



Shotton Hall Primary School

Working together to

SHINE

Successful, Happy, Inspired and Nurtured towards Excellence

Reviewed and Amended: 21.09.18

Next review: September 2019

Ratified by the governing body on: 24th November 2017

Signed:

RRSA Links

Article 28 - Every child has the right to an education.

Article 29 - Education must develop every child's personality, talents and abilities to the full. It must encourage the child's respect for human rights, as well as respect for their parents, their own and other cultures and the environment.

The following strategies are used in the teaching of addition in Maths. They are also supported by additional strategies which are suggested in the White Rose Teaching for Mastery documents.

PROGRESSION THROUGH CALCULATIONS FOR ADDITION

MENTAL CALCULATIONS

(ongoing)

These are a **selection** of mental calculation strategies:

Mental recall of number bonds

$$6 + 4 = 10$$

$$25 + 75 = 100$$

$$\square + 3 = 10$$

$$19 + \square = 20$$

Use near doubles

$$6 + 7 = \text{double } 6 + 1 = 13$$

Addition using partitioning and recombining

$$34 + 45 = (30 + 40) + (4 + 5) = 79$$

Counting on or back in repeated steps of 1, 10, 100, 1000

$$86 + 57 = 143 \text{ (by counting on in tens and then in ones)}$$

$$460 - 300 = 160 \text{ (by counting back in hundreds)}$$

Add the nearest multiple of 10, 100 and 1000 and adjust

$$24 + 19 = 24 + 20 - 1 = 43$$

$$458 + 71 = 458 + 70 + 1 = 529$$

Use the relationship between addition and subtraction

$$36 + 19 = 55$$

$$19 + 36 = 55$$

$$55 - 19 = 36$$

$$55 - 36 = 19$$

MANY MENTAL CALCULATION STRATEGIES WILL CONTINUE TO BE USED. THEY ARE NOT REPLACED BY WRITTEN METHODS.

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

Before the introduction of formal written methods for addition, children should be able to:

1. recall all addition pairs to $9 + 9$ and complements in 10;
2. add mentally a series of one-digit numbers, such as $5 + 8 + 4$;
3. add multiples of 10 (such as $60 + 70$) or of 100 (such as $600 + 700$) using the related addition fact, $6 + 7$, and their knowledge of place value;
4. partition two-digit and three-digit numbers into multiples of 100, 10 and 1 in different ways.

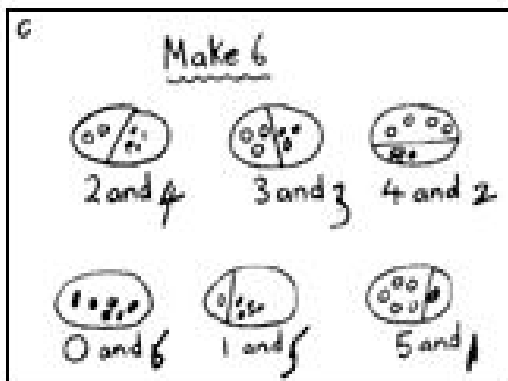
EARLY STAGES (EYFS)

Children will engage in a wide variety of songs and rhymes, games and activities. They will begin to relate addition to combining two groups of objects, first by counting all and then by counting on from the largest number. They will find one more than a given number. In practical activities and through discussion they will begin to use the vocabulary involved in addition.



'You have five apples and I have three apples. How many apples are there altogether?'

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures, etc.



In Reception children use numbertracks and practical resources as they are introduced to calculation.



Y1

Statutory Requirements

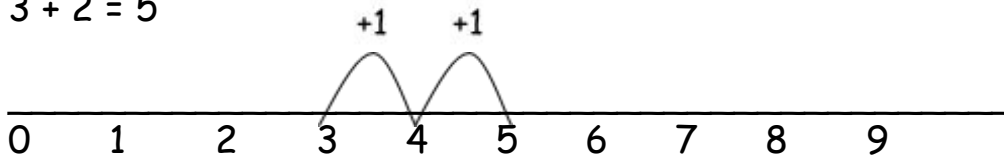
Pupils should be taught to:

- read, write and interpret mathematical statements involving addition (+) and equals (=) signs
- represent and use number bonds within 20
- add one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as $7 = \square + 5$.

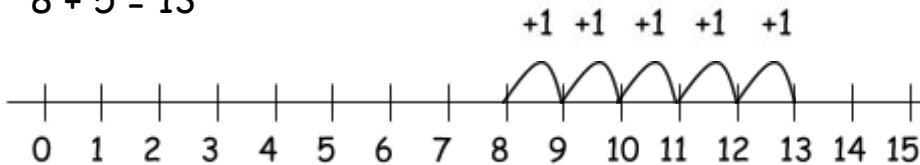
In Year 1, children will move to using numberlines (as well as practical resources) to support calculation and teachers *demonstrate* the use of the numberline.

By the end of Year 1, some children may be able to draw their own numberlines in books.

$$3 + 2 = 5$$



$$8 + 5 = 13$$



Y2

Statutory requirements

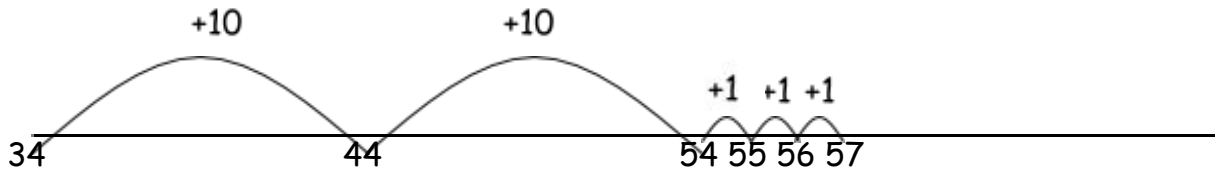
Pupils should be taught to:

- add numbers using concrete objects, pictorial representations, and mentally, including:
 - a two-digit number and ones
 - a two-digit number and tens
 - two two-digit numbers
 - adding three one-digit numbers

Children will begin to use 'empty number lines' themselves starting with the larger number and counting on.

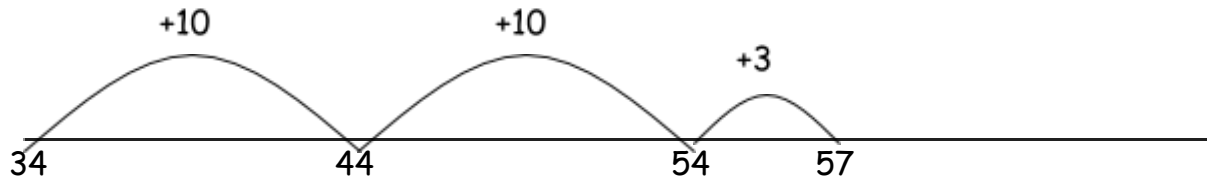
- ✓ First counting on in tens and ones.

$$34 + 23 = 57$$



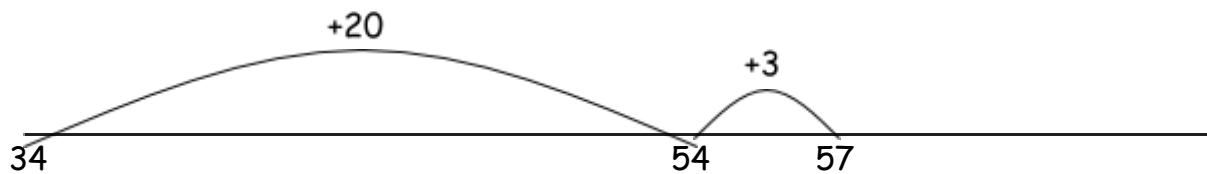
✓ Then helping children to become more efficient by adding the units in one jump (by using the known fact $4 + 3 = 7$).

$$34 + 23 = 57$$



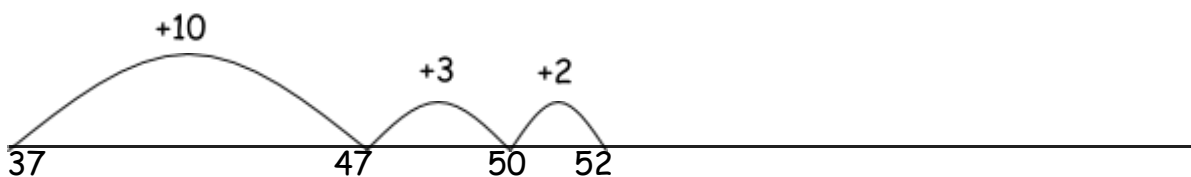
✓ Followed by adding the tens in one jump and the units in one jump.

$$34 + 23 = 57$$



✓ Bridging through ten can help children become more efficient.

$$37 + 15 = 52$$



Children will use partitioning as an informal jotting.

$$67 + 38 = \quad \begin{array}{l} 60 + 7 \\ 30 + 8 \end{array} \quad 90 + 15 = 105$$

$$\begin{array}{r} 21 \\ + 17 \\ \hline 38 \end{array}$$

30
+
8

Children will use the compact method of addition, at first with no 'carrying', then with 'carrying' on the 'doorstep'.

$$\begin{array}{r} 23 \\ + 14 \\ \hline 37 \end{array} \quad \begin{array}{r} 27 \\ + 14 \\ \hline 41 \end{array} \quad \begin{array}{r} 157 \\ + 234 \\ \hline 391 \end{array}$$

Y3

Statutory requirements

Pupils should be taught to:

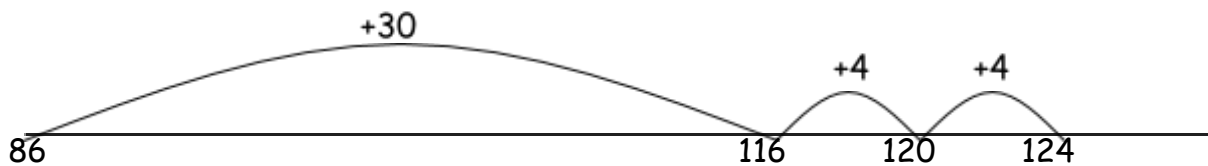
- add numbers with up to three digits, using formal written methods of columnar addition

Children, who require it, will continue to use partitioning as an informal jotting.

Children will continue to use empty number lines with increasingly large numbers, including compensation where appropriate.

- ✓ Count on from the largest number irrespective of the order of the calculation.

$$38 + 86 = 124$$



Build up starting with 2 digits + 2 digits

Introducing the compact layout

- no carrying (demonstration stage only), e.g. $54 + 35$, $326 + 271$
- carrying from units to tens, e.g. $47 + 26$, $368 + 423$
- carrying from tens to hundreds, e.g. $368 + 481$
- carrying from units to tens and tens to hundreds, e.g. $47 + 76$, $368 + 478$
- a mixture of 'carries'

E.g. demonstrate the method children currently use alongside the new method. Children should then

practise the new method. ($368 + 478$)

$$\begin{array}{r} \text{H T U} \\ 368 \\ + 478 \\ \hline 846 \end{array}$$

When the compact layout is introduced, it is helpful to use the place value headings of HTU.

When the compact layout is introduced, the language of place value should continue to be used but when children are confident, they will use 'digit-speak', e.g. for the addition of two three-digit numbers above, they are likely to say:

- 8 add 8 is sixteen; 6 in the answer and carry 1/put it on the doprstep
- 6 add 7 is 13 plus the carry 1 is 14; 4 in the answer and carry 1
- 3 add 4 is 7 plus the carry 1 is 8
- Answer is 846

*This is a form of shorthand that speeds up the process of addition. If children consistently carry out a range of calculations correctly, it is likely that they understand the process. However, teachers should occasionally check their understanding by asking children to explain what exactly they mean at each stage of the calculation, e.g. what does that 'carry 1' really mean?

Y4

Statutory requirements

Pupils should be taught to:

- add numbers with up to **4 digits** using the formal written methods of columnar addition where appropriate

See the column method shown for Y3 and extend to addition of 4 digit whole numbers.

Children in Y4 will meet some fairly simple additions of £.p. some children may be able to use the compact column method, but those who have not learnt how to use this method should change pounds to pence and add using a compact method.

Ensure that children are aware that the decimal points should line up especially when using mixed amounts.

$$\begin{array}{r} \text{Eg } \text{£}3.59 + 78\text{p} = \quad 3 . 5 9 \\ \quad \quad \quad + \quad \underline{01 . 71 8} \\ \quad \quad \quad \quad \underline{4 . 3 7} \end{array}$$

Children will continue this method until confident using larger numbers etc. (including decimals in the context of money).

$$\begin{array}{r} \text{£ } 12 . 6 5 \\ + \text{£ } \underline{23 . 81 6} \\ \text{£ } \underline{36 . 5 1} \end{array}$$

Y5

Statutory requirements

Pupils should be taught to:

- add whole numbers with more than 4 digits, including using formal written methods (columnar addition)

Children will continue with this compact method, extending the carrying method to numbers with at least four digits and beyond.

Using similar methods, children will:

- ✓ add several numbers with different numbers of digits;
- ✓ begin to add two or more three-digit sums of money, with or without adjustment from the pence to the pounds;
- ✓ begin to add two or more decimal fractions with up to three digits and the same number of decimal places;
- ✓ know that the decimal points should line up under each other, particularly when adding mixed amounts, e.g. 3.2 m - 280 cm.

Y6

NO STATUTORY REQUIREMENTS

Children should extend the carrying method to numbers with any number of digits and be able to apply this when problem solving.

Using similar methods, children will

- ✓ add several numbers with different numbers of digits;
- ✓ begin to add two or more decimal fractions with up to four digits and either one or two decimal places;
- ✓ know that decimal points should line up under each other, particularly when adding mixed amounts, e.g. $401.2 + 26.85 + 0.71$.

+ - + - + - + - + - + - +

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.

Children should be encouraged to approximate their answers before calculating. Children should be encouraged to check their answers after calculation using an appropriate strategy.

Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.