
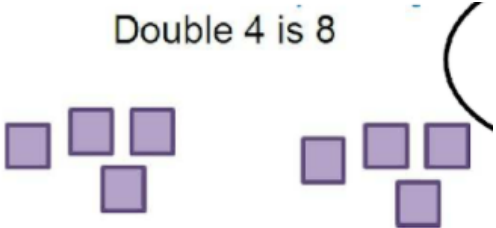
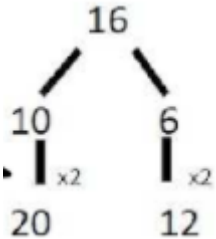
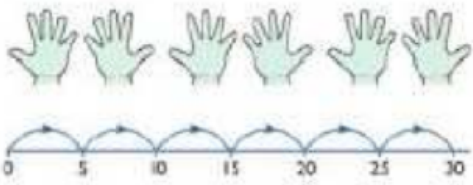


Calculation guidance to develop Multiplication

Progression in the Teaching of Calculations			
MULTIPLY IT!			
Objective/ strategies	Concrete - build it/ use it!	Pictorial - draw it!	Abstract - solve it!
Doubling	<p>Use practical activities and real life objects to show how you can double a number by having two lots of it.</p>  <p>$5 \times 2 = 10$ 2 lots of 5 = 10</p>	<p>Draw pictures to show how to double a number.</p> <p>Double 4 is 8</p> 	<p>Double numbers by partitioning mentally.</p> <p>$16 \times 2 = (10 \times 2) + (6 \times 2)$ $10 \times 2 = 20$ $6 \times 2 = 12$ $20 + 12 = 32$</p> 
Counting in multiples	<p>Count in equal groups of given multiples using real life objects.</p>	<p>Use jumps on a number line or pictures in groups to support understanding of multiples.</p> 	<p>Count in multiples of a number aloud. Write the sequence of multiples going forwards in order, then backwards.</p> <p>0, 2, 4, 6, 8, 10</p> <p>0, 25, 50, 75, 100, 125, 150, 175, 200</p>

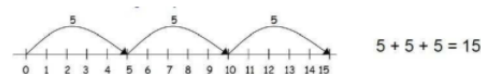


Repeated addition

Use different objects to show groups of numbers and add them.



Draw pictures as groups of objects to show repeated addition.
Use jumps on a number line to show the repeated addition.



Write addition calculations showing repeated addition.

$$2 + 2 + 2 = 6$$

$$6 = 2 + 2 + 2$$

Arrays showing commutative law with multiplication



Create arrays with real life objects to show the groups of a number.

Draw arrays in different orientations to show the commutative law of multiplication.



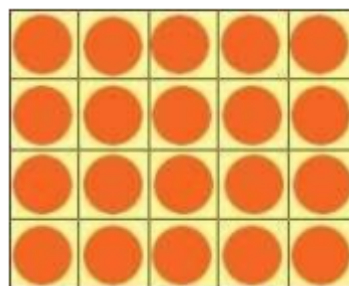
$$2 \times 4 = 8$$

$$2 \times 4 = 8$$



$$4 \times 2 = 8$$

Link arrays to the area of squares and rectangles.



Use an array to show the commutative law and link to repeated addition.

$$5 + 5 + 5 = 15$$

$$3 + 3 + 3 + 3 + 3 = 15$$

$$5 \times 3 = 15$$

$$3 \times 5 = 15$$

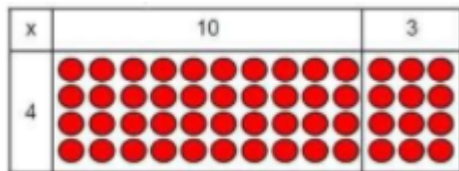


Grid method

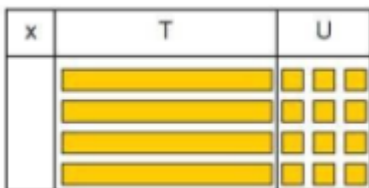
Use place value counters to link to arrays. $13 \times 4 = 52$
4 lots of 10 + 4 lots of 3

Draw the counters as shown in the concrete section after practising practically.

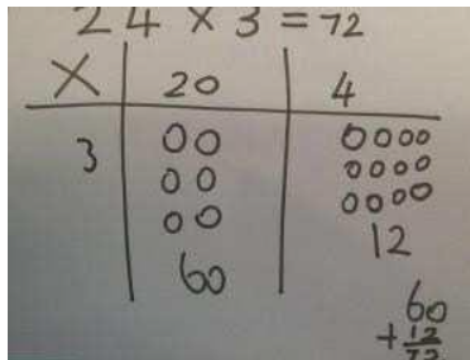
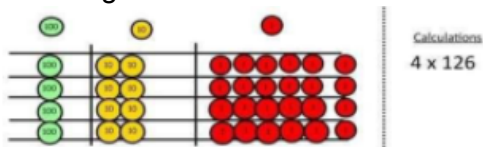
Partition 2 digit (or greater) numbers and multiply by a 1 digit multiplicand. Then add and recombine the partitioned amounts.



Use Dienes to show 4 lots of 13.



Use place value counters for 3 digit and 4 digit numbers.



x	30	5
7	210	35

$$210 + 35 = 245$$

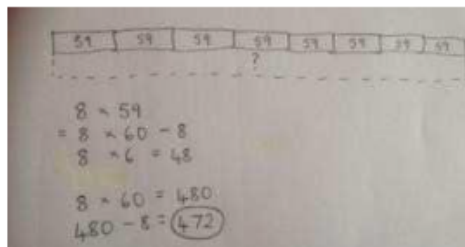
When teaching long multiplication in Year 5, show the grid representation before moving on to compact long multiplication.

	10	8
10	100	80
3	30	24

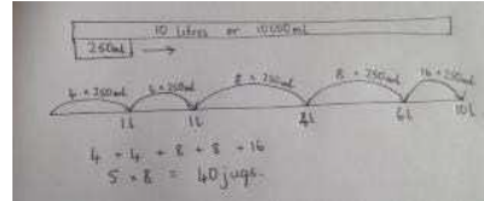
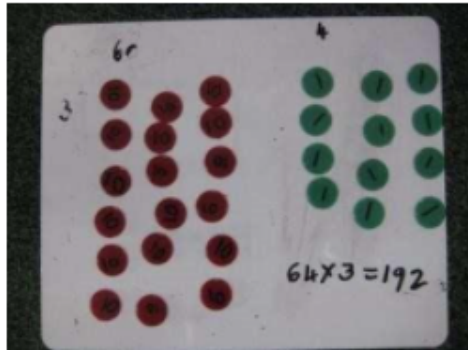
Column multiplication - short and long multiplication

Use place value counters to show how the digits are representative of greater numbers and they are being multiplied in 'lots of' the multiplicand.

Part whole bar models and number lines can support the understanding of multiplying one number by another.



Start without regrouping. Align the digits in the correct place value columns and then move on to regrouping underneath.



342 \times 7 becomes

$$\begin{array}{r} 342 \\ \times 7 \\ \hline 2394 \\ \hline \end{array}$$

Answer: 2394

Then, move on to long multiplication in the expanded form by writing each part out fully.

$$\begin{array}{r} 32 \\ \times 24 \\ \hline 8 \quad (4 \times 2) \\ 120 \quad (4 \times 30) \\ 40 \quad (20 \times 2) \\ 600 \quad (20 \times 30) \\ \hline 768 \end{array}$$

Then, move on to long multiplication in the compact form with the regrouping in each row.

$$\begin{array}{r} 327 \\ \times 53 \\ \hline 981 \quad \leftarrow 327 \times 3 \\ 16350 \quad \leftarrow 327 \times 50 \\ \hline 17331 \end{array}$$

Multiplication of fractions

Count in fractional steps, following repeated addition. Use real life objects to support.

3 lots of $\frac{1}{8} = \frac{3}{8}$



Draw a bar model to show the groups of fractions. $2 \times \frac{3}{8} = \frac{6}{8}$



Multiply fractions by a whole number.

$$3 \times \frac{1}{8} =$$

$$\frac{3}{1} \times \frac{1}{8} = \frac{3}{8}$$

Multiply fractions by another fraction by finding a common denominator.

$$\frac{2}{5} \times \frac{6}{7} = \frac{2 \times 6}{5 \times 7} = \frac{12}{35}$$

$$\frac{1}{4} \times \frac{2}{3} = \frac{1 \times 2}{4 \times 3} = \frac{2}{12} = \text{reduces to } \frac{1}{6}$$