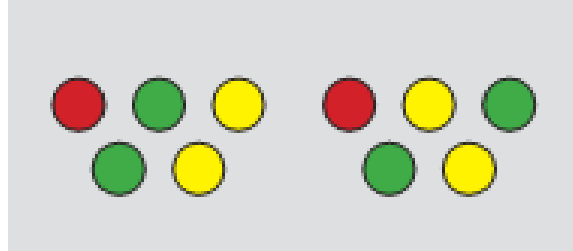


Multiplication Progression

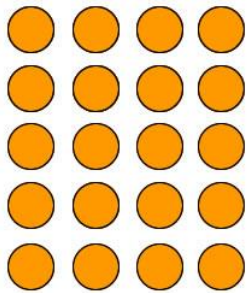
Stage 1

Count in 2's 10's
Problem solving experiences

Practical - making sets/ groups
Pictorial
Numicon shapes



Stage 2



Arrays
Numicon to demonstrate lots of and arrays

$$5+5+5+5=20$$

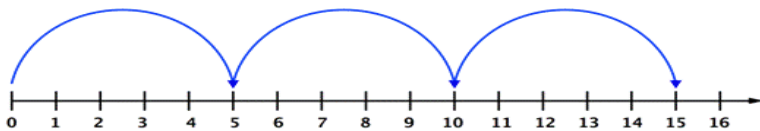
$$4 \text{ lots of } 5=20$$

$$5 \text{ lots of } 4=20$$

Stage 3

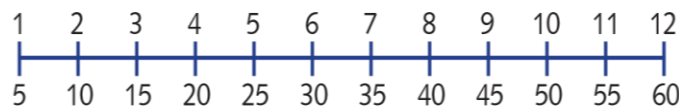
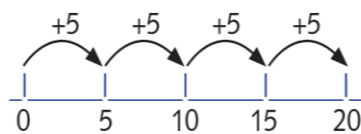
Cuisenaire rods

Jumps along number lines (with numbers/ with divisions)/ begin to draw own lines



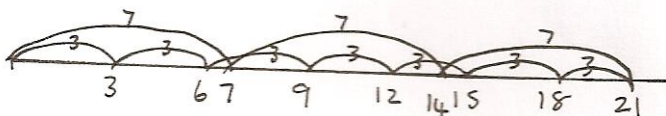
Repeated addition:

$$3 \times 5 = 3 \text{ lots of } 5 = 5+5+5$$



$$7 \times 3 = 3 \times 7$$

Theory of commutativity

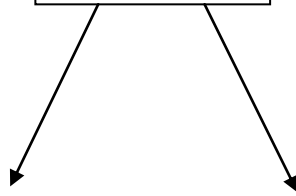


Stage 4

Informal

$$\begin{array}{l}
 16 \times 5 \\
 \hline
 10 \times 5 \quad 6 \times 5 \\
 50 + 30 = 80
 \end{array}$$

Partitioning



Formal

$$\begin{array}{l}
 18 \times 3 \\
 \hline
 \begin{array}{cc}
 \text{30} & \text{24} \\
 \text{10x} & \text{8x} \\
 \hline
 \text{30} & \text{54}
 \end{array}
 \end{array}$$

Stage 5

Place value counters
Diennes

- 1) Children must understand the effect of $\times 10$.
- 2) Children need to understand how to \times multiples of 10 by a 1 digit number.
- 3) Recognise all the calculations involves, so instead of 6 multiplied by 8 it is 60 multiplied by 8 (although relationship 6×8 should be stressed).
- 4) Where appropriate label columns HTO.

TOxO

Multiply the least significant digit first.

Children must be secure in their understanding of place value and number facts before the formal written method is taught.

Grid method

$$\begin{array}{r}
 63 \times 8 \\
 \times \quad 60 \quad 3 \\
 8 \quad \boxed{480} \quad \boxed{24} = 504
 \end{array}$$

Expanded written method

$$\begin{array}{r}
 63 \\
 \times \quad 8 \\
 \hline
 24 \quad (3 \times 8) \\
 480 \quad (60 \times 8) \\
 \hline
 504 \\
 \small 1
 \end{array}$$

$$\begin{array}{r}
 63 \\
 \times 8 \\
 \hline
 504 \\
 \hline
 2
 \end{array}$$

Stage 6

As before children should refer to the value of the digits when multiplying (e.g 50×7).

Where appropriate children label the columns HTU.

HTOxO

Grid method

$$356 \times 7$$

\times	300	50	6	
7	2100	350	42	= 2492

Multiply the least significant digit first.

Expanded written method

$$356 \times 7$$

$$\begin{array}{r} 356 \\ \times 7 \\ \hline 42 \quad (6 \times 7) \\ 350 \quad (50 \times 7) \\ \underline{2100} \quad (300 \times 7) \\ 2492 \end{array}$$

Children must be secure in their understanding of place value and number facts before the formal written method is taught.

$$\begin{array}{r} 356 \\ \times 7 \\ \hline 2492 \\ \hline 3 \quad 4 \end{array}$$

Stage 7

Place value counters
Diennes

As before children should refer to the value of the digits when multiplying (e.g 50×7).

Where appropriate children label the columns HTO.

TOxTO or HTOxTO

Multiply the least significant digit first.

Grid method

$$78 \times 34$$

\times	70	8	
30	2100	240	2340
4	280	32	+ 312
			<u>2652</u>

$$\begin{array}{r} 78 \\ \times 34 \\ \hline 32 \quad (4 \times 8) \\ 280 \quad (4 \times 70) \\ 240 \quad (30 \times 8) \\ \underline{2100} \quad (30 \times 70) \\ 2652 \\ 1 \end{array}$$

$$\begin{array}{r} 78 \\ \times 34 \\ \hline 312 \\ 2340 \\ \hline 2652 \end{array}$$

Stage 8

When using the grid method and multiplying the tenths in 4.83×6 it is 'zero point eight multiplied by six', not 'eight multiplied by 6' (the relationship to 8 multiplied by 6 should be stressed).

Grid method

$$4.83 \times 6$$

$$\begin{array}{r} \times \quad 4 \quad 0.8 \quad 0.03 \\ 6 \quad \boxed{24} \quad \boxed{4.8} \quad \boxed{0.18} \end{array} = 28.98$$

Multiply the least significant digit first.

Expanded written method

$$4.83 \times 6 \text{ is equivalent to } 483 \times 6 \div 100$$

$$\begin{array}{r} 483 \\ \times \quad 6 \\ \hline 18 \quad (3 \times 6) \\ 480 \quad (80 \times 6) \\ \underline{2400} \quad (400 \times 6) \\ 2898 \\ \hline 2898 \div 100 = 28.98 \end{array}$$



When children have a full understanding...

$$4.83 \times 6 \text{ is equivalent to } 483 \times 6 \div 100 =$$

$$\begin{array}{r} 483 \\ \times 6 \\ \hline 2898 \\ \hline \end{array}$$

4 1

$$2896 \div 100 = 28.98$$

