

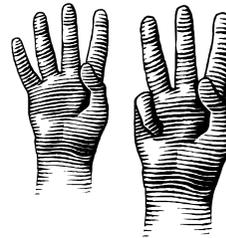
ADDITION Stage 1(i) : Counting on along a number line

Children begin to add together two small amounts in practical activities and play. Later it is modelled how this can be done using a number line and recorded in a number sentence. Practical activities where the children have access to a number line as they work is the next step.

It is important to remind children that they are "counting on" from the first number/amount and that number is not counted twice. The language of jumps is used, meaning count on one at this early stage.

As children work with bigger numbers they begin to count on using hundred squares. Reminders to "count on" are often still necessary.

It is also good at the early stages to encourage the habit of checking calculations by counting on more than once to see if they have got the right answer.



$$4 + 3$$

0 1 2 3 4 5 6 7 8 9 10

Other strategies encourage confidence and speed of recall of facts.

Children begin by starting from 0 every time and counting on both numbers. The next step is to put the biggest number first – holding the biggest number in your head and then counting on from there. It can be shown how this is quicker and more efficient and begins to introduce how you can add numbers in any order. This relies on children having firm conservation of number.

Putting the biggest number first to add : $2 + 7 =$
"put the biggest number in your head and count on" making use of a number line and making jumps with finger along the line.

Children will soon notice that putting the bigger number first makes the use of a number line more efficient.

ADDITION Stage 1(ii) : The empty number line

Steps in addition can be recorded on an open number line, starting with jumps of one.

Once number bonds are learnt (Y1) with quick recall teachers can always remind children how they can jump to the next multiple of ten in order to add on quickly and efficiently.

We are hoping to move children on from using number lines for addition to partitioning using place value and the introduction of columns

$$8 + 7 =$$



the number line starts either with the first number from the calculation or with the larger number to make the solution faster and makes use of number bonds to ten – this helps children to make sense of and apply the constant teaching and reinforcement of number bonds

ADDITION Stage 2(i) : Partitioning TU

The next stage is to record quick mental methods using partitioning and can be begun quickly once children are sure of place value in terms of Tens and Units. It can be quicker and more efficient to partition than use an open number line, especially if the early stages teachers ensure there are no cases where the sum of the Units digits will be more than 10 and the sum of the Tens digits more than 100.

It is apparent how important it is to keep children regularly rehearsing and practising number bonds to make sure that they can apply speed of recall of 4+3 to 4T+3T (40+30), etc

$$44 + 35 = 79$$

$$\text{add the Tens} \quad 40 + 30 = 70$$

$$\text{add the Units} \quad 4 + 5 = 9$$

total (found mentally) is **79**

Once children are confident they can be introduced to numbers that involve the sum of the Units being greater than 10 and the sum of Tens being more than Hundred – (the equivalent of carrying in column addition). It is best to introduce going beyond H with the Tens or beyond 10 in the Units one at a time, before tackling both together.

$$45 + 78 = 123$$

$$\text{add the Tens} \quad 40 + 70 = 110$$

$$\text{add the Units} \quad 5 + 8 = 13$$

Total (found mentally) 123

ADDITION Stage 2(ii) : Partitioning HTU, THTU and beyond

Larger numbers can be introduced once children are secure with relevant place value.

Begin each new stage with simple examples, gradually introducing numbers where children are required to add beyond 10 in the Units, beyond 100 in the Tens, etc.

$$125 + 343 = 468$$

$$\text{add the Hundreds} \quad 100 + 300 = 400$$

$$\text{add the Tens} \quad 20 + 40 = 60$$

$$\text{add the Units} \quad 5 + 3 = 8$$

Total (found mentally) **468**

ADDITION Stage 2(iii) : Partitioning decimals

Children will need to have had plenty of practice in place value and seeing the links between number facts and of number bonds to 10 and 20 to make the method efficient.

$$4.5 + 6.8 = 11.3$$

$$\text{add the Units} \quad 4 + 6 = 10$$

$$\text{add the Tenths} \quad 0.5 + 0.8 = 1.3$$

Total (found mentally) 11.3

ADDITION Stage 3 : Expanded method in columns (most significant digit and partitioning)

Move on to a layout showing the addition of the Tens to the Tens and the Units to the Units. To find the partial sums the Tens are added first, then the Units. The total of the partial sums can be found by adding them mentally. As children gain confidence, ask them to start by adding the Units digits first always.

- The addition of the tens in the calculation $47 + 76$ is described in the words 'forty plus seventy equals one hundred and ten', stressing the link to the related fact 'four plus seven equals eleven' so $4T + 7T = 11T$

The expanded method leads children to the more compact method so that they understand its structure and efficiency. The amount of time that should be spent teaching and practising the expanded method will depend on how secure the children are in their recall of number facts and in their understanding of place value.

Write the numbers in columns.

Adding the Tens first: **(Y3)**

$$\begin{array}{r} \text{TU} \quad \text{Use of TU notation is essential} \\ 47 \\ + 76 \\ \hline 110 \\ 13 \\ \hline 123 \end{array}$$

Adding the Units first:

$$\begin{array}{r} \text{TU} \quad \text{use of TU notation encourages thinking about, and application of, Place Value} \\ 47 \\ + 76 \\ \hline 13 \\ 110 \\ \hline 123 \end{array}$$

Discuss how adding the units first gives the same answer as adding the tens first.

ADDITION Stage 4 : Column method

In this method, recording is reduced further. Carry digits are recorded below the line, using the words 'carry Ten' or 'carry one Hundred', not 'carry one'.

Later, extend to adding three two-digit numbers, two three-digit numbers and decimal numbers with different numbers of digits.

$$\begin{array}{r} 47 \\ + 76 \\ \hline 123 \\ \text{11} \end{array} \quad \begin{array}{r} 258 \\ + 87 \\ \hline 345 \\ \text{11} \end{array} \quad \begin{array}{r} 366 \\ + 458 \\ \hline 824 \\ \text{11} \end{array}$$

Column addition remains efficient when used with larger whole numbers and decimals. Once learned, the method is quick and reliable.