



Mathematics Calculation Guidelines

Progression through Calculations for ADDITION

- These standards are age-related expectations and therefore we expect the majority of children to achieve them.
- New learning is likely to be taught to groups rather than the whole class to acknowledge the different learning stages of the children.
- Children should understand that addition is commutative and therefore calculations can be rearranged, e.g. $4 + 13 = 17$ is the same as $13 + 4 = 17$.
- Ensure that children understand the = sign means is the same as, **not** makes, and that children see calculations where the equals sign is in a different position, e.g. $3 + 2 = 5$ and $5 = 3 + 2$.
- Children should be encouraged to approximate before calculating and check whether their answer is reasonable.

EARLY YEARS:

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They should experience practical calculation opportunities using a wide variety of equipment, e.g. small world play, role play, counters, cubes etc. They develop ways of recording calculations using pictures, etc.



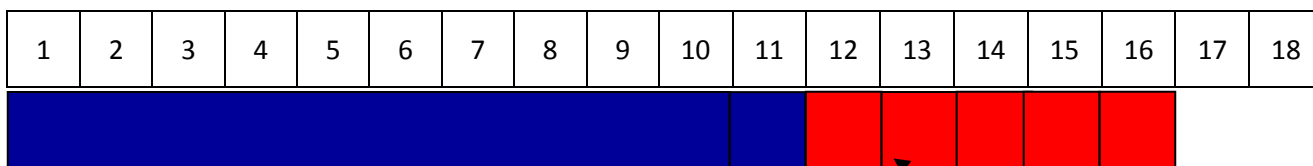
Children **who are ready** may record this as:

$$6 = 2 + 4 \quad 6 = 3 + 3 \quad 6 = 4 + 2 \quad 6 = 0 + 6 \quad 6 = 1 + 5 \quad 6 = 5 + 1$$

END OF YEAR 1 EXPECTATIONS:

Children will initially use practical equipment to combine groups of objects to find the total. They will move on to the use of number tracks and Base 10 equipment to support their developing understanding of addition. If possible, **use two different colours** of base 10 equipment so that the initial amounts can still be seen.

$$11 + 5 =$$



$$11 + 5 = 16$$

Model of Base 10 equipment

End of Year 1 Expectations

Addition: Pre-stage 1

Pictures and symbols

Add two groups of objects (using Base 10)

+ = 5 $3 + 2 = 5$

This can be recorded as:

$7 + 4 = 11$

Work out missing numbers:

$7 + \square = 11$

$\square + 4 = 11$



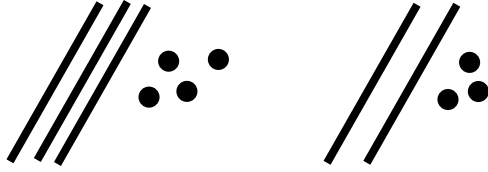
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END OF YEAR 2 EXPECTATIONS:

Children will continue to use the Base 10 equipment to support their calculations. They will record the calculations using their own drawings of the Base 10 equipment (as lines for the 10 rods and dots for the unit blocks)

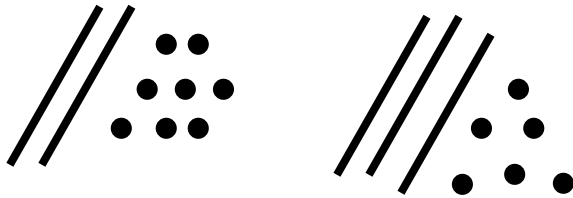
e.g. $34 + 23 =$



$$34 + 23 = 57$$

They would add the **units first** and then the tens before combining them.

e.g. $28 + 36 =$



$$28 + 36 = 64$$

When the units total 10 or more, children should be encouraged to **exchange** 10 ones for 1 ten. This is the start of children understanding 'carrying' in vertical addition.

End of Year 2 Expectations

Addition: Stage 1

Partition the smaller number into tens and units then recombine. (Use Base 10)

E.g. $34 + 23 =$

$/// \cdot \cdot$

$/// \cdot \cdot$

$34 + 23 = 57$

$////$

$\cdot \cdot \cdot$

END OF YEAR 3 EXPECTATIONS: Y2 and continue to use this to support with the transition into a vertical method.

Children should add the **least significant digits** first as preparation for the compact method.



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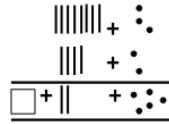
End of Year 3 Expectations

Addition: Stage 2

Column Method

$83 + 42 =$

$$\begin{array}{r} 80 + 3 \\ 40 + 2 \\ \hline 120 + 5 = 125 \end{array}$$



Leading to:

$383 + 42 =$

$$\begin{array}{r} 300 + 50 + 8 \\ 70 + 3 \\ \hline 300 + 120 + 11 \end{array}$$

$$\begin{array}{r} 300 + 00 + 0 \\ 100 + 20 + 0 \\ 10 + 1 \\ \hline 400 + 30 + 1 \end{array}$$

$$\begin{array}{r} 400 + 30 + 1 \\ \hline = 431 \end{array}$$

The Base 10 equipment should be used alongside to model the transition to the vertical method but this should not be recorded by the children.

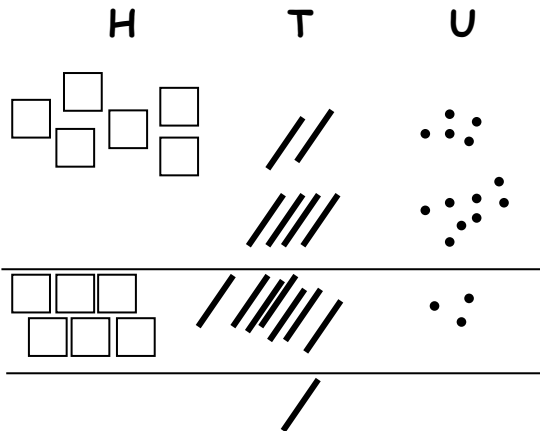
END OF YEAR 4 EXPECTATIONS:

Based on their experiences in Y3, children will then begin to carry below the line.

The best way to model this would be using Base 10 equipment to show how units would transfer to tens.

HTU

$$\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ 1 \end{array}$$



Teacher model

$$\begin{array}{r} 783 \\ + 42 \\ \hline 825 \\ 1 \end{array}$$

$$\begin{array}{r} 367 \\ + 85 \\ \hline 452 \\ 11 \end{array}$$

$$\begin{array}{r} 321 \\ + 7 \\ + 48 \\ \hline 376 \\ 1 \end{array}$$

$$\begin{array}{r} £3.48 \\ + £0.78 \\ \hline £4.26 \\ 11 \end{array}$$

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;
- know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. £3.59 + 78p.



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End of Year 4 Expectations

Addition: Stage 3

Column Method – show numbers carried under the line.

Extend to 4 digit numbers

$$\begin{array}{r} 358 \\ + 73 \\ \hline 431 \\ \hline \end{array}$$

1 1

$$\begin{array}{r} 2358 \\ + 773 \\ \hline 3131 \\ \hline \end{array}$$

1 1 1

END OF YEAR 5 EXPECTATIONS:

Children should extend the carrying method to numbers with at least four digits.

$$\begin{array}{r} 587 \\ + 475 \\ \hline 1062 \\ \hline \end{array}$$

1 1

$$\begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ \hline \end{array}$$

1 1 1

$$\begin{array}{r} 3121 \\ + 37 \\ + 148 \\ \hline 3306 \\ \hline \end{array}$$

1 1

$$\begin{array}{r} 3.20 \\ + 2.88 \\ \hline 6.08 \\ \hline \end{array}$$

1

Using similar methods, 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.

End of Year 5 Expectations

Addition: Stage 4

Extend to decimals with 1 and 2 decimal places.

$$124.9 + 117.25 = 242.15$$

$$\begin{array}{r} 124.90 \\ + 117.25 \\ \hline 242.15 \\ \hline \end{array}$$

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END OF YEAR 6 EXPECTATIONS:

Children should extend the carrying method to number with any number of digits.

$$\begin{array}{r} 7648 \\ + 1486 \\ \hline 9134 \\ 111 \end{array}$$

$$\begin{array}{r} 6584 \\ + 5848 \\ \hline 12432 \\ 111 \end{array}$$

$$\begin{array}{r} 42 \\ 6432 \\ 786 \\ 3 \\ + 4681 \\ \hline 11944 \\ 121 \end{array}$$

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 or subtracting mixed amounts, e.g. $401.2 + 26.85 + 0.71$.

$$\begin{array}{r} 401.20 \\ + 26.85 \\ + 0.71 \\ \hline 428.76 \\ 1 \end{array}$$

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 consider if a mental calculation would be appropriate before using written methods.