

## Progression towards a written method for subtraction

In developing a written method for subtraction, it is important that children understand the concept of subtraction, in that it is:

- Removal of an amount from a larger group (take away)
- Comparison of two amounts (difference)

They also need to understand and work with certain principles, i.e. that it is:

- the inverse of addition
- not commutative i.e.  $5 - 3$  is not the same as  $3 - 5$
- not associative i.e.  $10 - 3 - 2$  is not the same as  $10 - (3 - 2)$

### RECEPTION

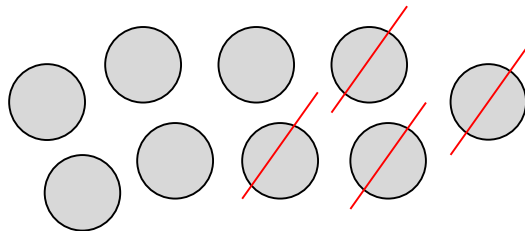
#### **Early Learning Goal:**

***Using quantities and objects, children subtract two single-digit numbers and count on or back to find the answer.***

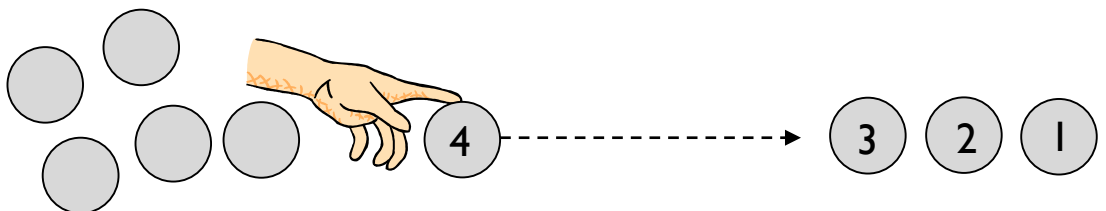
Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They should experience practical calculation opportunities using a wide variety of practical equipment, including small world play, role play, counters, cubes etc.

#### ***Taking away***

Children will begin to develop their ability to subtract by using practical equipment to count out the first number and then remove or take away the second number to find the solution by counting how many are left e.g.  $9 - 4$ .



For illustration purposes, the amount being taken away are show crossed out. Children would be encouraged to physically remove these using touch counting.



By touch counting and dragging in this way, it allows children to keep track of how many they are removing so they don't have to keep recounting. They will then touch count the amount that are left to find the answer.

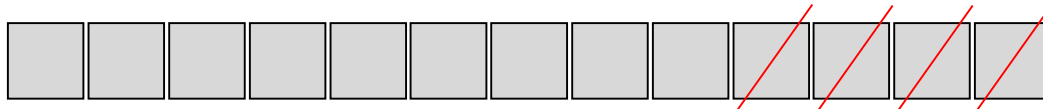
**Those who are ready** may record their own calculations.

## Y1

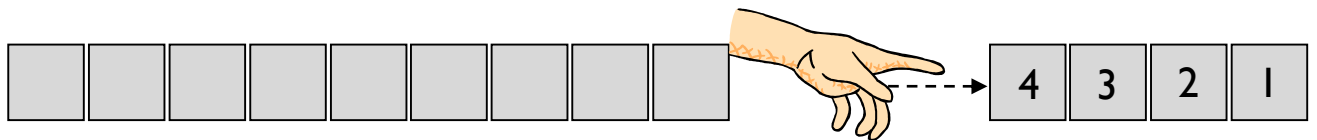
### **End of Year Objective:**

***Subtract one-digit and two-digit numbers to 20, including zero (using concrete objects and pictorial representations).***

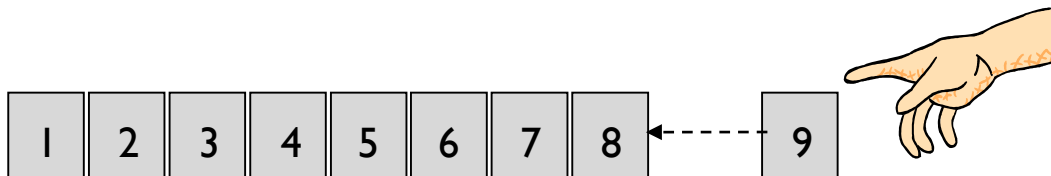
Children will continue to use practical equipment and taking away strategies. To avoid the need to exchange for subtraction at this stage, it is advisable to continue to use equipment such as counters, cubes and the units from the Base 10 equipment, but not the tens, e.g.  $13 - 4$



Touch count and remove the number to be taken away, in this case 4.



Touch count to find the number that remains.

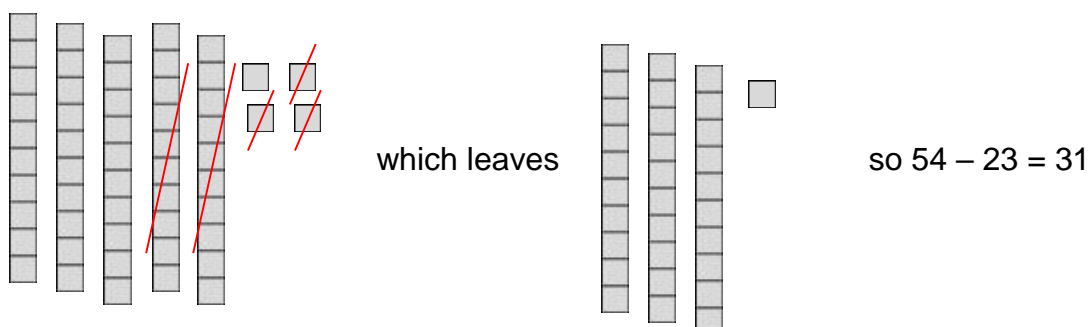


## Y2

### **End of Year Objective:**

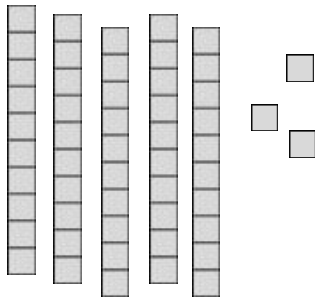
***Subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers. Subtract numbers with up to three digits, using formal written method of columnar subtraction.***

Children will begin to use the Base 10 equipment to support their calculations, still using a take away, or removal, method. 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. For example, to calculate  $54 - 23$ , children would count out 54 using the Base 10 equipment (5 tens and 4 units). They need to consider whether there are enough units/ones to remove 3, in this case there are, so they would remove 3 units and then two tens, counting up the answer of 3 tens and 1 unit to give 31.

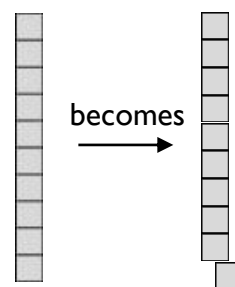


When the amount of units to be subtracted is greater than the units in the original number, an **exchange** method is required. This relies on children's understanding of ten units being an equivalent amount to one ten. To calculate  $53 - 26$ , by using practical equipment, they would count out 53 using the tens and units, as in Step 1. They need to consider whether there are enough units/ones to remove 6. In this case there are not so they need to exchange a ten into ten ones to make sure that there are enough, as in step 2.

Step 1

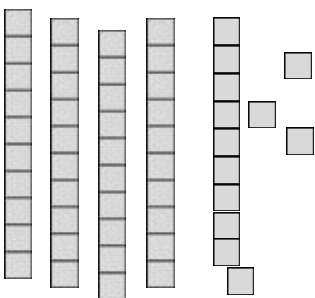


Step 2

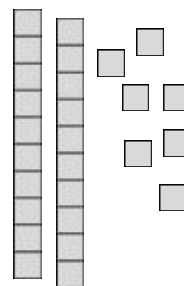


The children can now see the 53 represented as 40 and 13, still the same total, but partitioned in a different way, as in step 3 and can go on to take away the 26 from the calculation to leave 27 remaining, as in Step 4. At all stages, the written formal method will be recorded next to the Base 10 equipment to ensure that children can see the link between the two.

Step 3



Step 4



The working out and answer will be recorded as the standard written algorithm to include any exchanging that may have taken place.

$$\begin{array}{r}
 8 \\
 \cancel{0} 14 \\
 -36 \\
 \hline
 58
 \end{array}$$

### Y3

**End of Year Objective:**

***Subtract numbers with up to three digits, using formal written method of columnar subtraction using the same methods learnt in Year 2.***

By the end of year 3, children should also extend this written formal method for three digit numbers. Calculations should be completed as follows:

$$\begin{array}{r} \overset{6}{\cancel{7}} \quad \overset{14}{\cancel{5}} \quad 14 \\ - 2 \quad 8 \quad 6 \\ \hline 4 \quad 6 \quad 8 \end{array}$$

### Y4

**End of Year Objective:**

***Subtract numbers with up to 4 digits and decimals with one decimal place using the formal written method of columnar subtraction.***

Consolidation of the compact method of decomposition:

$$\begin{array}{r} \quad \quad \overset{6}{\cancel{4}} \quad \overset{14}{\cancel{5}} \quad 14 \\ - \quad 3 \quad 2 \quad 8 \quad 6 \\ \hline \quad 1 \quad 4 \quad 6 \quad 8 \end{array}$$

By the end of Y4, children should be using the written method confidently and with understanding. They will also be subtracting:

- numbers with different numbers of digits, understanding the place value;
- *decimals with one decimal place, knowing that the decimal points line up under one another.*

### Y5

**End of Year Objective:**

***Subtract whole numbers with more than 4 digits and decimals with two decimal places, using the formal written methods (columnar subtraction).***

Children should continue to use the decomposition method to solve calculations such as:

$$\begin{array}{r} \overset{6}{\cancel{7}} \quad \overset{6}{\cancel{0}} \quad \overset{6}{\cancel{7}} \quad \overset{12}{\cancel{1}} \\ - 3 \quad 2 \quad 2 \quad 6 \\ \hline 3 \quad 8 \quad 4 \quad 6 \end{array}$$

$$\begin{array}{r} \overset{2}{\cancel{3}} \quad \overset{13}{\cancel{4}} \quad \overset{12}{\cancel{1}} \\ - 1 \quad . \quad 7 \quad 6 \\ \hline 1 \quad . \quad 6 \quad 6 \end{array}$$

They will also be subtracting:

- Numbers with different numbers of digits, understanding the place value;
- *Decimals with up to two decimal places (with each number having the same number of decimal places), knowing that the decimal points line up under one another.*
- Amounts of money and measures, including those where they have to initially convert from one unit to another

## Y6

**End of Year Objective:**

***Subtract whole numbers and decimals using formal written methods (columnar subtraction).***

Children should extend the decomposition method and use it to subtract whole numbers and decimals with any number of digits.

$$\begin{array}{r} \overset{5}{\cancel{6}} \overset{13}{4} \overset{1}{3} \overset{2}{2} \\ - \quad 4 \quad 6 \quad 8 \quad 1 \\ \hline 1 \quad 7 \quad 5 \quad 1 \end{array}$$

$$\begin{array}{r} \overset{3}{\cancel{4}} \overset{1}{1} \overset{6}{7} \overset{11}{2} \overset{10}{0} \\ - \quad 3 \quad 4 \quad . \quad 7 \quad 1 \\ \hline 3 \quad 8 \quad 2 \quad . \quad 4 \quad 9 \end{array}$$

When subtracting decimals with different numbers of decimal places, children should be taught and encouraged to make them the same through identification that 2 tenths is the same as 20 hundredths, therefore, 0.2 is the same value as 0.20. A place holder.