Multiplication

Reception

Children should gain an understanding of groups of amounts and objects through practical activities. They should be introduced to doubling numbers up to 5 in a range of different contexts.
E.g. If there are 3 cherries on 1 cake how many sweets will there be on 2 cakes?

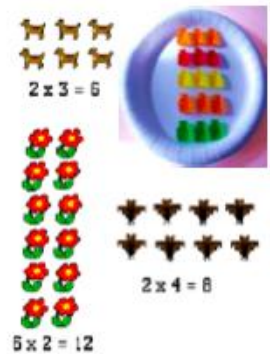E.g If you have 4 cubes and I gave you 4 more cubes how many would you have?

Year 1

Arrays
The children should learn to represent multiplication in an array using a range of practical resources or through their own images.

The children should learn to count in 2's, 5's and 10's.

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

E.g A bag has 4 coins in it. How many coins would I have if I had 3 bags? Children should start by physically counting the coins then move onto repeated addition (4+4+4=12). Practical resources should be used to represent amounts.
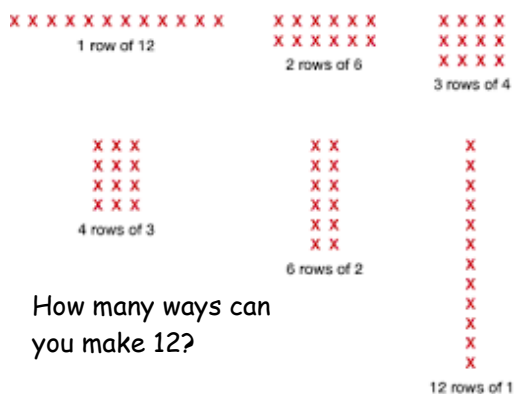
4 + 4 + 4 = 12

Year 2

Multiplication tables
Children should learn to recall and use multiplication facts for the 2, 5 and 10 times tables.

Arrays
The children should continue arrays from Year 1 but with increasingly larger numbers and other multiplication tables.

X X X X X X X X X X X X
1 row of 12

X X X X X X
X X X X X X
2 rows of 6

X X X X
X X X X
X X X X
3 rows of 4

X X X
X X X
X X X
X X X
4 rows of 3

X X
X X
X X
X X
X X
X X
6 rows of 2

X
X
X
X
X
X
X
X
X
X
X
X
12 rows of 1

How many ways can you make 12?

3 x 5 = 15   5 x 3 = 15

Number lines (repeated addition)
Number lines can be used to show repeated addition. Questions should be around the 2, 5 and 10 times tables to begin with and should go up to x12. Children who are not secure with their understanding of the tables should use pictorial representation or objects alongside their written work. These should include arrays.

+5   +5   +5

+4   +4   +4
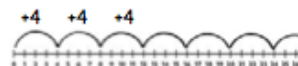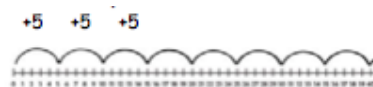
Commutative law
The commutative law shows that multiplication of two number can be done in any order. E.g 3x5=15 so 5x3=15.
They should investigate how multiplication can be done in any order and how it links to division. Children should also be able to derive a number sentence to work out a problem.

I have 3 bags with 5 coins in each. How many coins do I have?
I have 5 groups with 3 coins in each. How many coins do I have?

5 x 3 = 15

3 x 5 = 15
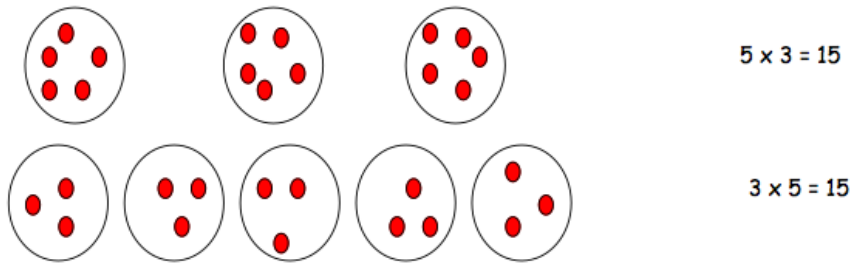
Year 3

Multiplication tables
Children should learn to recall and use multiplication facts for the 3, 4 and 8 times tables. They should also understand that the 4x table is double the 2x table and the 8x table is double the 4x table.

Number lines (repeated addition)
The children should continue to use a number line to show repeated addition. As they become more confident a blank number line can be introduced.

4 x 4 = 16

+4   +4   +4   +4

0   4   8   12   16
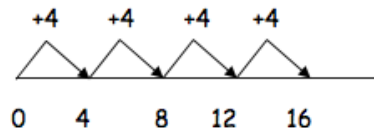
Multiplying by 10 and 100
The children should understand that when numbers are multiplied by 10 each digit moves a space to the left and when numbers are multiplied by 100 they move two spaces to the left. Children must not think that zeros are added to the number, as this will cause confusion when multiplying decimals by 10 or 100.

Hundreds	Tens	Units
2	2 3	3 0

23 × 10 = 230

Informal written methods (2 digit x 1 digit)

Children should be taught to multiply a 2 digit number by a 1 digit number using their knowledge of place value which progresses to formal written methods.

✕	30	5
7	210	35

210 + 35 = 245

The children should understand that 35x7 is the same as (30x7) + (5x7). Use appropriate methods for addition (see addition calculation policy).

Year 4

Multiplication tables

Children should learn to recall and use multiplication tables up to 12x12.

Informal written methods (3 digit x 1 digit)

Continue to use the grid method to multiply a 2 and 3 digit number by a 1 digit number. Colour coding the different columns may help children that are struggling.

123 x 5

x	100	20	3
5	500	100	15

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

This is not a formal method but is a good introduction to the formal written method. These methods should always be used alongside real life contexts. E.g. 235 people attend a part. They each need 6 sandwiches. How many sandwiches are needed altogether?

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

This leads to the formal short method. Children should not be taught this until the are secure with the grid method.

342 × 7 becomes

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

Answer: 2394

Multiplying three numbers

The children should be taught to multiply three small numbers together using their knowledge of number facts and rules of arithmetic. From the commutative law children should know that the order of multiplication is irrelevant and can be done in any order.

E.g. 2x6x5 is the same as the following:
- 2x5x6
- 5x6x2
- 5x2x6
- 6x2x5
- 6x5x2
- 10x6
- 12x5 etc

Factors and factor pairs

Children should learn that a factor pair is a set of two numbers that when multiplied together give another.
E.g. 2 and 3 are a factor pair of 6. 2x3=6

Year 5

Multiply up to a 4 digit number by a 1 or a 2 digit number

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

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

24 × 6 becomes

```
      2  4
×        6
   1  4  4
      2
```

Answer: 144

342 × 7 becomes

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

Answer: 2394

2741 × 6 becomes

```
   2  7  4  1
×           6
1  6  4  4  6
   4  2
```

Answer: 16 446

Long multiplication

24 × 16 becomes

```
         2
      2  4
×     1  6
   2  4  0
   1  4  4
   3  8  4
```

Answer: 384

Multiplication with fractions and decimals

Children should solve 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?

Year 6

Children should continue to multiply numbers up to 4 digit by a 2 digit number using the formal written method of long multiplication, including decimal numbers.

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

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

6 x (4 + 5) = 4 + 5 = 9 x 6 = 54

The BODMAS Rule

B RACKETS   ( ) [ ] { }

O RDER POWER OF $\sqrt{}$ ( )²

D IVIDE   / ÷

M ULTIPLY   * X

A DDITION   +

S UBTRACTION   ——