

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, not makes, 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 who are ready may record this as $8 - 5 = 3$

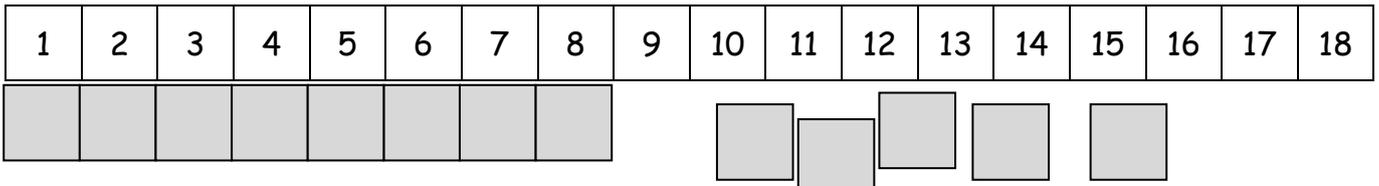
Y1

Children will use practical equipment for subtraction by taking away (counting back).

$$13 - 5 =$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

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

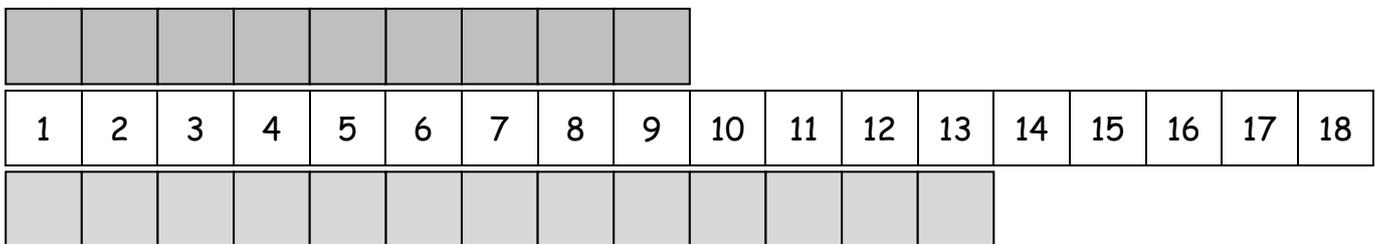


$13 - 5 = 8$ It is important that children keep track of how many have been removed.

Subtraction as finding the difference

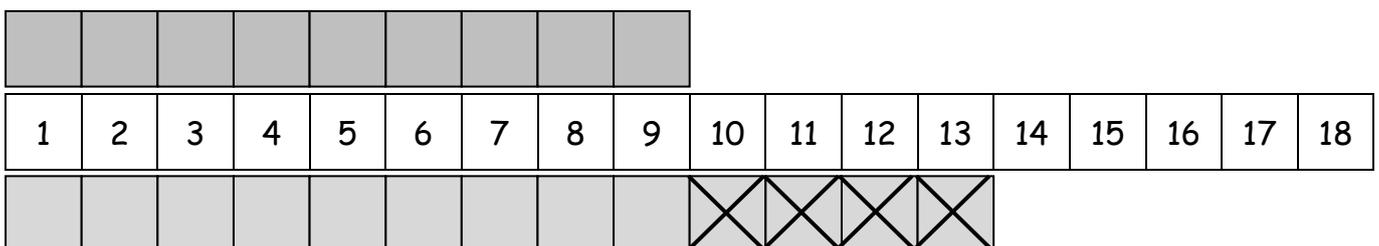
In preparation for understanding how to find the difference by counting up, children should be shown that finding the difference is linked to subtraction and the teacher should ensure the children know that it is an appropriate strategy to use when the numbers are close together.

e.g. $13 - 9$



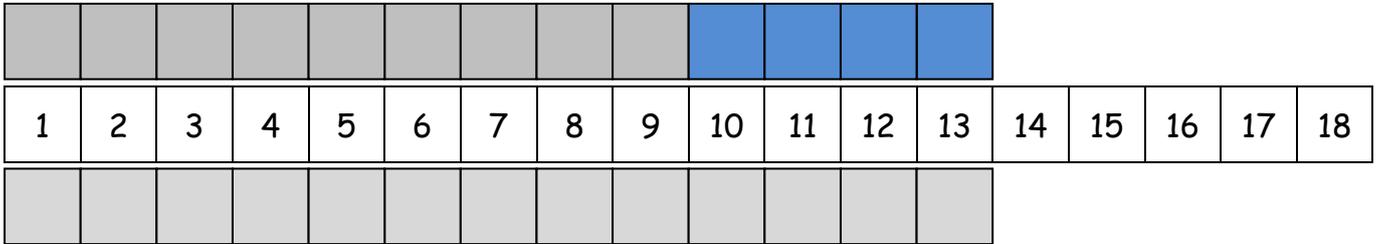
Children should use the Base 10 unit cubes and count out the correct amounts, placing one set above the number track and one below.

To find the difference, children need to identify how to make the two amounts the same. This should begin by removing cubes from the larger amount, one at a time, until it is the same size as the smaller amount. As each cube is removed the children count how many are being removed.



Children should understand that this calculation is $13 - ? = 9$

The next stage of finding the difference regards making the smaller amount the same size as the larger amount by counting on.



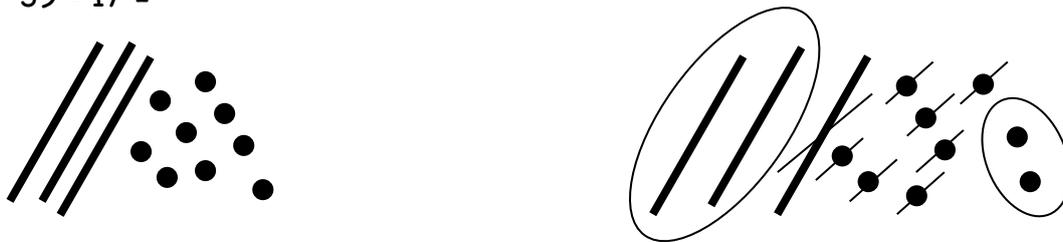
Children should understand that this calculation is $9 + ? = 13$

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

Y2

Children will move on to using the Base 10 equipment to support their calculations. 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. $39 - 17 =$

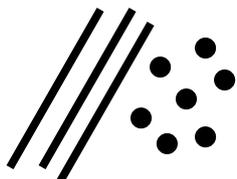


Children would count out 39 using the Base 10 equipment (3 tens and 9 units) and would remove 7 units and then one ten, counting up the answer of 2 tens and 2 units to give 22.

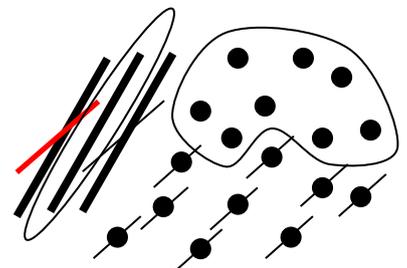
Circling the tens and units that remain will be modelled by the teacher but does not have to be written by pupil in their answer.

When exchange is required:

$37 - 19 =$



Children can see that there are not enough units available to subtract 9 units so they need to exchange a ten for 10 units. This will become:



Children would count out how many tens and units are left to give the answer (18).

At the end of Y2, children will be encouraged to record this by drawing representations of the Base 10 material and crossing out those pieces that they are subtracting. If children are representing exchange, they should be encouraged to cross out a 10 rod line in a

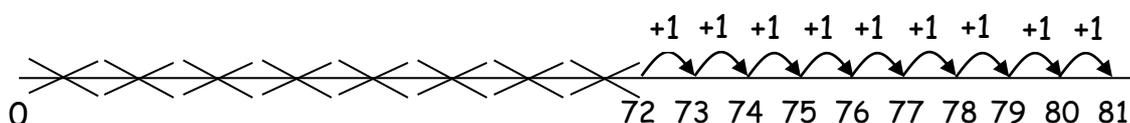
different colour (red in the example above, to avoid confusion between the exchange and the subtraction) and replace with 10 unit dots.

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 using a number line to support the mental calculation. Initially, 0 should be included on the number line to demonstrate that this portion (from 0-72) has been removed, which is similar to the process of taking away.

e.g. $81 - 72$

$$81 - 72$$



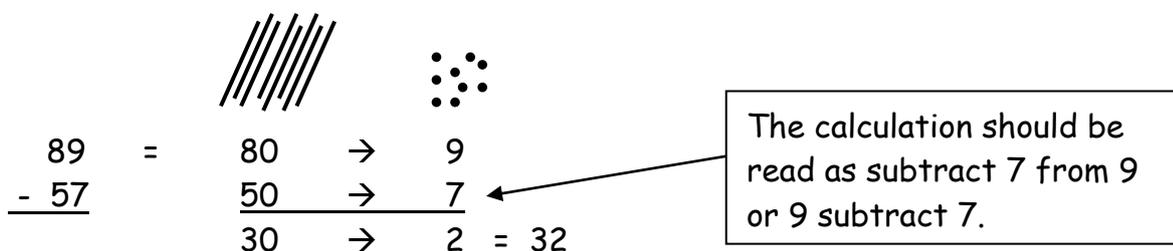
Help children to become more efficient with counting on by:

- Subtracting the units in one jump.

Y3

Children should begin the method of expanded decomposition with, initially, TU - TU 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.



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).

Initially, the children will be taught using examples that do not need the children to exchange. 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

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

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

Children can see that there are not enough units to subtract 6 units so they need to exchange a ten for ten units. This will become:

Step 2

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

This would be recorded by the children as

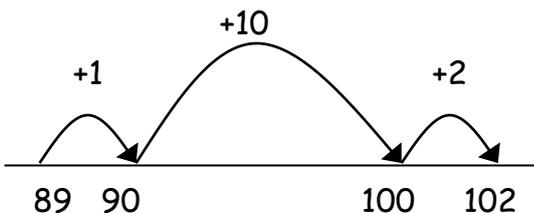
$$\begin{array}{r} 60 \\ \cancel{70} \rightarrow 11 \\ - 40 \rightarrow 6 \\ \hline 20 \rightarrow 5 = 25 \end{array}$$

Children should know that units line up under units, 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 using a number line to support the mental calculation.

e.g. $102 - 89 = 13$



Help children to become more efficient with counting on by:

- Subtracting the units in one jump;

- Subtracting the tens in one jump and the units in one jump.

Y4

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

Step 1

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

Step 2

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

Step 3

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

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:

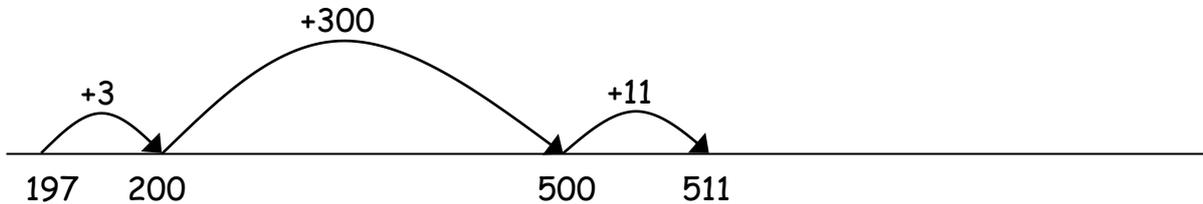
$$\begin{array}{r} \pounds 8.95 = 8 \rightarrow 0.9 \rightarrow 0.05 \\ - \pounds 4.38 \quad - 4 \rightarrow 0.3 \rightarrow 0.08 \\ \hline \end{array} \quad \text{leading to}$$

$$\begin{array}{r} = 8 \rightarrow 0.8 \rightarrow 0.15 \quad (\text{adjust from T to U}) \\ - 4 \rightarrow 0.3 \rightarrow 0.08 \\ \hline 4 \rightarrow 0.5 \rightarrow 0.07 \end{array} \quad \begin{array}{r} 1 \\ 8.95 \\ - 4.38 \\ \hline = \pounds 4.57 \end{array}$$

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 using a number line to support the mental calculation.

e.g. $511 - 197 = 314$



Help children to become more efficient with counting on by:

- Subtracting the units in one jump;
- Subtracting the tens in one jump and the units in one jump;
- Subtracting the hundreds in one jump, the tens in one jump and the units in one jump.

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.*

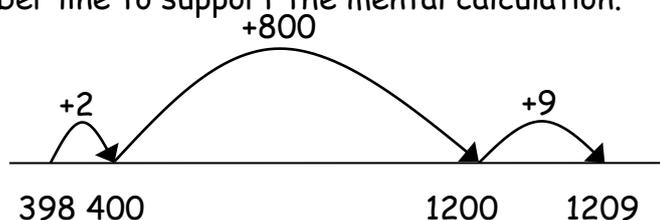
614 1	2 13 1
1754	3.42
- 286	- 1.76
1468	1.66

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.

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 using a number line to support the mental calculation.

e.g. $1209 - 398 = 811$



Y6

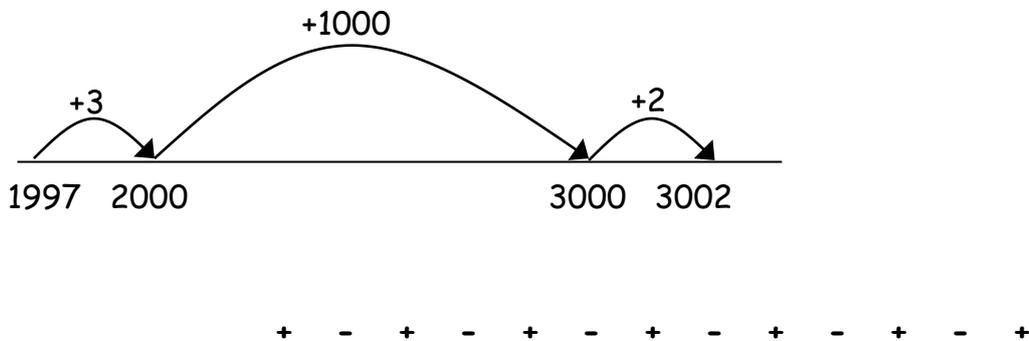
$$\begin{array}{r} ^5 ^3 ^1 \\ 1\cancel{6}467 \\ - \underline{2684} \\ 13783 \end{array}$$

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.

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 using a number line to support the mental calculation.

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.