Calculation policy – Addition in Curriculum 2014
Progression of methods across the school

The following calculation policy has been devised to meet the requirements of the National curriculum 2014 for the teaching and learning of mathematics, and is designed to ensure a smooth and consistent, yet rapid progression of learning calculations across the school.

Guidance for use of the policy
- The following standards are what we would expect most children to achieve.
- Children achieving below the standards, for example children with S.E.N, will need to be given the method most appropriate for their level of achievement.
- Children achieving the expected standards in calculation will be provided with more opportunities to apply their calculations, at their age-related level, in more challenging contexts and problems.

A context for calculation
- Calculations should be given a real-life context.

Children should be encouraged to:

- **Approximate their answers before calculating.**
- **Check their answers after calculation using an appropriate strategy.**
- **Consider if a mental calculation would be appropriate before using written methods.**
- **Understand the process of partitioning**
- **Develop mental fluency and an understanding of problem solving.**
- **Use reasoning skills**
- **Use manipulatives or visualisation where appropriate**

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

Foundation Stage and Year 1

Expectations of experience
- Children should have access to a wide range of counting equipment, everyday objects, bead strings and number lines that they can manipulate and handle.
- Numbers should be shown in different contexts.
- They are encouraged to develop a mental picture of the number system in their heads to use for calculation (visualisation).
- Children count on and back given numbers. They develop ways of recording calculations using pictures, number lines, hundred squares etc.
- Children should interpret number sentences and solve missing number problems such as $7 = ? + 4$
- Be able to add one-digit and two-digit numbers to 20 and use number bonds to 20, in Year 1.
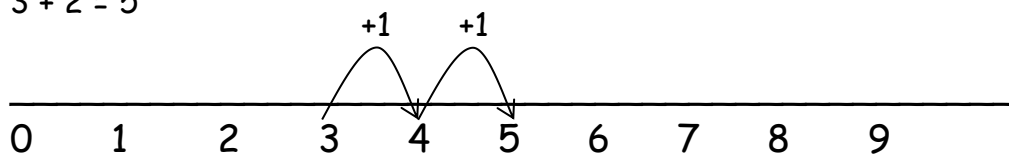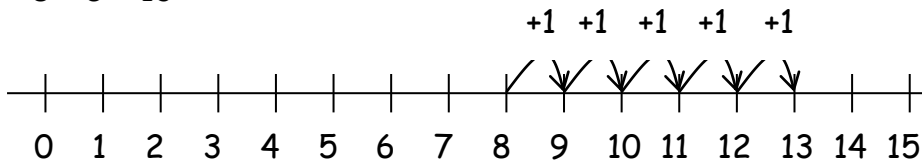
Pictorial representation
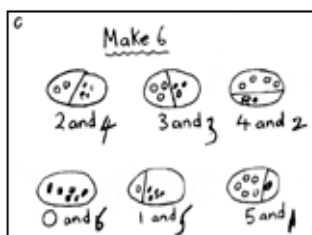
Number lines
Children use number lines and practical resources to support calculation.
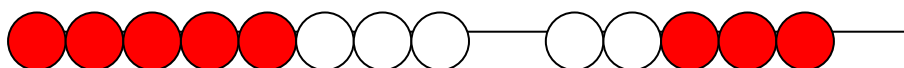
$3 + 2 = 5$

$8 + 5 = 13$

Bead Strings/ bars
Bead strings or bead bars can be used to illustrate addition including bridging through ten. E.g. In 8 + 5, by counting on 2 then counting on 3.
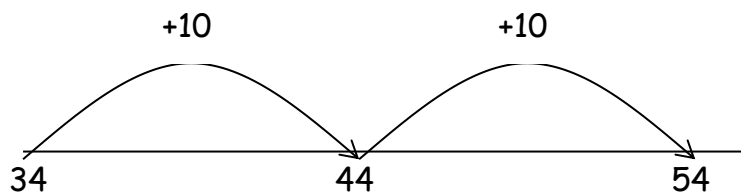
Year 2

Children will be taught to add in columns where exchanging is not required, but only with manipulatives.
Children will add numbers using concrete objects and pictorial representations, hundred squares etc. and to build confidence in mental addition skills.

Number lines

For adding 2-digit numbers and tens

34 + 20 = 54

```
        +10            +10
   ⌒              ⌒
  34           44            54
```

For adding 2-digit numbers and units

16 + 7 = 23

```
        +4             +3
   ⌒              ⌒
  16           20            23
```
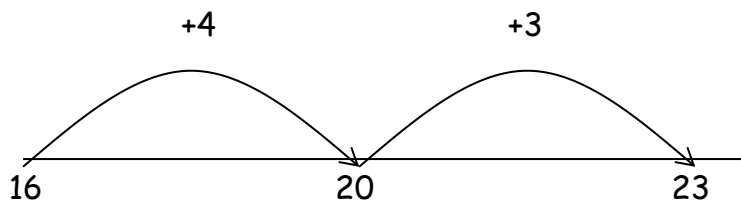
For adding pairs of 2-digit numbers

16 + 13 = 23

```
        +10            +3
   ⌒              ⌒
  16           26            29
```
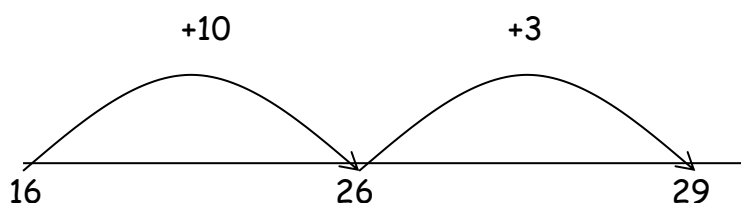
Column method

(For adding pairs of 2-digit numbers, when secure adding tens and units)

```
    25                      31
+   42                  +   42
    67                      73
```

The column method will be taught, supported by place value equipment.
Do not cross the tens boundary until children are fully secure with the method itself.

Using these methods, children will add numbers with up to 2 digits. For example:
- ✓ add two two-digit numbers
- ✓ three one-digit numbers   (including mentally)
- ✓ a two-digit number and tens (including mentally)
- ✓ a two-digit number and ones (including mentally)

Children will also:
Choose to addmentally, where appropriate.
Recall and use addition facts to 20, fluently and derive and use related facts up to 100.
Solve problems using number facts, place value and missing number problems.
Know that addition can be done in any order.

<u>Y3</u>

Children will be taught to exchange below the line.

```
   625              31             367
+  142          +  298         +  225
   767             329            592
                     1              1
```

This method will be taught, supported by place value equipment, to allow children to better understand the process of exchanging in addition and the relationship to place value.

Using this method, children will add numbers with up to 3 digits, using formal written methods.
Children should also be able to add mentally including:
- *A three digit number and ones*
- *A three digit number and tens*
- *A three digit number and hundreds*

Children will also:
Choose to add mentally, where appropriate.
Estimate and use inverse operations to check answers.
Solve problems using number facts, place value and missing number problems.

Y4

Children will be taught to exchange below the line.

```
   3625              3683              367
+  5648           +  5242          + 2085
   9273              8925             2452
   1   1                1            1 1
```

This method will be taught, supported by place value equipment, to allow children to better understand the process of carrying in addition. By the end of Year 4, children should have a secure and efficient written method for addition.

Using this method, children will:
✓   *add several numbers with different numbers of digits;*
✓   *add numbers with up to 4 digits;*

Children will also:
Choose to add mentally, where appropriate.
Estimate and use inverse operations to check answers.
Solve two-step problems in context.

Y5

Children should extend the exchanging method to numbers with more than four digits.

```
    7648              26584                    42
 + 53486            +25848                   6432
   61134             52432                    786
    1 11               1 11                     3
                                        +   4681
                                           11944
                                             1 2 1
```

With this method children will:
- ✓   *add several numbers with different numbers of digits;*
- ✓   *begin to add two or more decimal fractions with up to three digits and the same number of decimal places;*
- ✓   *know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m – 280 cm, converting to the same units, before adding.*

Children will also:
Choose to add mentally, with increasingly large numbers.
Use rounding to check answers to calculations and determine, in the context of a problem, the level of accuracy required.
Estimate and use inverse operations to check answers.
Solve multi-step problems in context.

<u>Y6</u>

Children should extend the exchanging method, from Year 5, but with any number of digits, to solve multi-step problems, in context.
Children should also understand how to calculate using knowledge of the order of the 4 operations.
Be able to estimate with an appropriate degree of accuracy to check answers from problems.
Perform mental calculations including mixed operations and large numbers.

By the end of Year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should not be made to go onto the next stage if:

1) **they are not ready.**
2) **they are not confident.**