Maths Calculation

Key Stage 1

*Achieving excellence through the pursuit of good'*

Bathwick St. Mary Church School

The importance of place value

In Year 1 and Year 2, place value is extremely important. Children will learn to read and recognise numbers in digits and words. They will also explore how to make 2 digit numbers using resources such as dienes, (orange rods below) objects and arrow cards. Arrow cards show children the value of a digit. Numbers are broken into **tens** and **ones.** In KS1, we do not go beyond 100 so that children are secure with using and applying numbers below 100.
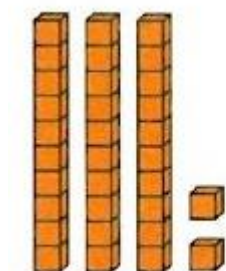
Tens	Ones
3	2
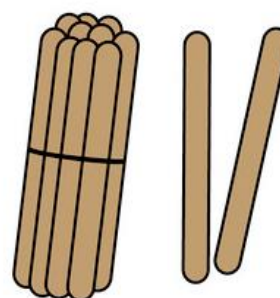
twelve 12
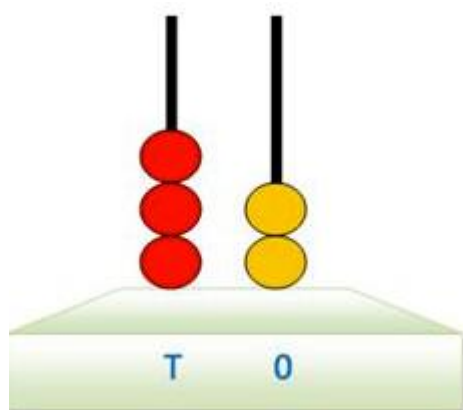
A really good interactive website to use to develop this is:
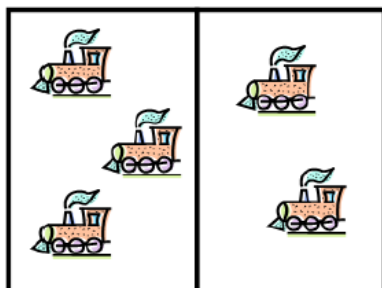http://www.ictgames.com/arrowCards_revised_v5.html

In school, we will share that in a 2 **digit number**, the 0 is the **place holder** for the ones. Therefore, the 6 ones sit on top of the 0 to make 46, shown above.
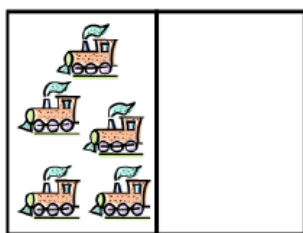
Addition

Pictorial

Children use pictures and other resources to support the recording of calculations.

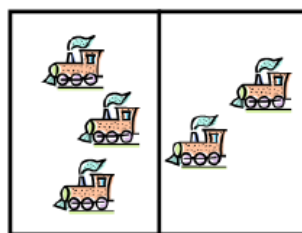3 + 2 = 5

Children are encouraged to relate their pictures to 'formal' symbols associated with addition.

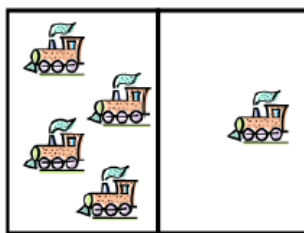## Ways to make 5

5 and 0

3 and 2

Children will often work with physical resources before recording their calculations on paper.

4 and 1

☺ Collections of objects (shells, conkers, buttons etc.) can really help at this stage.
☺ Bead strings, counters and other practical resources are also really useful.

Number Lines

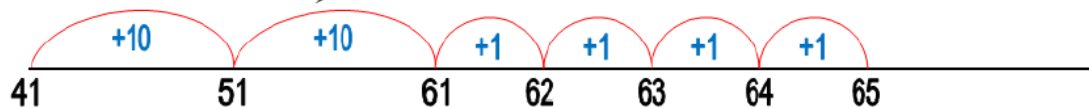Children begin by using 'numbered' lines to support their calculations.
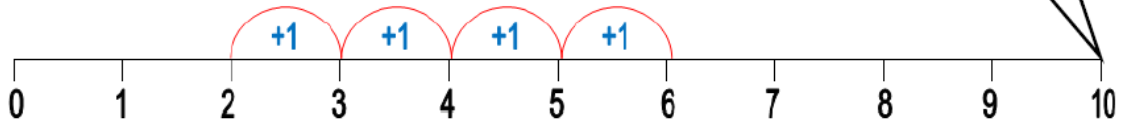
The challenge is increased by counting past (bridging through)10 e.g. 8 + 5 =.

2 + 4 = 6

+1   +1   +1   +1

0   1   2   3   4   5   6   7   8   9   10

Children move to using blank number lines.

To use this method, they need to know how to 'count on' in tens from any two digit number.

41 + 24 = 65

+10   +10   +1   +1   +1   +1

41   51   61   62   63   64   65

As confidence increases, children are able to mark less of the 'steps'.
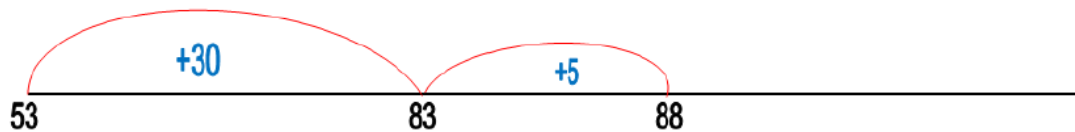
Children must be able to 'partition' numbers into 'tens' and 'ones' to use this method e.g. 35 = 30 + 5

53 + 35 = 88

+30   +5

53   83   88

Children should move through these methods as their confidence and skills allow.
There is little point in marking every 'step' if they are confident adding larger 'chunks'.

Expanded Method

	H	T	O
		6	7
+		5	6
7 + 6 =		1	3
60 + 50 =		1	1	0
TOTAL:	1	2	3

The 'expanded' method allows children to see the value of the numbers they are adding.
In this example, children see that the digits in the 'tens' column represent 60 and 50.

Children are taught to add the 'ones' first as this prepares them for 'carrying' when they move to the contracted method.

Squared paper helps children to line up the correct columns.

Jotting the calculation at the side is helpful when a child is first using this method. It helps them to focus clearly on the value of the digits they are adding.

	H	T	O
	2	8	8
+	1	4	7
8 + 7 =			1	5
80 + 40 =		1	2	0
200 + 100 =	3	0	0
TOTAL:	4	3	5

	H	T	O
	£ 2·	8	8
+	£ 1·	4	7
8p + 7p =	£ 0·	1	5
80p + 40p =	£ 1·	2	0
£2.00 + £1.00 =	£ 3·	0	0
TOTAL:	£ 4·	3	5

This method can also be used for decimals (be sure that the decimal points are lined up).

18	
9	9
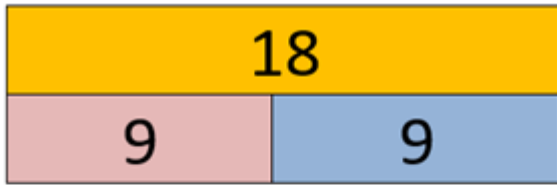
We also share with the children this **bar model**, which helps them to distinguish between tens and ones, and how to make a 2 digit number. This really helps them with **number families.**

68	
60	8
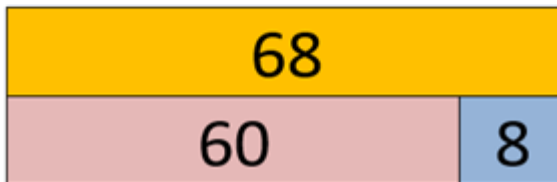
We may also share **an incomplete bar model** and ask the children to fill in the missing number. This really helps with **missing number calculations.**

35	
15	
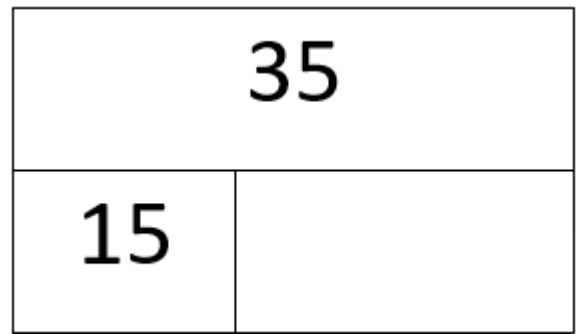
Complete the part whole models by drawing the counters then
writing the numerals.
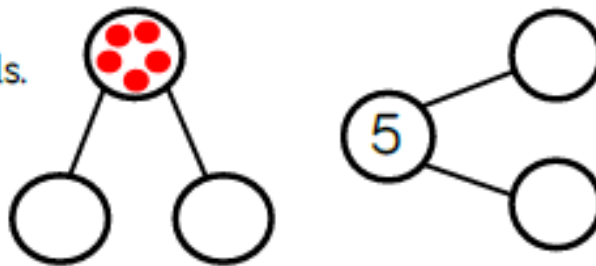
A **part whole model** is also used to show children different ways of making a 1 or 2 digit number. This can be using images and numbers.
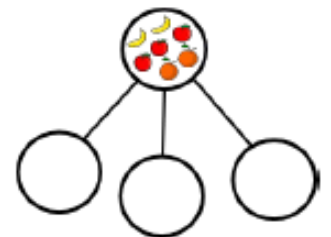
Here are seven pieces of fruit.

Put the fruit into a part whole model.
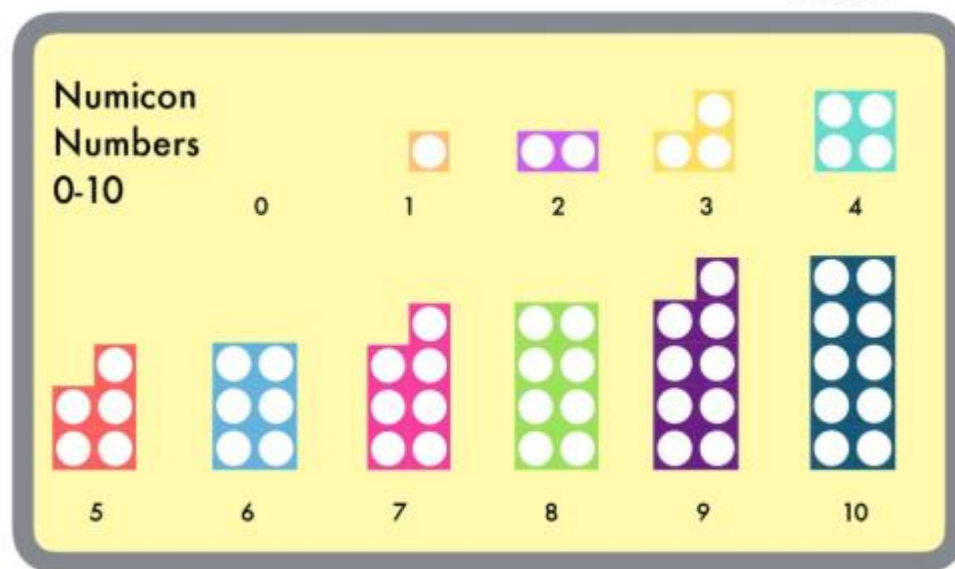Complete the sentences.
………… is the whole.
………… is a part, ………… is a part and ………… is a part.

4 is the whole.
Complete all the part whole models using different numbers for the parts each time.

Numicon Numbers 0-10

0 1 2 3 4

5 6 7 8 9 10

+ ☐

+ ☐

5+5   6+4   7+3   8+2   9+1

Contracted Method (traditional)

H	T	O
2	3	7
+ 1	5	6
3	9	3
	1	

Children should move to this traditional method once they are confident with the value of each digit in a calculation.

Children learn to 'carry' digits below the line that cannot be recorded in the column they are adding.

This is usually explored more in Year 3.

Pictorial

I have 6 sweets.
I eat 2.
I have 4 left.

Children use pictures and other resources to support the recording of calculations.

7 people wait for a bus.
2 get on.
5 are still waiting.

☺ Collections of objects (shells, conkers, buttons etc.) can really help at this stage.
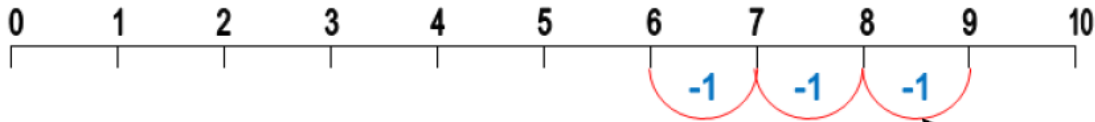☺ Bead strings, counters and other practical resources are also really useful.

Number Lines

9 - 3 = 6

0   1   2   3   4   5   6   7   8   9   10

-1   -1   -1
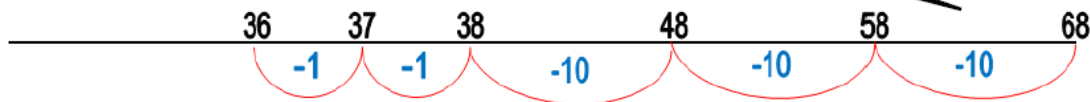
Children are taught to work 'below' the number line to reinforce subtraction as the 'opposite' of addition.

To use this method, they need to know how to 'count back' in tens from any two digit number.

68 - 32 = 36

36   37   38   48   58   68

-1   -1   -10   -10   -10

Children soon begin using blank number lines, 'counting back' in steps of ten and one.

85 - 24 = 61

61   65   85

- 4   - 20
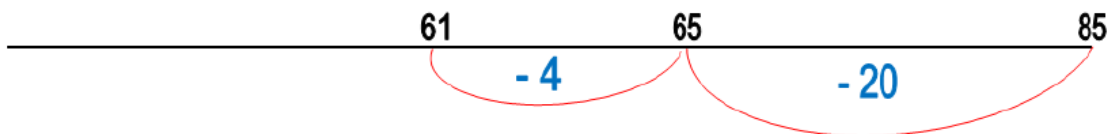
Children must be able to 'partition' numbers into 'tens' and 'ones' to use this method e.g. 24 = 20 + 4

As confidence increases, children are able to mark less of the 'steps'.

Expanded Method

92 - 47 =

	T	O
	⁸9̷ ¹2	
-	4	7
12 - 7 =		5
80 - 40 =	4	0
ANSWER:	4	5

The 'expanded' method allows children to see the value of the numbers they are subtracting.

Children learn to 'exchange' when a calculation is not possible.
In this example, 7 cannot be subtracted from 2 so '10' is borrowed from Tens column.

Contracted Method (traditional)

553 - 236 =

H	T	O
5	⁴5̷	¹3
- 2	3	6
3	1	7

Children should move to this traditional method once they are confident with the value of each digit in the calculation.

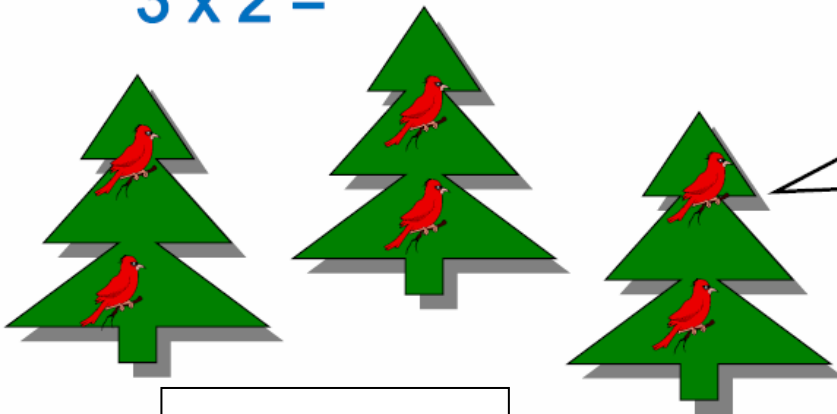# Counting & Grouping

2   4   6   8   10

Counting in twos e.g. the number of wheels on the bikes.

5   10   15   20   25

The number of fingers on the hands.

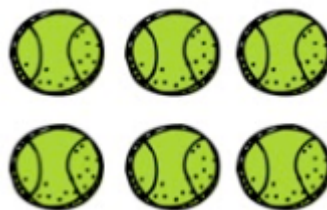Get really good at counting in 2, 5 and 10!

$3 \times 2 =$

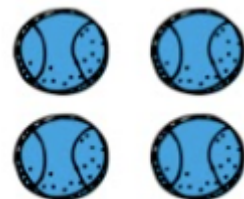Pictorial ways to represent multiplications e.g. three trees with two birds in each tree.

Arrays

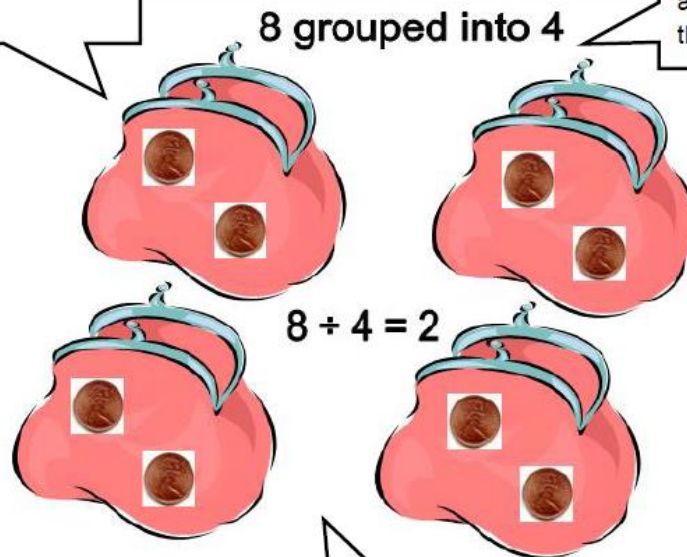Children can draw arrays to visually represent a multiplication calculation.

$3 \times 2 = 6$

$4 \times 2 = 8$

2 **groups of** 2 = 4

Pictorial

Children use pictures and other resources to support the recording of calculations.

Children should be encouraged to think about 'grouping' rather than 'sharing'.

8 grouped into 4

$8 \div 4 = 2$

Examples should be as meaningful as possible e.g. grouping coins or sweets.

☺ Division is taught as the 'inverse' of multiplication.
☺ The concept of 'grouping' is clearly linked to this.
☺ Opportunities must be provided to make these links explicit.

Useful websites:

https://www.topmarks.co.uk/maths-games/hit-the-button

http://www.ictgames.com

https://www.topmarks.co.uk/learning-to-count/paint-the-squares

www.topmarks.co.uk