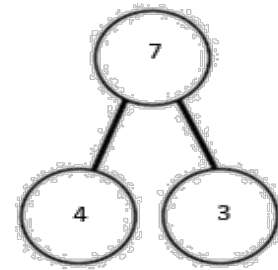

Children to represent the cubes using dots or crosses. They could put each part on a part whole model too.

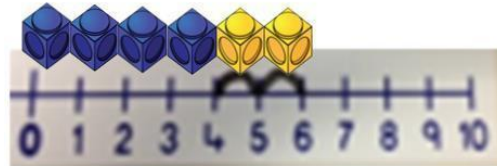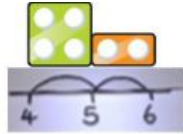4 + 3 = 7
Four is a part, 3 is a part and the whole is seven.

Addition

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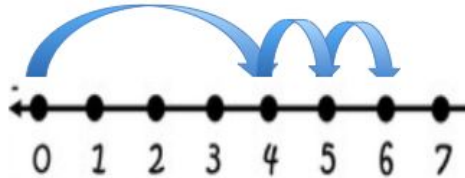
1	Concrete
Counting on using number lines using cubes or Numicon.

2	Pictoral
A number line which encourages the children to count on, rather than count all.

3	Abstract
The abstract number line: What is 2 more than 4? What is the sum of 2 and 4? What is the total of 4 and 2? 4 + 2
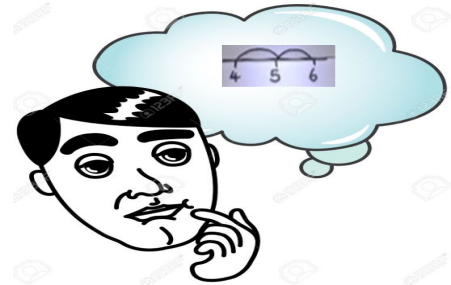
Addition

Key language: sum, total, parts and wholes, plus, add, altogether, more, 'is equal to' 'is the same as
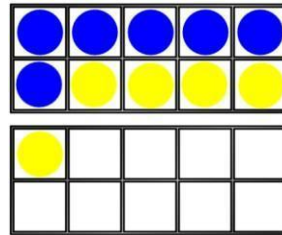
1	Concrete

Regrouping to make 10; using ten frames and counters/cubes or using Numicon.

6 + 5

2	Pictoral

Children to draw the ten frame and counters/cubes.

3	Abstract

Children to develop an understanding of equality e.g.

$6 + □ = 11$

$6 + 5 = 5 + □$

$6 + 5 = □ + 4$

Addition

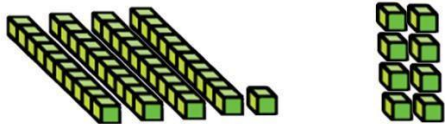Key language: sum, total, parts and wholes, plus, add, altogether, more, 'is equal to' 'is the same as

1	Concrete

TO + O using base 10.
Continue to develop understanding of partitioning and place value.
41 + 8

2	Pictoral

Children to partition into tens and ones. 41 + 8

3	Abstract

41 + 8

1 + 8 = 9
40 + 9 = 49

Addition

Key language: sum, total, parts and wholes, plus, add, altogether, more, 'is equal to' 'is the same as

1	Concrete

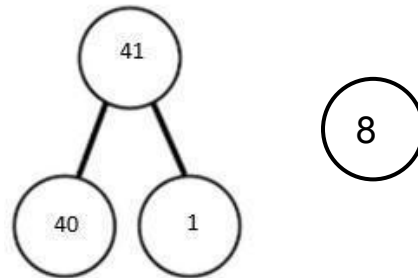**TO + TO using base 10.** Continue to develop an understanding of partitioning and place value. 36 + 25

2	Pictoral

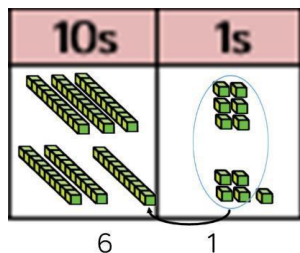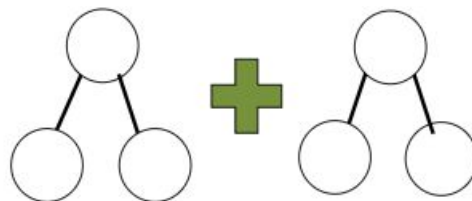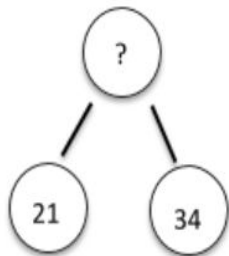Children to partition into tens and ones. 36 + 25

3	Abstract

36+25 =

Addition

Key language: sum, total, parts and wholes, plus, add, altogether, more, 'is equal to' 'is the same as

Conceptual Variation; different ways to solve TO + TO

|			
	Word problems (21+34) In year 3, there are 21 children, and in year 4, there are 34 children. How many children are there in total? 21 + 34 = 55. Prove it.	$$\begin{array}{r} 21 \\ +34 \\ \hline \end{array}$$ ☐ = 21 + 34 Calculate the sum of twenty-one and thirty-four.	Missing digit problems $$\begin{array}{r} 21 \\ +3☐ \\ \hline ☐5 \end{array}$$

Subtraction

Key Language: Take away, less than, the difference, subtract, minus, fewer, decrease
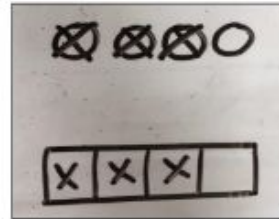
Concrete

Physically taking away and removing objects from a whole (Numicon, cubes and other items such as beanbags could be used).
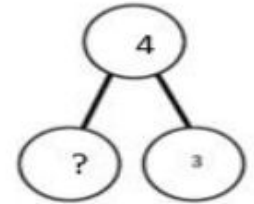
4 – 3 = 1
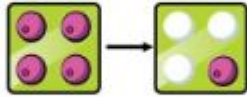
Pictorial

Children to draw the concrete resources they are using and cross out the correct amount.

Abstract

4 – 3 =

☐ = 4 - 3

4
? 3

Subtraction

Key Language: Take away, less than, the difference, subtract, minus, fewer, decrease

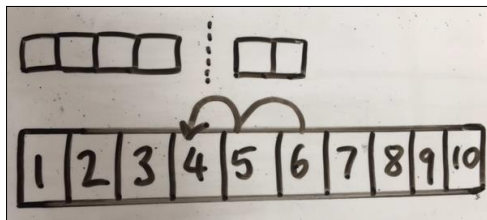| 1	Concrete

Counting back (using number lines or number tracks) children start with 6 and count back 2.

6 – 2 = 4

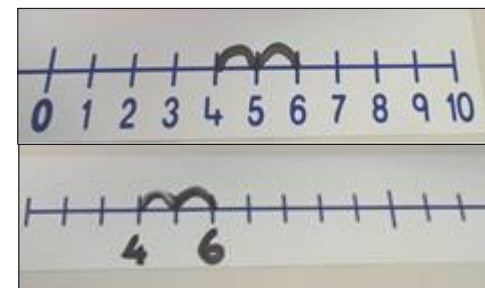| 2	Pictorial

Children to represent what they see pictorially e.g.

Cubes can also be used.

3	Abstract

Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use an empty number line.
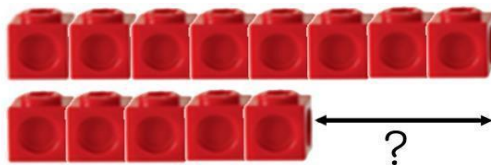
Subtraction

Key Language: Take away, less than, the difference, subtract, minus, fewer, decrease
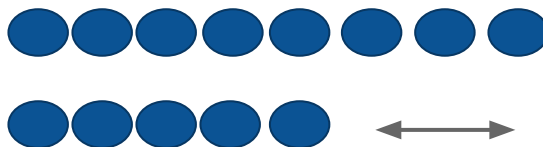
1 | Concrete

Finding the difference (using cubes, Numicon or Cuisenaire rods, other objects can also be used).

Calculate the difference between 8 and 5.

2 | Pictorial

Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate.

3 | Abstract

Find the difference between 8 and 5.

8 – 5, the difference is ☐

Children to explore why
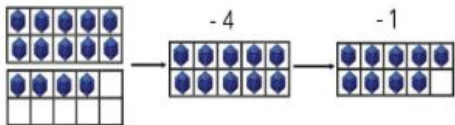9 - 6 = 8 – 5 = 7 – 4 have the same difference.

Subtraction

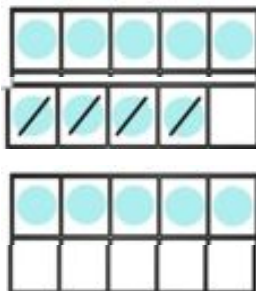Key Language: Take away, less than, the difference, subtract, minus, fewer, decrease

1	Concrete

Making 10 using ten frames (and/or dienes)

14 –5

2	Pictorial

Children to present the ten frame pictorially (and or dienes) and discuss what they did to make 10.

3	Abstract

Children to show how they can make 10 by partitioning the subtrahend.

$14 - 5 = 9$
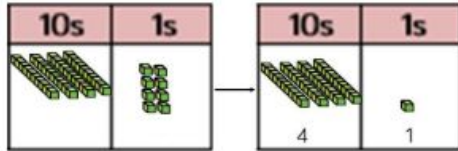
4   1

$14 – 4 = 10$
$10 – 1 = 9$

Subtraction

Key Language: Take away, less than, the difference, subtract, minus, fewer, decrease
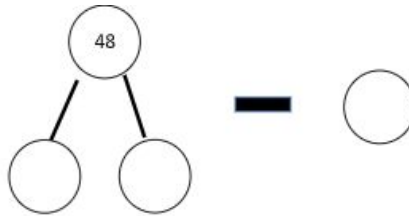
1	Concrete

Column method using base 10.
 48-7

2	Pictorial

Children to represent the base 10 pictorially.

3	Abstract

Column method or children could count back 7.

Subtraction

Key Language: Take away, less than, the difference, subtract, minus, fewer, decrease

1	Concrete

Column method using base 10 and having to exchange. 41 – 26

2	Pictorial

Represent the base 10 pictorially, remembering to show the exchange.

T	O
30 40	10 + 1
20	6

3	Abstract

Formal column method. Children must understand that when they have exchanged the 10 they still have 41 because 41 = 30 + 11.
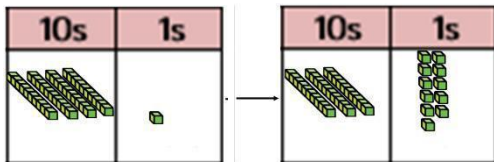
Subtraction

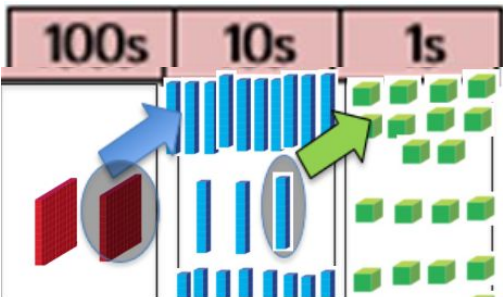Key Language: Take away, less than, the difference, subtract, minus, fewer, decrease

1	Concrete

Column method using dienes.
234 – 88

2	Pictorial

Represent the place value counters pictorially; remembering to show what has been exchanged.

H	T	O
100 200	10 + 30 20	10 + 4
	80	8

3	Abstract

Formal column method. Children must understand what has happened when they have crossed out digits.

$$\begin{array}{r} 2\overset{2}{3}\overset{1}{4} \\ -\ \ 88 \\ \hline 6 \end{array}$$

Multiplication

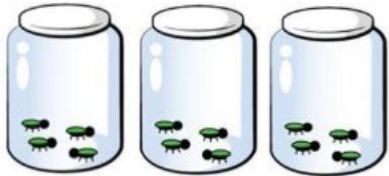Key Language: double, times, multiplied by, the product of, groups of, lots of equal groups.

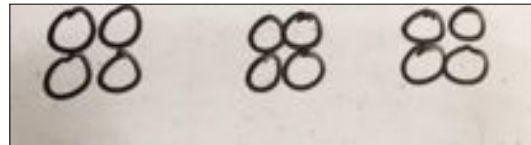| 1	Concrete	2	Pictorial	3	Abstract

Repeated grouping/repeated addition 3 × 4

4 + 4 + 4

There are 3 equal groups, with 4 in each group.

Children to represent the practical resources in a picture.

$$3 × 4 = 12$$

$$4 + 4 + 4 = 12$$

Multiplication

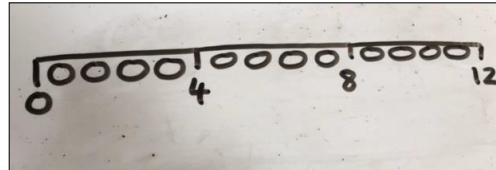Key Language: double, times, multiplied by, the product of, groups of, lots of equal groups.

1	Concrete

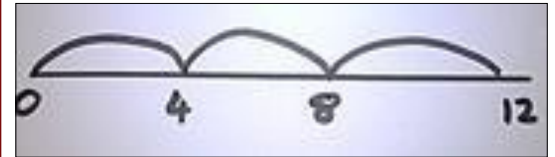**Number lines to show repeated groups-** 3 × 4

2	Pictorial

Represent this pictorially alongside a number line e.g.:

3	Abstract

Abstract number line showing three jumps of four.

3 × 4 = 12

Multiplication

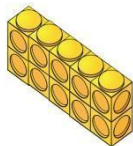Key Language: double, times, multiplied by, the product of, groups of, lots of equal groups.

1	Concrete

Use arrays to illustrate commutativity counters and other objects can also be used.
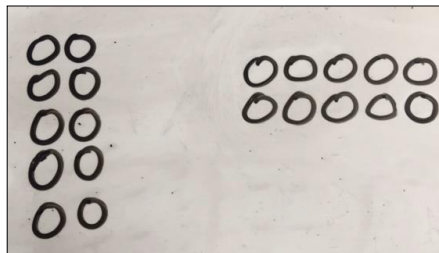
$2 \times 5 = 5 \times 2$

2 lots of 5   5 lots of 2

2	Pictorial

Children to represent the arrays pictorially (e.g. theatre rows).

3	Abstract

Children to be able to use an array to write a range of calculations e.g.

$10 = 2 \times 5$
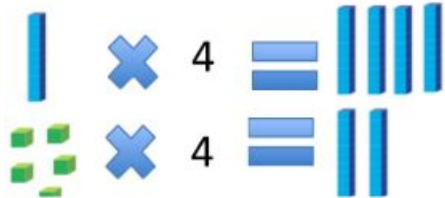$5 \times 2 = 10$
$2 + 2 + 2 + 2 + 2 = 10$
$10 = 5 + 5$

Multiplication

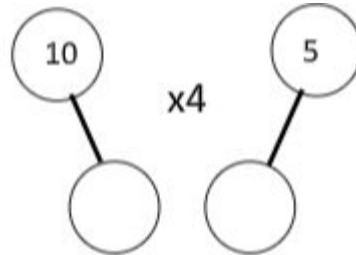Key Language: double, times, multiplied by, the product of, groups of, lots of equal groups.

1	Concrete

Partition to multiply using base 10 (dienes)
15 x 4

2	Pictorial

Children to represent the concrete manipulatives pictorially.

3	Abstract

Children to be encouraged to show the steps they have taken.

X	10	5
4	40	20

Then, 40 + 20 = 60

Multiplication

Key Language: double, times, multiplied by, the product of, groups of, lots of equal groups.

1	2
Formal column method go straight from grid method to column method 3 × 23 and 23 x 6 Children may need to record what it is they are doing to show understanding. 3 × 23 3 × 20 = 60 3 × 3 = 9 20 3 60 + 9 = 69	$$\begin{array}{r} 23 \\ \times\ \ 3 \\ \hline 69 \\ \hline \end{array} \qquad \begin{array}{r} 23 \\ \times\ \ 6 \\ \hline 138 \\ \hline {\scriptstyle 1\ 1} \end{array}$$

Division

Key Language: Share, group, divide, divided by, half.

1	Concrete

Sharing using a range of objects.
6 ÷ 2
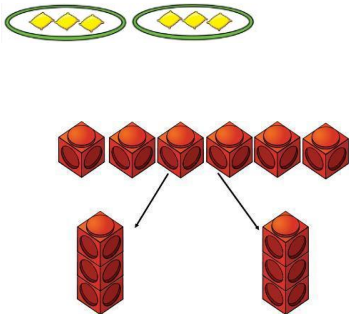
2	Pictorial
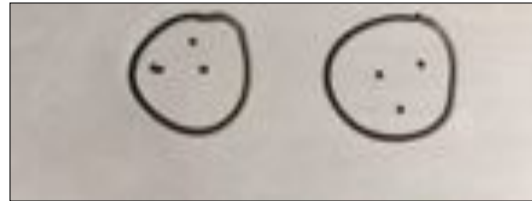
3	Abstract

6 ÷ 2 = 3

Children should also be encouraged to use their 2 times tables facts

Division

Key Language: Share, group, divide, divided by, half.

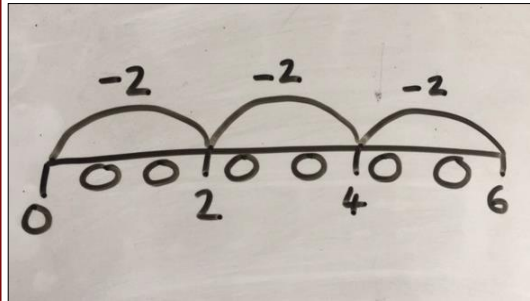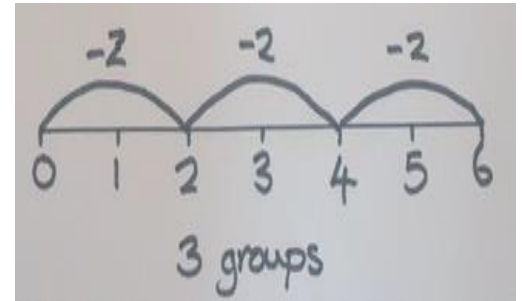| 1	Concrete	2	Pictorial	3	Abstract

Repeated Subtraction
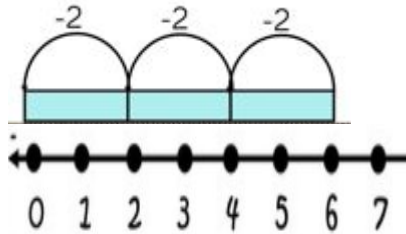
Division

Key Language: Share, group, divide, divided by, half.
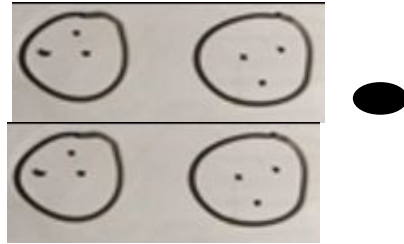
1	Concrete

2d ÷ 1d with remainders
 using sharing.
13 ÷ 3
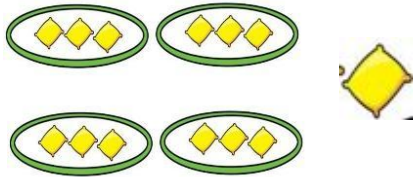
2	Pictorial

Children to represent the saring pictorially

There are 4 groups with 1 left over

3	Abstract

13 ÷ 4 – 3 remainder 1

Children should be encouraged to use their times table facts; they could also represent repeated addition on a number line.

'3 groups of 4, with 1 left over'

Division

Key Language: Share, group, divide, divided by, half.

1 | Concrete

Division using chunking method

42 ÷ 3

3 | Abstract

Children need to be able to use chunking method to make sense of place value when sharing.

Homework Ideas

- Number plates – making a number sentence
- Shapes in the environment
- Shopping – weighing/counting
- Travelling – estimating time and distance

Thank you!

If you have any further questions or queries please contact:

jnicholl@vhprimary.com

srobinson@vhprimary.com

bmiddleton@vhprimary.com