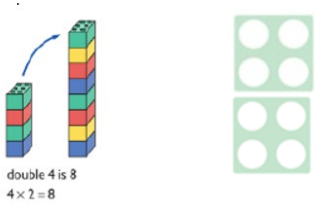
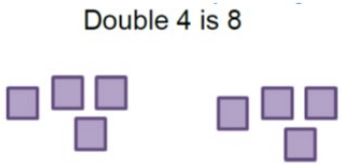
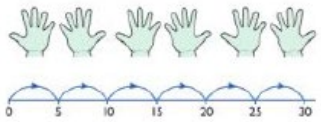
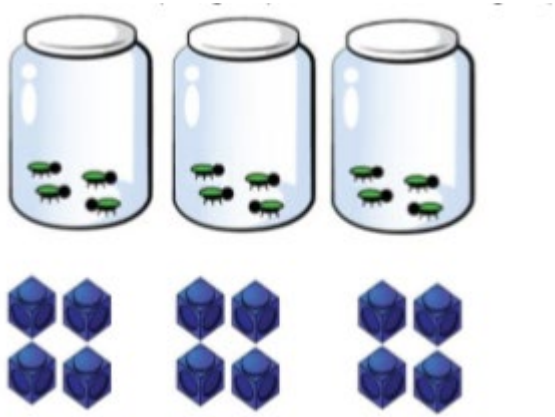
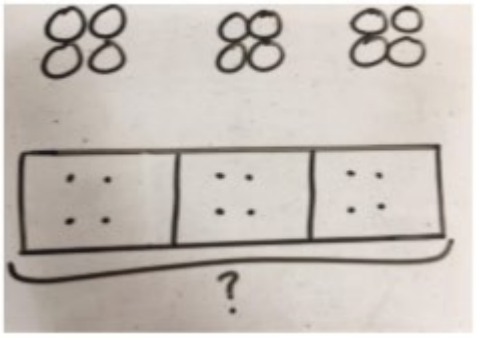
# Multiplication

| Skills | Concrete | Pictorial | Abstract |
|---|---|---|---|
| **Doubling**<br><br>**double, doubling, is, equals, add** | Use of practical resources to show how to double a number<br>  | Draw pictures to show how to double a number<br>  | Encourage number sentences and mental calculations.<br><br>4 + 4 = 8 → 4 x 2 = 8<br><br>**End of YR target** |
| **Counting in multiples**<br><br>**multiple, sequence, groups, lots of, groups of** | <br> <br><br>Counting in multiples supported by concrete objects in equal groups. |  <br><br>Use of a number line or pictures to continue support in counting in multiples. | Count in multiples aloud.<br><br>Write sequences with multiples of numbers.<br><br>2, 4, 6, 8, 10<br><br>5, 10, 15, 20, 25<br>**End of Y1 target** |
| **Repeated grouping/ repeated addition**<br><br>**grouping, equal, part, equal, repeated addition How many times?** | 3 x 4<br>4 + 4 + 4<br>There are 3 groups, each with 4 in them<br>  | Children to represent the practical resources in a picture and use a bar model.<br><br>  | 3 x 4 = 12<br>4 + 4 + 4 = 12<br><br>4 x 3 = 12<br>3 + 3 + 3 + 3 = 12 |

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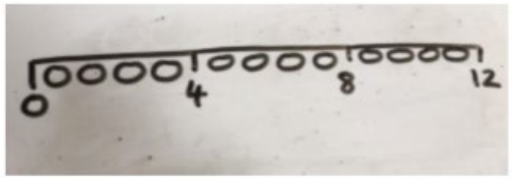
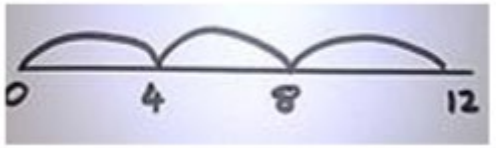
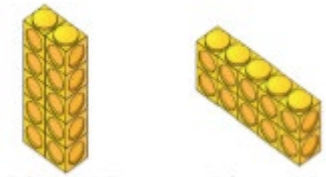
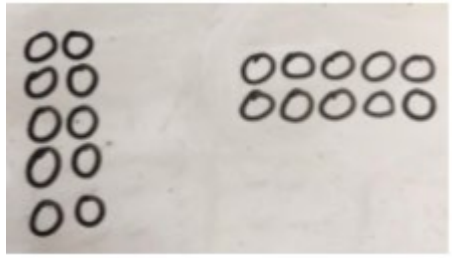
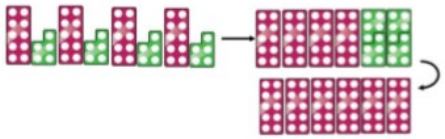
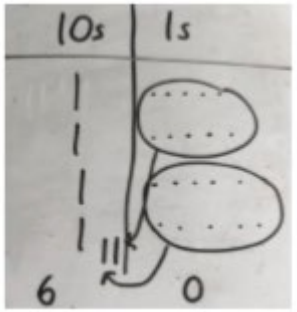
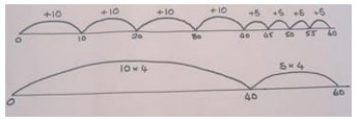
| **Number lines to show repeated groups**<br><br>**multiply, multiplied by, times, steps, equal** | 3 x 4<br><br>Cuisenaire rods could also be used. | Abstract number line representing the three groups of four.<br><br>  <br> | Abstract number line showing three jumps of four.<br>3 x 4 = 12<br><br>  <br> |
| **Use arrays to illustrate commutativity**<br><br>**array, commutative, repeated addition, row, column** | Counters, objects, Numicon pegs and other objects can be used.<br>$2 \times 5 = 5 \times 2$<br><br>  <br> | Children to represent arrays pictorially.<br><br>  | Children to be able to use an array to write a range of cclculations, e.g:<br><br>$10 = 2 \times 5$<br>$5 \times 2 = 10$<br>$2 + 2 + 2 + 2 + 2 = 10$<br>$10 = 5 + 5$<br><br>**End of Y2 target** |
| **Partition to multiply**<br><br>**partition, tens, ones, value, times, derive, product, scale up commutativity associativity** | Partition to multiply using Numicon, Base 10 or Cuisenaire rods.<br><br>15 x 4<br><br>  <br><br>What is the calculation?<br>What is the product?<br><br> <br> | Children to represent the manipulatives pictorially.<br><br>  <br> | Children should be encouraged to show their process:<br><br>4 x 15<br>10 5<br><br>10 x 4 = 40<br>5 x 4 = 20<br>40 + 20 = 60<br><br>A number line might be used alongside.<br><br>  |

# Multiplication

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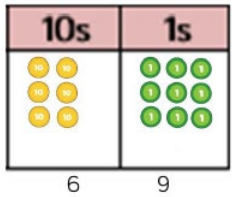
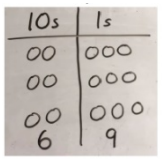
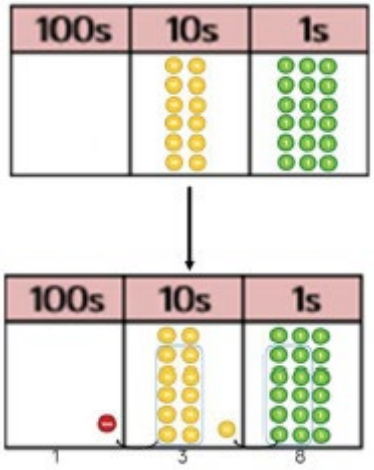
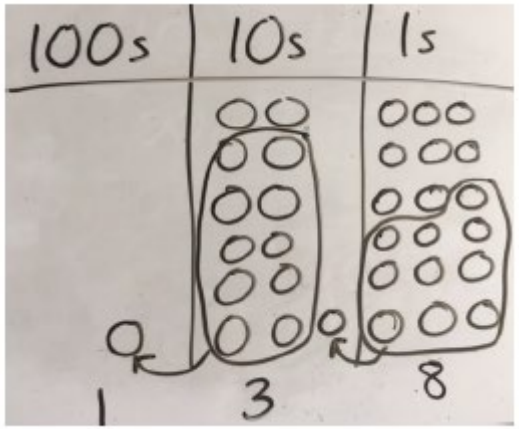
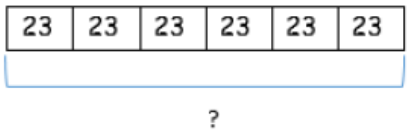
| **Multiplying two-digit numbers by one-digit numbers**<br><br>**partition, place value** | Using place value counters (Base 10 could also be used).<br><br>23 x 3<br>  <br> | Children represent the place value counters pictorially.<br>  <br> | Children record their process to show their understanding.<br><br>$3 \times 23$<br>20 3<br><br>$3 \times 20 = 60$<br>$3 \times 3 = 9$<br>$60 + 9 = 69$<br><br>Grid method can also be used here.<br><br>$\begin{array}{r} 23 \\ \times\ 3 \\ \hline 69 \\ \hline \end{array}$<br><br>**N.B. See Written Methods page** |
| **Formal written method**<br><br>**Carrying, place holder,** | Using place value counters (Base 10 could also be used).<br><br>23 x 6<br>  <br> | Children to represent the counters/ Base 10 pictorially.<br>  <br> | $6 \times 23 =$<br><br>$\begin{array}{r} 23 \\ \times\ 6 \\ \hline 138 \\ \hline 1\ 1 \end{array}$<br><br>**N.B. See Written Methods page**<br><br>**End of Y3 target** |

# Multiplication

**Conceptual Variation:**

6 x 23




Mai had to swim 23 lengths, 6 times a week.
How many lengths did she swim in one week?

With the counters, prove that 6 x 23 = 138

Find the product of 6 and 23

$6 \times 23 =$

$\square = 6 \times 23$

$$\begin{array}{r} 6 \\ \times\ 23 \\ \hline \\ \hline \end{array} \qquad \begin{array}{r} 23 \\ \times\ 6 \\ \hline \\ \hline \end{array}$$

**Mental Strategies:**

- Counting in multiples
- Repeated addition
- Arrays
- Links to doubling, including doubles to link x2, x4 and x8 tables
- Reorder calculation (**commutative**)
- Using known facts and place value
- Use the rule of **associativity**
- Scaling up using known facts
- Using the relationship betwenn multiplication and division
- Use partitioning and **Distributive Law** to multiply
- Use **factor pairs** and the **Associative Law** to multiply
- Recognise and use square and cube numbers

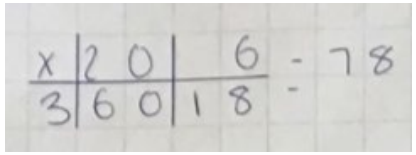
# Multiplication

## Written Methods of Multiplication

N.B. Written abstract methods must only be used once children have a secure understanding of the operation and place value.

### 1. Grid method

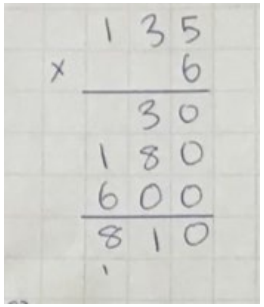
26 x 3




60 + 18 = 78

### 2. Expanded form

135 x 6

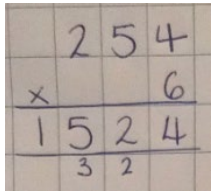



**Teaching Point**

Ensure children quickly progress to compact – don't keep them at this step for long.

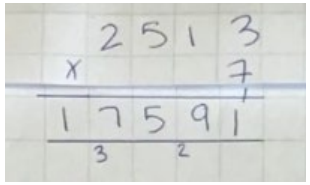
### 3. Compact form

3-digit x 1-digit – 254 x 6



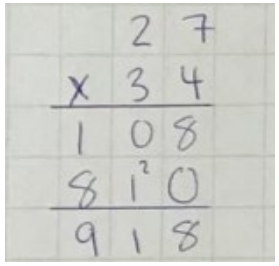

**End of Y4 target**

4-digit x 1-digit – 2513 x 7

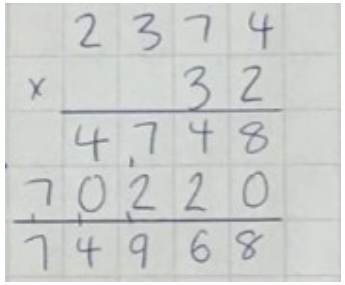



### 4. Long multiplication

27 x 34




2374 x 32




**Teaching Point**

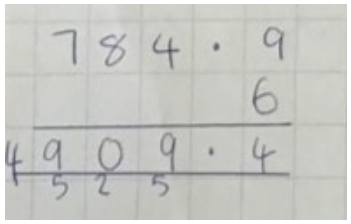
Make place value explicit!

Ensure children understand that they are multiplying by 30 not 3. We know that all multiples of 10 end in a 0, therefore we can apply that before we start.

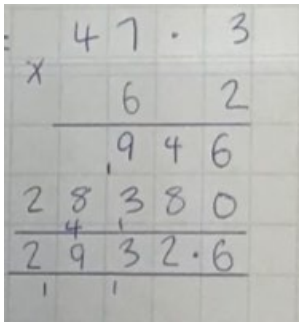
**End of Y5 target**

### 5. Multiply decimals by integers

784.9 x 6




47.3 x 62




**Teaching Point**

Ignore D.P to start.
Complete sum as learned previously, then count the DP back in e.g. 1 D.P in Q = 1 D.P in A.
Place value can appear confused, when multiplying by larger digits but including the 0 makes the calculation unnecessarily complex.

**End of Y6 target**