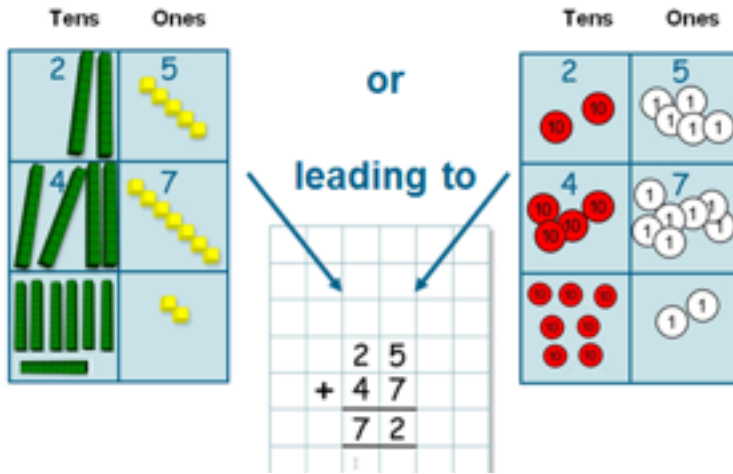


Stage 5

Addition

This stage connects the practical equipment to the formal written method using a similar and transferrable layout. Dienes/Place value counters can be used to support this step especially when crossing the tens barrier with ones.



The term 'exchange' is used to describe converting ten ones into one ten.

Then partitioning into hundreds, tens and ones to lead to a formal written method

This method can be extended to TU + HTU and HTU + HTU

Then Formal written method

$$\begin{array}{r} 48 \\ + 36 \\ \hline 14 \\ 70 \\ \hline 84 \end{array}$$

$$\begin{array}{r} 148 \\ + 236 \\ \hline 300 \\ 70 \\ 14 \\ \hline \hline \end{array}$$

$$\begin{array}{r} 148 \\ + 236 \\ \hline 384 \\ \hline 1 \end{array}$$

Subtraction

Making a link between the practical and column subtraction

This stage connects the practical equipment to the formal written method using a similar and transferrable layout. Children first experience the practical version of column subtraction and when confident in explaining this, including exchanging when 'not having enough to subtract from', they record the written method alongside.

Diagram 1: Practical equipment shows 7 tens rods and 2 ones units. A written method shows $72 - 47$ with a zero in the tens column. An arrow labeled 'leading to' points to the next diagram.

Diagram 2: Practical equipment shows 6 tens rods, 10 ones units, and 2 ones units. A written method shows $72 - 47$ with a crossed-out zero and a 1 in the tens column.

Diagram: Practical equipment shows 6 tens rods, 12 ones units, and 4 tens rods, 7 ones units. A written method shows $612 - 47 = 25$ with a crossed-out 1 in the tens column and a 1 in the hundreds column. An arrow labeled 'leading to' points to the next diagram.

A written method now follows which shows partitioning and decomposition and the need to exchange with progressively larger numbers.

$$\begin{array}{r}
 81 \\
 - 47 \\
 \hline \\
 \hline
 \end{array}
 =
 \begin{array}{r}
 80 + 1 \\
 - 40 + 7 \\
 \hline
 4 \\
 30 \\
 \hline
 34
 \end{array}$$

$$\begin{array}{r}
 245 \\
 - 66 \\
 \hline \\
 \hline
 \end{array}
 =
 \begin{array}{r}
 200 + 40 + 5 \\
 \quad 60 + 6 \\
 \hline
 9 \\
 70 \\
 100 \\
 \hline
 179
 \end{array}$$

Multiplication

Expanded short multiplication

The next step is to represent the method of recording in a column format, but showing the working out.

Drawing a link with the grid method previously used.

Multiply the ones first which enables them to move towards the compact method e.g..

$$38 \times 7 =$$

$$\begin{array}{r} 30 + 8 \\ \times \quad 7 \\ \hline 210 \\ \underline{266} \end{array} \quad \begin{array}{l} \text{Meaning} \\ (7 \times 8) \\ (7 \times 30) \end{array}$$

$$47 \times 6 =$$

$$\begin{array}{r} 40 + 7 \\ \times \quad 6 \\ \hline 282 \\ \underline{282} \end{array} \quad \begin{array}{l} (6 \times 7) \\ (6 \times 40) \end{array}$$

Division

Short division

For calculations where numbers with up to 4 digits are divided by a single digit number, children are expected to use short division.

432 ÷ 5 becomes

$$\begin{array}{r} 86 \\ 5 \overline{) 432} \\ \underline{40} \\ 32 \\ \underline{30} \\ 2 \end{array}$$

Answer: 86 remainder 2

With short division, children are expected to 'internalise' the working from above using their knowledge of multiplication tables.

