

PROGRESSION THROUGH CALCULATIONS FOR SUBTRACTION

- 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 subtraction is the removing or taking away one quantity from another (not necessarily the smaller number from the larger one) or finding the difference between two separate quantities.
- Children should understand that, unlike addition, subtraction is **not** commutative.
- Ensure that children understand the = sign means is the same as and that children see calculations where the equals sign is in a different position, e.g. $9 - 5 = 4$ and $4 = 9 - 5$.
- Children should be encouraged to approximate before calculating and check whether their answer is reasonable.

YR

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.

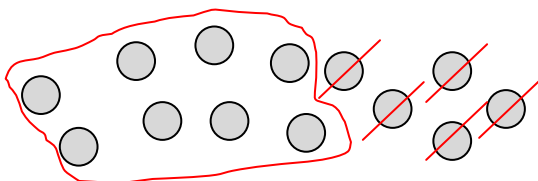


Children will see modelled recording of such calculations as $8 - 5 = 3$.

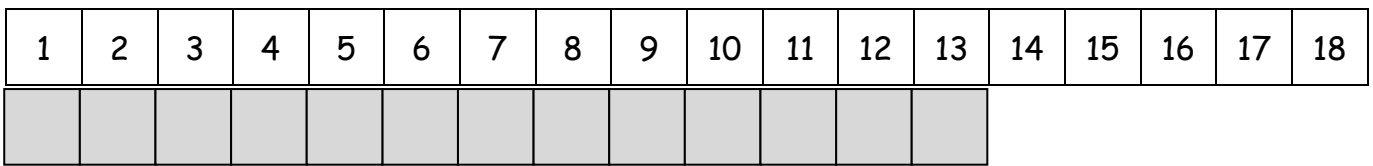
Those who are ready may record their own calculations.

Y1

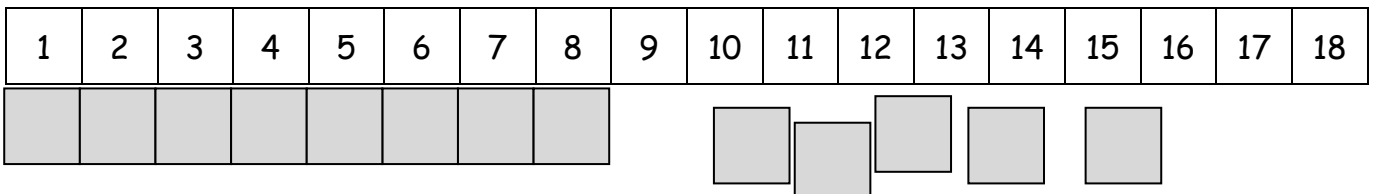
Children will use practical equipment for subtraction by taking away, e.g. $13 - 5$



Children may also use a number track to support their taking away using Base 10 cubes (ones only), e.g. $13 - 5$



Count out 13 cubes along the number track followed by removal of 5 cubes to give answer:



$13 - 5 = 8$ It is important that children keep track of how many have been removed.

Subtraction as finding the difference

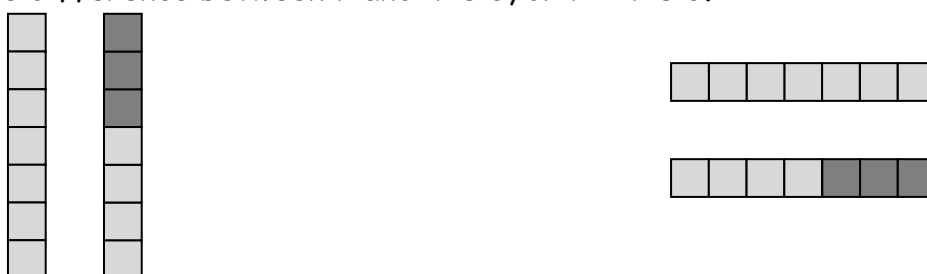
In preparation for understanding how to find the difference by counting up, children should be shown that finding the difference is linked to subtraction and the teacher should ensure the children know that it is an appropriate strategy to use when the numbers are close together.

e.g. $7 - 4$

Children should use equipment such as unifix or multilink to create towers for the two given amounts, this could be done both vertically or horizontally.



To find the difference, children should find out how many more cubes are required to make the towers the same. This provides the basis for finding the difference by counting on, e.g. the difference between 7 and 4 is 3, or $7 - 4$ is 3.

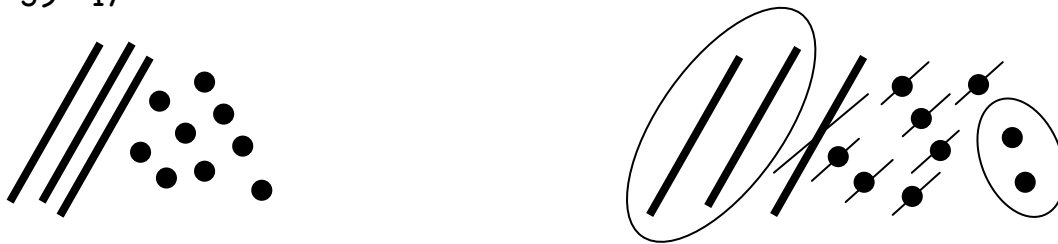


NB - It is useful to present the concept of difference in contexts such as real life problems, comparing two measurements or when interpreting block graphs.

Y2

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 slanted lines for the 10 rods and dots for the ones). They need to understand that the number being subtracted does not appear as an amount on its own, but rather as part of the larger amount.

e.g. $39 - 17$



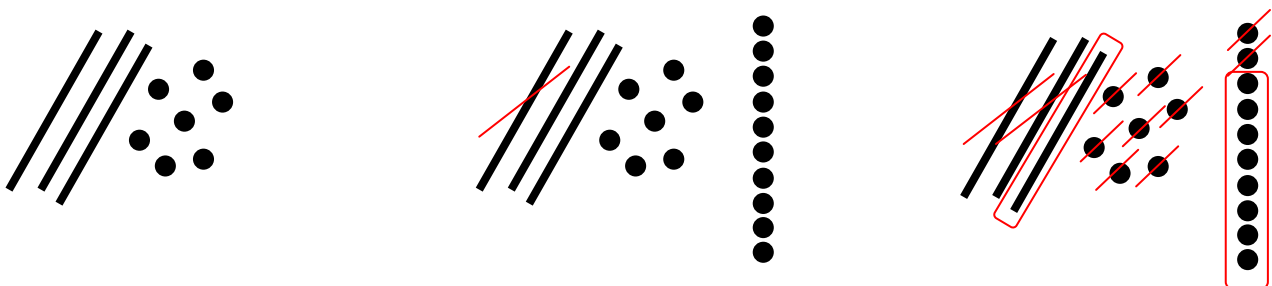
Children would count out 39 using the Base 10 equipment (3 tens and 9 ones) and would remove 7 ones and then one ten, counting up the answer of 2 tens and 2 ones to give 22.

Circling the tens and ones that remain will help children to identify how many remain.

When exchange is required:

$$37 - 19 =$$

Children can see that they cannot subtract 9 units from 7 units so they need to exchange a ten for ten ones.



Crossing out a ten and exchanging for ten ones. Drawing them in a vertical line ensures that children create ten ones and do not get them confused with the ones that were already in place.

Subtraction as finding the difference

If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc, children should be encouraged to recognise that it is more efficient to find the difference by counting up. They should use the base 10 to create two amounts, in a similar way to the method used in Y1. The children can then create a number line in between the two amounts and use jumps to show how many have been counted on.

e.g. 61 - 52



Y3

Children should begin the method of expanded decomposition with, initially, TO - TO calculations. This process should be demonstrated using arrow cards to show the partitioning and Base 10 materials to show the decomposition of the number.

When solving the calculation 89 - 57, children need to understand that the number being subtracted (57) does not appear as an amount on its own, but rather as part of the larger amount. Therefore, when using Base 10 materials, children would need to count out only the 89.

89	=		→		
- 57		<u>80</u>	→	9	
		30	→	2	= 32

The calculation should be read as subtract 7 from 9 or 9 subtract 7.

Children should use the Base 10 materials to represent the first number and remove the units and tens as appropriate (as with the more informal method in Y2).

Emphasise that the bottom number is being subtracted from the top number rather than the smaller number from the bigger.

From this the children will begin to solve problems which involve exchange:

$$\begin{array}{r} 71 \\ - 46 \\ \hline \end{array}$$

Step 1

$$\begin{array}{r} \text{//////} \quad \cdot \\ 70 \rightarrow 1 \\ - 40 \rightarrow 6 \\ \hline \end{array}$$

The calculation should be read as subtract 6 from 1 or 1 subtract 6.

Children can see that they cannot subtract 6 ones from the 1 one so they need to exchange a ten for ten ones. This will become:

Step 2

$$\begin{array}{r} \text{//////} \quad \cdot\cdot\cdot\cdot\cdot \\ 60 \rightarrow 11 \\ - 40 \rightarrow 6 \\ \hline 20 \rightarrow 5 = 25 \end{array}$$

This would be recorded by the children as

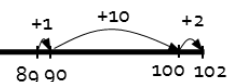
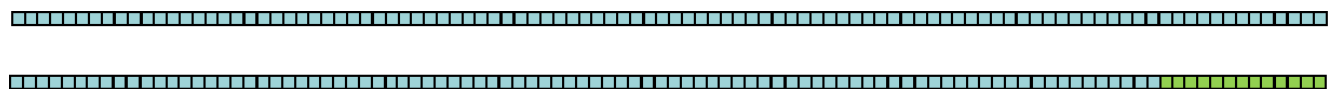
$$\begin{array}{r} 60 \\ \cancel{70} \rightarrow 11 \\ - 40 \rightarrow 6 \\ \hline 20 \rightarrow 5 = 25 \end{array}$$

Children should know that ones line up under ones, tens under tens, and so on.

Subtraction as finding the difference

If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc, children should be encouraged to recognise that it is more efficient to find the difference by counting up. To move on from the method used in Y2, children should be encouraged to use both units and tens to find the difference. This should be shown on the number line as in the example below.

e.g. 102 - 89



Y4

$$\begin{array}{r} 754 \\ - 86 \\ \hline \end{array}$$

$$\begin{array}{r} \text{Step 1} \quad 700 \rightarrow 50 \rightarrow 4 \\ - \quad \quad \quad 80 \rightarrow 6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{Step 2} \quad 700 \rightarrow 40 \rightarrow 14 \quad (\text{adjust from T to O}) \\ - \quad \quad \quad 80 \rightarrow 6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{Step 3} \quad 600 \rightarrow 140 \rightarrow 14 \quad (\text{adjust from H to T}) \\ - \quad \quad \quad 80 \rightarrow 6 \\ \hline 600 \rightarrow 60 \rightarrow 8 = 668 \end{array}$$

This would be recorded by the children as

$$\begin{array}{r} \overset{600}{\cancel{700}} \rightarrow \overset{140}{\cancel{50}} \rightarrow 14 \\ - \quad \quad \quad 80 \rightarrow 6 \\ \hline 600 \rightarrow 60 \rightarrow 8 = 668 \end{array}$$

When children are ready, this leads on to the compact method of decomposition:

$$\begin{array}{r} \overset{6141}{\cancel{754}} \\ - 86 \\ \hline 668 \end{array}$$

Children should:

- be able to subtract numbers with different numbers of digits;
- using this method, children should also begin to find the difference between two three-digit sums of money, with or without 'adjustment' from the pence to the pounds;
- know that decimal points should line up under each other.

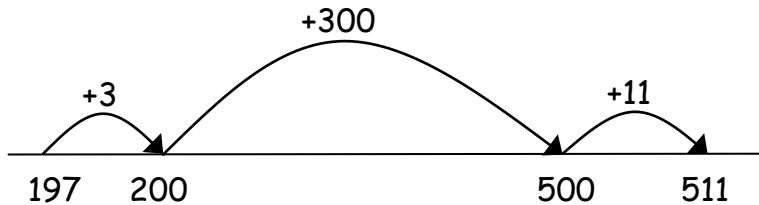
For example:

$$\begin{array}{r} \text{£}8.95 = 8 \rightarrow 0.9 \rightarrow 0.05 \\ - \text{£}4.38 = - 4 \rightarrow 0.3 \rightarrow 0.08 \\ \hline \\ = 8 \rightarrow 0.8 \rightarrow 0.15 \quad (\text{adjust from T to O}) \\ - 4 \rightarrow 0.3 \rightarrow 0.08 \\ \hline 4 \rightarrow 0.5 \rightarrow 0.07 \end{array} \quad \begin{array}{l} \text{leading to} \\ \\ 8.85 \\ - 4.38 \\ \hline = \text{£}4.57 \end{array}$$

Subtraction as finding the difference

If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc, children should be encouraged to recognise that it is more efficient to find the difference by counting up.

e.g. $511 - 197 = 314$



Y5

NB *If children have not reached the stage of compact method of decomposition then they will continue at this point with the expanded method.*

614 1	2 13 1
17 54	8 .42
- 286	-1.76
1468	1.66

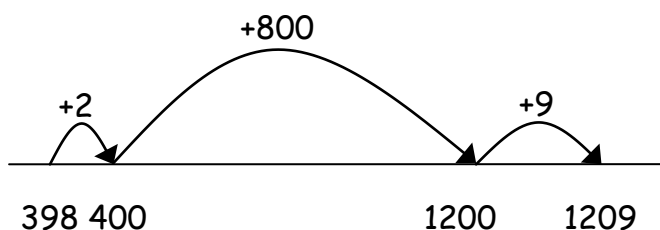
Children should:

- be able to subtract numbers with different numbers of digits;
- begin to find the difference between two decimal fractions with up to three digits and the same number of decimal places;
- know that decimal points should line up under each other.

Subtraction as finding the difference

If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc, children should be encouraged to recognise that it is more efficient to find the difference by counting up.

e.g. $1209 - 398 = 811$



Y6

$$\begin{array}{r} ^5 ^{13} ^1 \\ 1\cancel{6}467 \\ - \underline{2684} \\ \hline 13783 \end{array}$$

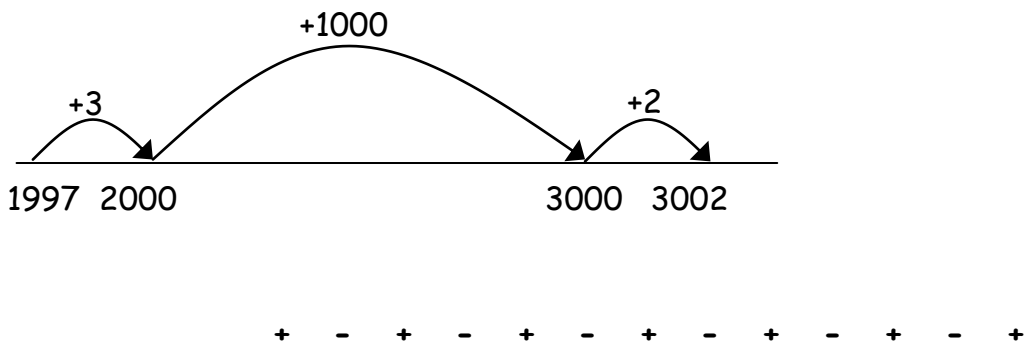
Children should:

- be able to subtract numbers with different numbers of digits;
- be able to subtract two or more decimal fractions with up to three digits and either one or two decimal places;
- know that decimal points should line up under each other.

Subtraction as finding the difference

If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc, children should be encouraged to recognise that it is more efficient to find the difference by counting up.

e.g. $3002 - 1997 = 1005$



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.