



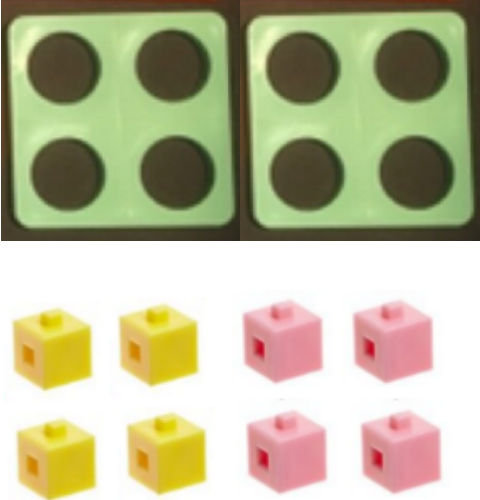
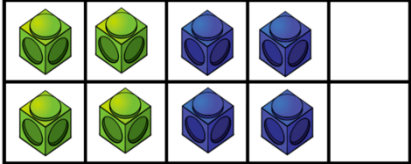
**Northway Primary School**  
**Mathematics Calculation Policy - Multiplication**

The **Concrete Pictorial Abstract (CPA)** approach is a system of learning that uses physical and visual aids to build a child's understanding of abstract topics.

- **Concrete:** New concepts are introduced through the use of physical objects or practical equipment e.g. Numicon or Base 10. These can be physically handled, enabling children to explore different mathematical concepts.
- **Pictorial:** Once children are confident with a concept using concrete resources, they progress to drawing pictorial representations of the objects. This stage encourages children to make a mental connection between the physical object and abstract levels.
- **Abstract:** Once children have a secure understanding of the concept through the use of concrete resources and visual images, they are then able to move on to the abstract stage. Here, children are using abstract symbols to model problems - usually numerals. To be able to access this stage effectively, children need access to the previous two stages alongside it.

For the most effective learning to take place, children need to constantly go back and forth between each of the stages. This ensures concepts are reinforced and understood.

**Children should be using concrete resources when covering place value objectives in Maths lessons and making numbers with these so that they learn the value of each concrete resource. This will then support them when using the same concrete resources for multiplication methods (see below).**

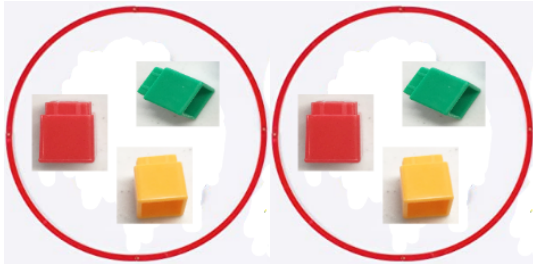
Year group	NC Objective Pupils should be taught to:	Concrete	Pictorial	Abstract
Reception	<p>Explore the composition of numbers to 10.</p> <p>Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.</p> <p>Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed evenly.</p>			$4 + 4 = 8$

Y1

Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

**One bag holds 3 apples. How many apples do 2 bags hold?**

Use sorting rings and concrete objects to represent the problem e.g. cubes or counters to make 2 groups of 3:



Progress to this when children are ready:

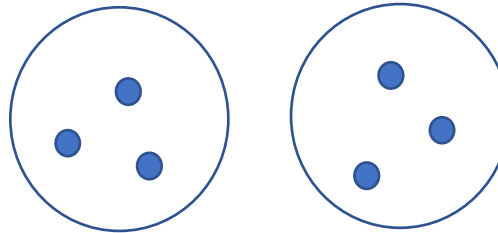
With the support of the teacher, begin to represent multiplication using arrays with concrete objects e.g. counters:

**One bag holds 3 apples. How many apples do 2 bags hold?**



**One bag holds 3 apples. How many apples do 2 bags hold?**

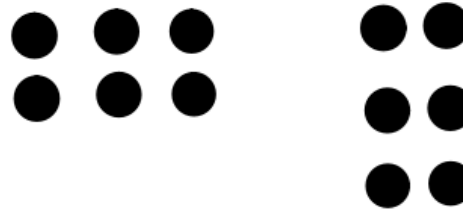
Draw 2 circles to represent the 2 groups and then draw a picture of the counters or cubes inside.



Progress to this when children are ready:

With the support of the teacher, begin to represent multiplication using arrays with drawings:

**One bag holds 3 apples. How many apples do 2 bags hold?**



2 groups of 3 is 6

2 groups of 3 is 6

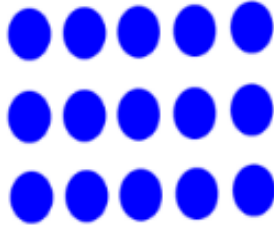
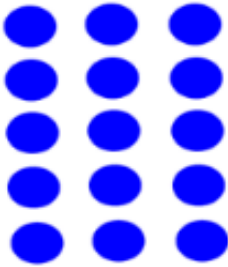
Y2

Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication ( $\times$ ) and equals (=) signs.

Show that multiplication of two numbers can be done in any order (commutative).

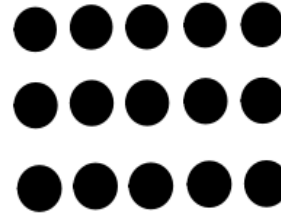
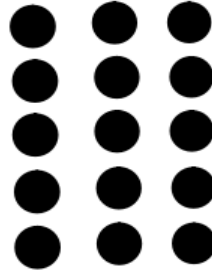
Solve problems involving multiplication, using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts.

Use counters to make arrays to represent multiplication calculations.



***\*NB: The array can be shown in the 2 different ways above to teach that multiplication is commutative.***

Draw circles to make arrays to represent multiplication calculations:

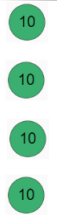
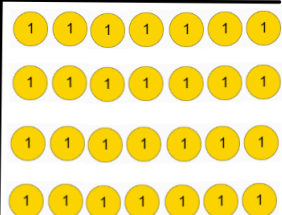


$$3 \times 5 = 15$$

$$5 \times 3 = 15$$

Y3 Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.

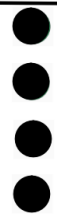
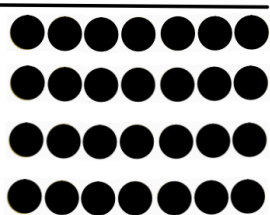
$17 \times 4 =$

$\times$	10		7
4			

$40 + 28 = 68$

*\*NB: Children should be taught to do 4 lots of 7 and then do 4 lots of 10 and set this out as above (doing it this way will allow for consistency when moving to short multiplication in Y4).*

$17 \times 4 =$

$\times$	10		7
4			

$40 + 28 = 68$

$17 \times 4 =$


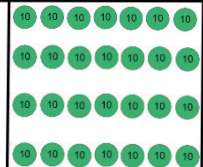
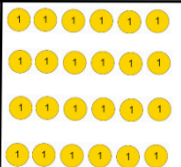
$\times$	10		7
4	40		28

$40 + 28 = 68$

Y4 Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.

Autumn Term

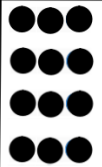
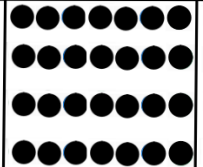
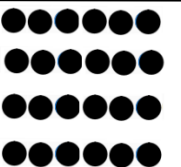
$376 \times 4 = 1504$

$\times$	300		70		6
4					

$1200 + 280 + 24 = 1504$

Autumn Term

$376 \times 4 = 1504$

$\times$	300		70		6
4					

$1200 + 280 + 24 = 1504$

Autumn Term

$376 \times 4 = 1504$

$\times$	300		70		6
4	1200		280		24

$1200 + 280 + 24 = 1504$

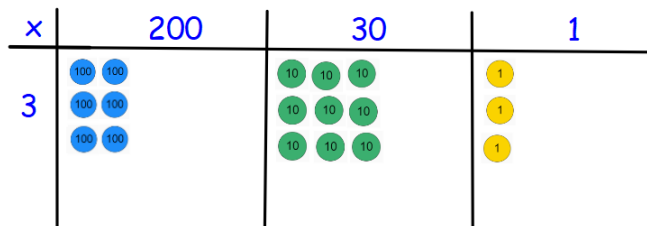
*\*NB: Children should be taught to do 4 lots of 6 then do 4 lots of 70 and then do 4 lots of 300 and set this out as above (doing it this way will allow for consistency when moving to short multiplication).*

Spring Term onwards

Step 1

HTO x O using short multiplication (no regrouping)

$$231 \times 3 = 693$$

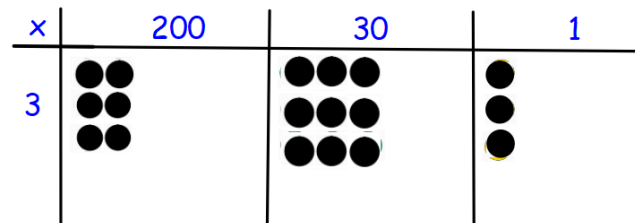


Spring Term onwards

Step 1

HTO x O using short multiplication (no regrouping)

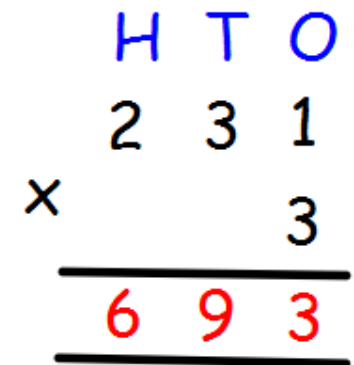
$$231 \times 3 = 693$$



Spring Term onwards

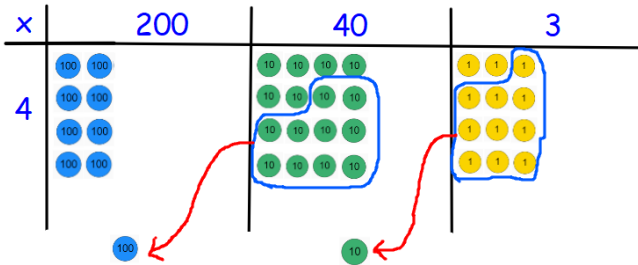
Step 1

HTO x O using short multiplication (no regrouping)



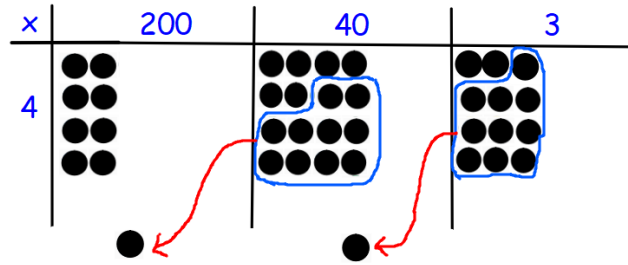
**Step 2**  
HTO x O using short multiplication (with regrouping)

$$243 \times 4 = 972$$



**Step 2**  
HTO x O using short multiplication (with regrouping)

$$243 \times 4 = 972$$



**Step 2**  
HTO x O using short multiplication (with regrouping)

$$\begin{array}{r}
 \text{H T O} \\
 243 \\
 \times \quad 4 \\
 \hline
 972 \\
 \hline
 \end{array}$$

*\*N.B.: Regroup above the line when multiplying. Tick the regroupings to show you have added them on.*

Y5 Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.

$$\begin{array}{r}
 \text{Th H T O} \\
 3729 \\
 \times \quad 8 \\
 \hline
 29832 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{H T O} \\
 124 \\
 \times \quad 16 \\
 \hline
 744 \\
 1240 \\
 \hline
 1984
 \end{array}$$

Lock in a zero here to make the answer here 10 times bigger.

$$\begin{array}{r}
 \text{Th H T O} \\
 1245 \\
 \times \quad 37 \\
 \hline
 8715 \\
 37350 \\
 \hline
 46065
 \end{array}$$

Lock in a zero here to make the answer here 10 times bigger.

*\*N.B. : Regroup above the line when multiplying but below the line when adding. Tick the regroupings to show you have added them on.*



Y6

Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.

$$\begin{array}{r}
 \text{Th H T O} \\
 3 \quad 7 \quad 2 \quad 9 \\
 \times \quad \checkmark_5 \quad \checkmark_2 \quad \checkmark_7 \quad 8 \\
 \hline
 2 \quad 9 \quad 8 \quad 3 \quad 2
 \end{array}$$

$$\begin{array}{r}
 \text{Th H T O} \\
 1 \quad 2 \quad 4 \quad 5 \\
 \times \quad \checkmark_1 \quad \checkmark_3 \quad \checkmark_3 \\
 \hline
 8 \quad 7 \quad 1 \quad 5 \\
 3 \quad 7 \quad 3 \quad 5 \quad 0 \\
 \hline
 4 \quad 6 \quad 0 \quad 6 \quad 5 \\
 \checkmark_1 \quad \checkmark_1
 \end{array}$$

Lock in a zero here to make the answer here 10 times bigger.

*\*N.B.: Regroup above the line when multiplying but below the line when adding. Tick the regroupings to show you have added them on.*