

Bury C of E Primary School

Mathematics Calculations Progression Document

**YEAR 1**

At Bury CE Primary, we believe that children should be introduced to the processes of calculation through practical, oral and mental activities. As children begin to understand the underlying ideas, they develop ways of recording to support their thinking and calculation methods; use particular methods that apply to special cases and learn to interpret and use the signs and symbols involved.

Choosing the appropriate strategy, recording in mathematics and in calculation in particular is an important tool both for furthering the understanding of ideas and for communicating those ideas to others. Children use age appropriate calculations in order to become **fluent** in that strategy, they will then use calculation strategies to support their thinking and **reasoning**, making connections in their mathematical understanding and for them to become efficient at **problem solving**.

Written methods are complementary to mental methods and should not be seen as separate from them. The aim is that children use mental methods when appropriate, but for calculations that they cannot do mentally they use an efficient written method accurately and with confidence. It is important children acquire secure mental methods of calculation and one efficient written method of calculation for addition, subtraction, multiplication and division which they know they can rely on when mental methods are not appropriate.

This document identifies progression in calculation strategies.

By the end of Year 6, children should be able to choose the most appropriate approach to solve a problem: making a choice between using jottings (an extended written method), an efficient written method or a mental method.

This policy contains the key procedures that will be taught within our school alongside practical resources. It has been written to ensure consistency and progression throughout the school and reflects a whole school agreement.

For a further understanding of mathematics terminology, please see the NCETM 'mathematics glossary' on our school website for an explanation of terms used in each Key Stage.

Recommended websites/ blogs:

<https://www.bbc.co.uk/bitesize/primary>

<https://garethmetcalfe.wordpress.com/>

<http://www.mathematicshed.com/>

<https://ttrockstars.com/>

<https://nrich.maths.org/>

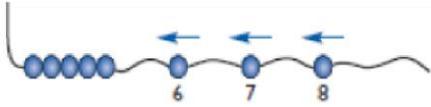
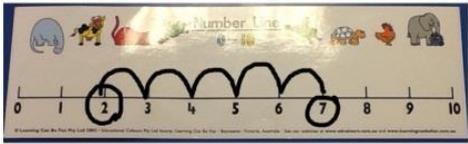
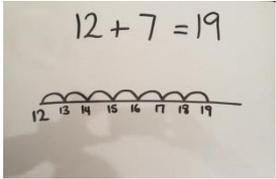
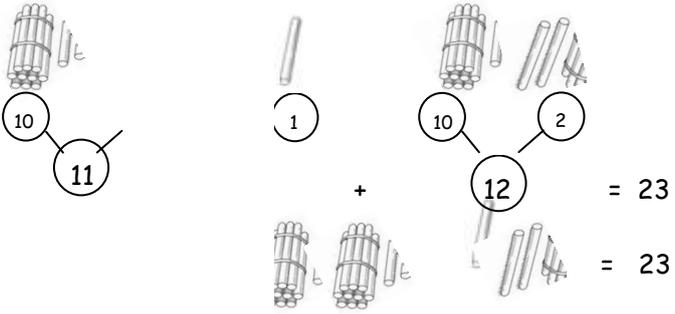
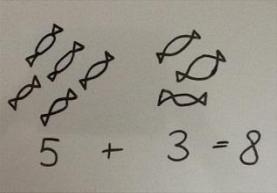
<https://www.ncetm.org.uk/>

\*Note: the terminology of 'ones' and 'units' in the following diagrams is the same concept, meaning a single value.

# YEAR 1 - Addition

**VOCABULARY:** number bonds, add, more, plus, make, sum, total, addend, augend, altogether, inverse double, near double, equals, is the same as (including equals sign), score, one more, two more... ten more, how many more to make...?, how many more is... than...?, how much more is...?

Across all year groups, the questions 'what is the same/ different?' is asked. This supports children with noticing patterns, making connections and making comparisons.

Method:	Example/Representation:
Children will be taught to use songs and a number line to support addition	$4 + 2 = 6$ 
Bead strings, numicon, counting sticks and practical apparatus such as unifix will be used to support addition	$5 + 3 = 8$ 
Children will use a prepared number line to solve simple addition stories and number sentences	$2 + 5 = 7$ 
Children will be taught how to solve simple addition stories with the support of a 100 number square	$11 + 7 = 18$ 
Children are taught how to use a blank number line for addition and then encouraged to draw their own number line to help solve problems	$12 + 7 = 19$ 
Children will partition numbers into tens and ones when adding two 2-digit numbers that lie within the tens boundary	
Children will solve one-step addition problems using concrete objects and/or pictorial representations	<p>I have 5 sweets and I am given 3 more. How many do I have altogether?</p> 

**EXPECTATIONS:**

- Know addition can be carried out in any order (commutative)
- The position of a digit determines its value e.g. 41 is more than 14 due to the place value of the digit 4 being different.
- = (equals) means 'the same as' and can appear anywhere in a number sentence e.g.  $5 = 3 + 2$  and  $3 + 2 = 5$
- Add 1 and 2 digit numbers to 20 including 0
- Number bonds to 20
- Doubles of numbers up to and including double 10
- Adding 10 to a single digit number
- Identify 1 more than a given number
- Part whole relationships link addition and subtraction e.g.  $2 + 4 = 6$  and  $6 - 2 = 4$ .
- Number facts can be related e.g. 'If I know  $10 + 5 = 15$ , then  $9 + 5$  will total one less than 15'
- A whole can have parts e.g. a cake can be cut into parts (link to fractions).

## YEAR 1 – Subtraction

**VOCABULARY:** subtract, take away, minus, leave, minuend, subtrahend, how many fewer is...than..?, how much less is..? half, halve, how many are left/left over?, how many are gone?, one less, two less, ten less..., how many fewer is... than...?, how much less is...? =, equals, sign, is the same as, count on, count back, difference between. how many more is...than...?, how much more is..?

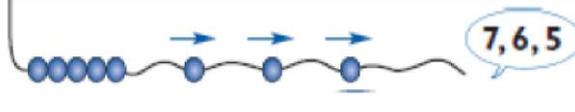
Across all year groups, the questions 'what is the same/ different?' is asked. This supports children with noticing patterns, making connections and making comparisons.

**Method:**  
Children will be taught songs and use a number line to support subtraction by counting backwards

**Example/Representation:**  
 $6 - 2 = 4$

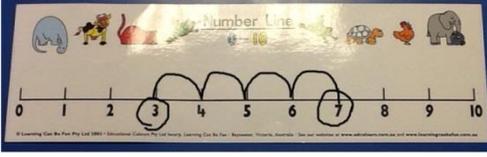


Concrete apparatus such as bead strings, numicon and counting sticks can be used to support subtraction by counting backwards.



$8 - 3 = 5$

Children will use a prepared number line to solve simple subtraction stories and number sentences by counting backwards



$7 - 4 = 3$

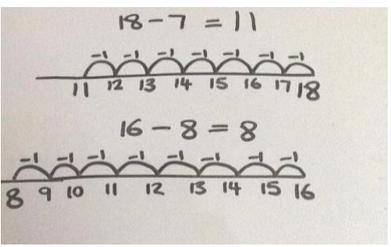
Children will be taught how to solve simple subtraction stories with the support of a 100 number square



$20 - 4 = 16$

Children are taught how to use a blank number line for subtraction (counting backwards) and then encouraged to draw their own number line to help solve problems.

Children will begin with Tens and Ones – Ones that lie within the tens boundary then move onto Tens and Ones – Ones that cross the tens boundary.



Children will solve one-step subtraction problems (including missing number problems) using concrete objects and pictorial representations.



$5 - \square = 3$     $\square - 2 = 3$

**EXPECTATIONS:**

- Subtract 1 and 2 digit numbers to 20 including 0
- To know that subtraction is not commutative and that the larger number must always come first
- Subtraction can be done by counting up to find the difference, or counting back.
- A number fact can be derived from another fact e.g. If I know  $10 + 5$  is 15 then  $9 + 5$  will be one less than 15.
- Use knowledge of number bonds and part/ whole relationships to reason using numbers to 20 e.g. ( $9 + 1 = 10$  so  $10 - 9 = 1$  and  $10 - 1 = 9$ ).

## YEAR 1 – Multiplication

**VOCABULARY:** odd, even, count in twos, fives, count in tens (forwards from/backwards from), how many times? lots of, groups of, once, twice, five times, ten times, multiple of, times, multiply, multiplier, multiply by, array, row, column, double.

### Method:

Children will count groups of the same number of objects and add them together.  
The children learn about grouping in practical contexts, through pictorial representation  
Concrete apparatus such as bead strings and counting sticks will be used to support counting in sequences of 2s, 5s and 10's

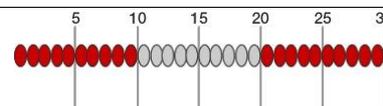
Children will recognise and complete patterns and sequences involving **multiples of 2, 5 and 10**

Children will be given one-step word problems to solve, involving counting in **multiples of 2, 5 and 10 and doubles**. Children will use concrete objects and pictorial representations to support their ideas

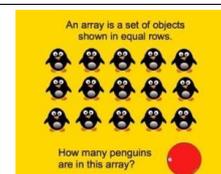
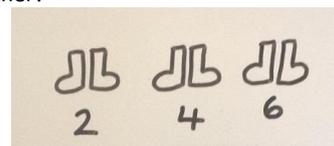
Children will be introduced to an **array** to support multiplication and to support the understanding that multiplication is repeated addition

### Example/Representation:

1) I have 5 pairs of socks in the bag. How many socks are there?



Alfie, Joseph and Ben all have a pair of socks. How many socks are there altogether?



$$5 + 5 + 5 = 15$$

### EXPECTATIONS:

- Count forwards and backwards in multiples of 2s, 5s and 10s.
- Recall doubles of numbers up to and including 10.

## YEAR 1 - Division

**VOCABULARY:** halve, share, share equally, groups, equal groups of, divide, divided by, left, left over

### Method

Children will understand **equal groups and share items** out using concrete apparatus.

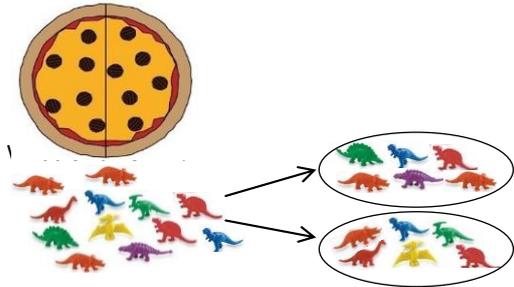
### Example/Representation:

Share 12 cakes between 3 people equally:



Children will be taught to **associate 'half' with dividing by two** and recognise, find and name a half as one of two equal parts

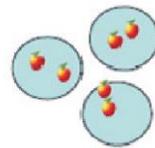
Can you cut the pizza in half?



Children will be given a word problem to complete either practically or using pictorial representations

Can you share 6

apples between 3 plates?



Children will recognise and write the division symbol ( $\div$ ) in mathematical statements, calculating the answer with the teacher using concrete objects

$$8 \div 2 = 4$$



### EXPECTATIONS:

- Count forwards and backwards in multiples of 2s, 5s and 10s.