FOLTE

Multiplication Policy

Reception

Children to count by rote in 2s to 20, 5s to 50 and 10s to 100.

Doubling
Children to solve problems using doubling.

In a range of practical and play contexts the child explores and solves problems involving doubling, utilising his or her own methods.

Ideas of how this could be taught:
- ✓ Draw/put the same amount of coins on/in each hand. How many coins are there now? (2 add 2 is 4. Double 2 is 4)
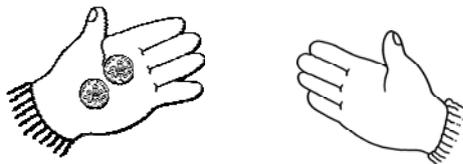
- ✓ I have 4p. If I was given 4p more, how much would I have?

- ✓ Start with physically doubling objects. Then double pictures and finally double numbers.

- ✓ 5 sweets on the cake. How many on 2 cakes?

You should be using a range of apparatus to support the children's learning using Numicon, Cuisenaire, counters, money, unifix cubes, 100s square, number lines etc.

When doubling numbers, start with numbers under 5 so they are doubling within 10.
Double 3 = 6   Double 4 = 8

Move onto doubling within 20.
Double 7 = 14   Double 9 = 18
(Numicon could be used to show the relationship with doubling and even numbers.)

Year 1

Solving one step problems

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

A bag has 4 coins in it. How many coins would I have if I had 3 bags?
- ✓ Start with physically counting the coins.
- ✓ Move onto repeated addition. 4 + 4 + 4 = 12
- ✓ Use Numicon and number lines to support this.

E.g. One dinosaur has 5 spikes so how many spikes would there be if there were 4 dinosaurs? *Children could count the spikes, count in 5's or do repeated addition.*

Arrays and number patterns

They make connections between arrays, number patterns, and counting in twos, fives and tens.

- ✓ These could be pictorial or concrete objects: e.g. there are 5 teddy bears in one family. How many bears in 3 families?

- ✓ Alongside using practical apparatus and objects, children can draw by hand or create their own images using a draw program to represent an array.

- ✓ Begin to introduce the concept of the commutative law with arrays

2 x 3 = 6

2 x 4 = 8

6 x 2 = 12
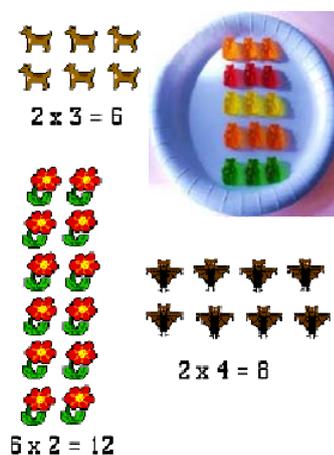
- ✓ When counting in 2s, 5s and 10s, link to a range of contexts. Money, measure,

capacity etc. Use a hundreds square to show what happens to numbers when multiplying by 10. (Children need to understand this as it is fundamental when partitioning number and using the grid method.)

✓ Alongside physically manipulating objects into arrays, children can draw or create their own.

Year 2

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

Arrays
Continue arrays from Year 1 but with increasingly larger numbers and other times tables.

$2 \times 3 = 6$

$4 \times 3 = 12$

$2 \times 4 = 8$

$6 \times 2 = 12$

1 x 6   6 x 1   2 x 3   3 x 2

1 x 4   4 x 1   2 x 2   1 x 3   3 x 1

1 row of 12   2 rows of 6   3 rows of 4

4 rows of 3   6 rows of 2   12 rows of 1

How many ways can you make 12?

Numicon could be used to show repeated addition on a number line e.g. I have 7 friends and I would like to give each of them 3 apples. How many apples do I need altogether?

Number lines – repeated addition
Number lines could be used to show repeated addition too.

+4   +4   +4

+5   +5   +5

- ✓ Questions should be around the 2, 5 and 10 times tables first and should go up to x 12 e.g. 2 x 11, 5 x 12, 10 x 11 Children to write the answers to the calculations using their mental knowledge of these tables.
- ✓ Pupils that are not secure with their understanding of the tables should use pictorial representations or objects alongside their written work. These should include arrays.

Real life contexts
Use real life contexts to support children's learning.
I have 5 cakes on one plate. How many cakes do I have on 3 plates?
I want to give my 10 friends 5 sweets each. How many sweets do I need?
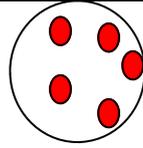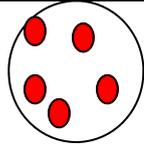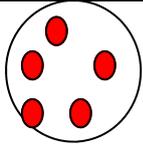
5 + 5 + 5 = 15
3 x 5 = 15

✓ I want to give my 10 friends 5 sweets each. How many sweets do I need?
(Children should know their 2, 5 and 10 times tables by the end of the year.)
✓ When counting in 2s, you could use 2ps.
✓ Counting in 5s could be linked to the clock face.
✓ Counting in 10s could be linked to cm when counting along a metre stick.
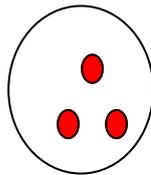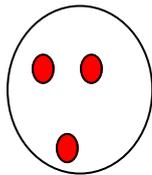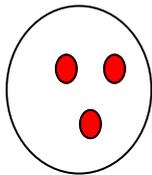
Commutative law
Show that multiplication of two numbers can be done in any order (commutative).

They should investigate how multiplication can be done in any order and how it links to division.
✓ I have 3 groups with 5 balls in each. How many balls do I have?
✓ If I have 5 groups with 3 balls, how many balls do I have?

5 x 3 = 15
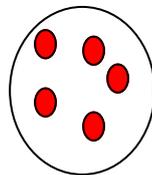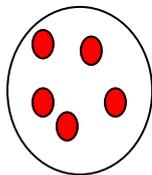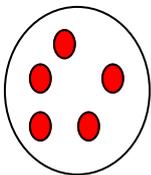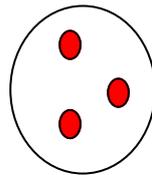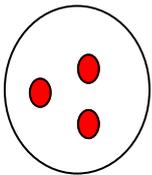
3 x 5 = 15

Using signs
Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×) and equals (=) signs.

Children should write times tables as number sentences with the X and = sign.
2 x 4 = 8   4 x 2 = 8

Children should be able to derive a number sentence to work out a problem.
✓ I have 3 groups with 5 balls in each. How many balls do I have? 3 x 5 = 15

<u>**Year 3**</u>

Children continue to use practical situations and resources to enable children to visualise and understand multiplication. Children can learn tables by chanting, playing games or singing songs then they should be writing number fact sentences.

Repeated addition and number lines
Children will continue to use repeated addition using a number line. As the children become more confident, a blank number line could be introduced.

$4 \times 4 = 16$
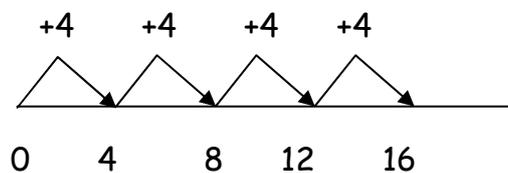
Commutative law
$4 \times 8 = 32$ $8 \times 4 = 32$
Make connections between the 2, 4 and 8 times tables. If we know what 4×4 is, we know what 2×8 is. Again, this could be done through experimentation with number lines and Numicon.

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

Ensure children understand **partitioning** before moving onto the grid method, using a range of structured apparatus.

×	30	5
8	240	40

$240 + 40 = 280$
(Use the appropriate method for addition e.g. number sentence, expanded method or column method- see addition policy).

Informal column method

This is not a formal method but helps the children to understand the method rather than learning it by rote.

```
      35
×      6
      30      (5 × 6)
+    180      (30 × 6)
     210
```

Formal written method

```
    23          ¹23          23
  ×  6         ×  6        ×  6
                   8         138
```

3×6=18   2×6=12   This is your answer
put down the 8   12+1=13   138
and carry the 1 Write down the
                 13

- ✓ Children should be given questions in different real life contexts and given the opportunity to select the correct operation e.g. I have 23 people and they each need 8 pencils. How many pencils do I need?
- ✓ Children should realise that in this context, repeated addition is not the most appropriate method and should understand the link between repeated addition and multiplication.

Missing numbers

Children use symbols such as □ or ∇ to stand for unknown numbers and complete number sentences.

3 × △ = 18   △ × 6 = 18

Extend to:

△ × ◇ = 32 etc

Year 4

To ensure children fully understand all tables *(up to 12 x 12)*. Children continue to use practical situations and resources to enable children to visualise and understand multiplication. Children can learn tables by chanting, playing games or singing songs then they should be writing number fact sentences.

Informal and formal methods

Grid method

Colour coding the different columns may help children that are struggling with this concept.

123 x 5

x	100	20	3
5	500	100	15

```
    500
+   100
+    15
    615
```

This is not a formal method but helps the children to understand the method rather than learning it by rote.

```
     235
x      6
      30 (5 x 6)
+   180 (30 x 6)
   1200 (200 x 6)
   1410
```

Formal short method

342×7 becomes

```
      3   4   2
  ×           7
  2   3   9   4
      2   1
```

Answer: 2394

These methods should be used alongside real life contexts. E.g. 342 people attend a party. They each need 7 sandwiches each. How many sandwiches are required?

Multiplication with fractions and decimals
Children solve simple measure and money problems involving fractions and decimals to two decimal places.

I earn £1.75 a day for helping my mum with the housework. I help her for 7 days. How much do I earn?

```
    1.75
  X 7
  £12.25
```
Note where the 7 is placed. This helps the children understand place value.

Or convert to like term. E.g.

```
    175
  X   7
   1225
```

Year 5

Multiply numbers up to 4 digits by a one or two digit number using a formal written method, including long multiplication for 2 digit numbers.

Grid method

x	800	10	5
30	24000	300	150
4	3200	40	20

```
        24000
         3200
          300
    +     150
           40
           20
        27710
```

1

Long multiplication

24 × 16 becomes
```
      2
    2 4
  ×  1 6
  2 4 0
  1 4 4
  3 8 4
Answer: 384
```

124 × 26 becomes
```
    1   2
  1 2 4
  ×   2 6
  2 4 8 0
    7 4 4
  3 2 2 4
    1   1
Answer: 3224
```

124 × 26 becomes
```
    1   2
  1 2 4
  ×   2 6
    7 4 4
  2 4 8 0
  3 2 2 4
    1   1
Answer: 3224
```

Look at whether we start with the tens or the units. Make a decision and then crop the picture. Examples taken from the new national curriculum.

Year 6

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

Continue with the formal written method for multiplication from previous years.
If the children need it, the grid method or partitioning can be used initially.

Solve problems involving multiplication.

Give children opportunities to select the most appropriate method by giving them different problems to solve.

Use their knowledge of the order of operations to carry out calculations involving the four operations.

$6 \times (4 + 5) =$
$4 + 5 = 9$
$6 \times 9 = 54$

Brackets   ( )
Other Things $\sqrt{}$ X^2
Division   / or $\div$
Multiplication   X or .
Addition   +
Subtraction   —