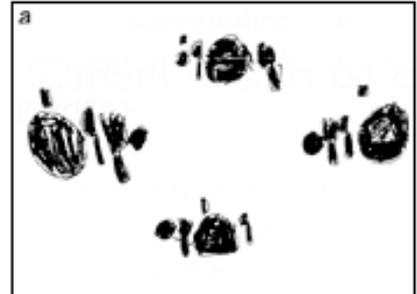


Multiplication

Year 1 – multiply with concrete objects, arrays and pictorial representations

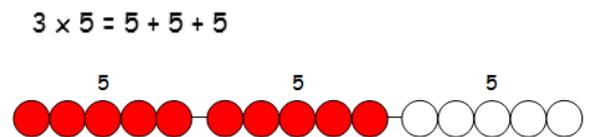
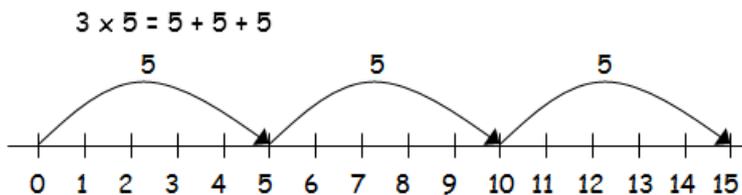
Children will experience equal groups of objects and will count in 2s and 10s and begin to count in 5s. They will work on practical problem solving activities involving equal sets or groups.



They develop their understanding of multiplication and use jottings to support calculation. They will understand multiplication as repeated addition:

3 times 5 is $5 + 5 + 5 = 15$ or 3 lots of 5 or 3×5

Repeated addition should be shown on a numberline, on a bead string and using Numicon:



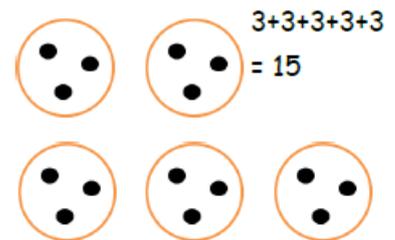
Children should be presented with practical problem solving activities involving counting equal sets or groups:

How many legs will 3 teddies have?



$$2 + 2 + 2 = 6$$

There are 3 sweets in one bag.
How many sweets are in 5 bags
altogether?



Children should have access to a wide range of counting equipment, everyday objects, number tracks and number lines, and be shown numbers in different contexts.

Key skills:

- Count in multiples of 2, 5 and 10
- Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
- Make connections between arrays, number patterns, and counting in twos, fives and tens
- Begin to understand doubling using concrete objects and pictorial representations.

Key vocabulary:

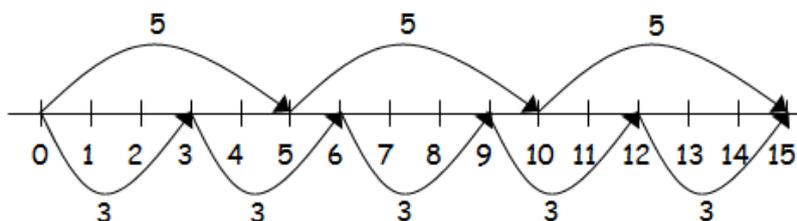
groups of, lots of, times, array, altogether, multiply, count

Multiplication

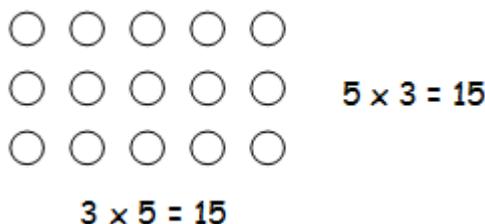
Year 2 – multiply using arrays and repeated addition (at least 2s, 5s and 10s)

Children use repeated addition, commutativity and arrays to develop their understanding of multiplication.

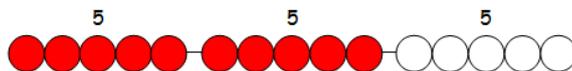
Repeated addition and commutativity can be modelled on an 'empty number line':



Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method:



They should also use practical apparatus such as bead strings and Numicon:



Key skills:

- Count in steps of 2, 3 and 5 from zero, and in 10s from any number
- Recall and use multiplication facts from the 2, 5 and 10 multiplication tables, including recognising odds and evens
- Write and calculate number statements using the \times and $=$ signs
- Know that multiplication can be done in any order (commutative)
- Solve a range of problems involving multiplication, using concrete objects, arrays, repeated addition, mental methods, and multiplication facts
- Use a variety of language to discuss and describe multiplication.

Key vocabulary:

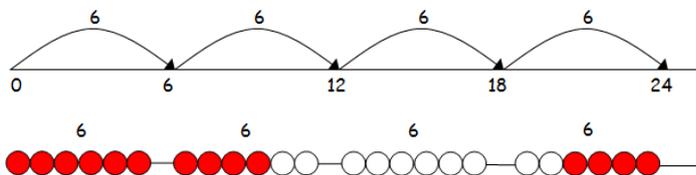
groups of, lots of, times, array, altogether, multiply, count, *multiplied by*, *repeated addition*, column, row, *commutative*, sets of, equal groups, times as big as, once, twice, three times...

Multiplication

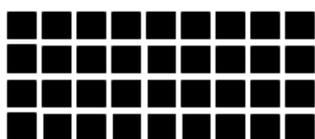
Year 3 – multiply 2-digits by a single digit number

Children will continue to use informal models for multiplication, including the use of partitioning. They will be introduced to the grid method when appropriate.

Children continue to use repeated addition, using empty numberlines and bead strings to support their understanding:



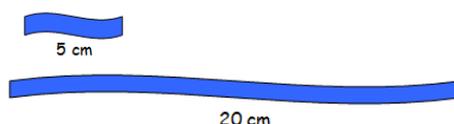
They should continue to model a multiplication calculation using an array:



$$9 \times 4 = 36$$

$$4 \times 9 = 36$$

They will develop an understanding of scaling:



They will use symbols to stand for unknown numbers to complete equations using inverse operations:

$$3 \times \triangle = 18$$

$$\square \times 5 = 20$$

$$\square \times \circ = 32$$

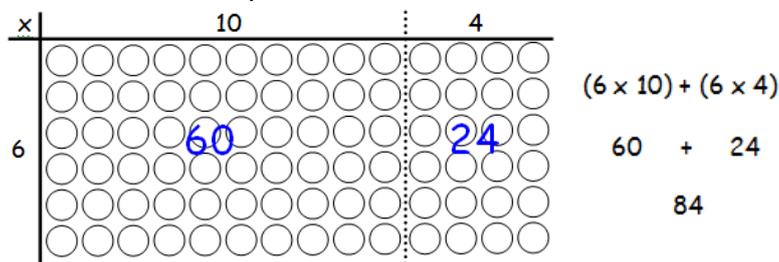
They use an informal written method involving partitioning:

$$38 \times 5 = (30 \times 5) + (8 \times 5)$$

$$= 150 + 40$$

$$= 190$$

They will be introduced to the grid method if appropriate, linked to the use of an array:



Key skills:

- Count from 0 in multiples of 4, 8, 50 and 100
- Recall and use multiplication facts for the 2, 3, 4, 5, 8 and 10 multiplication tables, and multiply multiples of 10
- Write and calculate number statements using the multiplication tables they know, including 2-digit x single digit, drawing upon mental methods, and progressing to reliable written methods
- Solve multiplication problems, including missing number problems
- Solve simple problems in contexts, deciding which operations and methods to use
- Develop efficient mental methods to solve a range of problems e.g. using commutativity ($4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and for missing number problems ($? \times 5 = 20$, $3 \times ? = 18$, $? \times ? = 32$).

Key vocabulary:

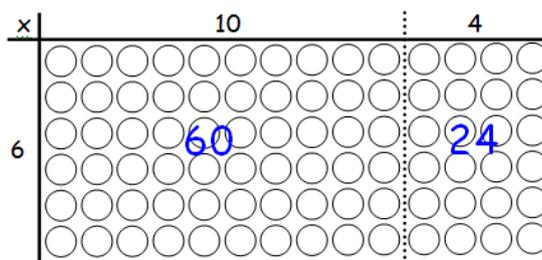
groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, _times as big as, once, twice, three times..., *partition, grid method, multiple, product, tens, units, value, inverse*

Multiplication

Year 4 – multiply 2 and 3-digits by a single digit, using all tables up to 12 x 12

Children will move develop their use of the grid method. They will be introduced to short multiplication if appropriate.

They will develop their understanding of the grid method, initially supported by an array:



They will then use the grid method with an array to multiply 2- and 3-digit numbers by a single digit:

$$\begin{array}{r}
 \times \quad 20 \quad 3 \\
 8 \quad \boxed{160} \quad \boxed{24} \\
 \hline
 160 \\
 + 24 \\
 \hline
 184
 \end{array}$$

Children who are confident **and** accurate when multiplying 2 and 3-digit numbers by a single digit this way, **and** who are already confident in "carrying" for written addition, can be introduced to short multiplication:

x	300	20	7
4	1200	80	28



$$\begin{array}{r}
 \quad \quad 327 \\
 \times \quad \quad 4 \\
 \hline
 1308 \\
 \quad \quad 1 \quad 2
 \end{array}$$

Key skills:

- Count in multiples of 6, 7, 9, 25 and 1000
- Recognise place value of digits in up to 4-digit numbers
- Recall multiplication facts for all multiplication tables up to 12 x 12
- Use place value, known facts and derived facts to multiply mentally, e.g. multiply by 1, 10, 100, by 0, or to multiply 3 numbers
- Use factor pairs, commutativity and other strategies mentally ($3 \times 6 = 6 \times 3$, $2 \times 6 \times 5 = 10 \times 6$, $39 \times 7 = 30 \times 7 + 9 \times 7$)
- Multiply 2-digit and 3-digit numbers by a 1-digit number using a formal written layout
- Solve problems with increasingly complex multiplication in a range of contexts.

Key vocabulary:

groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, _times as big as, once, twice, three times..., partition, grid method, multiple, product, tens, units, value, inverse

Multiplication

Year 5 – multiply up to 4-digits by 1- or 2-digits

Children will be introduced to more formal written methods for short multiplication and long multiplication. They must be taught to approximate first in order to minimise errors.

Short multiplication (when multiplying by 10 or less):

x	300	20	7
4	1200	80	28



	3	2	7
x			4
<hr/>			
	1	3	0
		1	2

Long multiplication (when multiplying by 2- or 3-digit numbers):

Use the grid to introduce long multiplication, as the relationship can be seen in the answers in each row.

x	10	8
10	100	80
3	30	24



		1	8
x		1	3
<hr/>			
		5	4
			2
	1	8	0
<hr/>			
	2	3	4

18 x 3 on the 1st row (8 x 3 = 24, carrying the 2 for twenty, then '1' x 3).
18 x 10 on the 2nd row. **Put a zero in the units column first**, then say 8 x 1, and 1 x 1.

Key skills:

- Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000
- Identify multiples and factors, using knowledge of multiplication tables to 12x12
- Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- Establish whether a number up to 100 is prime and recall prime numbers up to 19
- Multiply numbers mentally using known facts
- Multiply numbers up to 4-digits by a 1- or 2- digit number using a formal written method, including long multiplication for 2-digit numbers
- Multiply integers and decimals by 10, 100 and 1000
- Recognise and use square and cube numbers and their notation
- Solve multiplication problems using knowledge of factors and multiples, squares and cubes
- Solve multiplication problems including scaling by simple fractions and problems involving simple rates
- Solve problems involving combinations of operations, choosing and using calculations and methods appropriately.

Key vocabulary:

groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, _times as big as, once, twice, three times..., partition, grid method, multiple, product, tens, units, value, inverse, *prime*, *prime factor*, *composite*, *square*, *factor*, *integer*, *decimal*, *short/long multiplication*, *carry*

Multiplication

Year 6 – multiply decimals with up to 2 decimal places by a single digit

Children will use the formal methods for short and long multiplication to answer questions involving more complex numbers including decimals. They must continue to approximate first.

$$\begin{array}{r} 3652 \\ \times 8 \\ \hline 29216 \\ \text{54}' \end{array}$$

$$\begin{array}{r} 1234 \\ \times 16 \\ \hline 7404 \\ 12340 \\ \hline 19744 \end{array}$$

$$\begin{array}{r} 3.19 \\ \times 8 \\ \hline 25.52 \\ \text{1} \quad \text{7} \end{array}$$

Key skills:

- Use rounding and place value to make approximations before calculating and use these to check answers
- Multiply numbers up to 4-digits by a 2-digit whole number using the formal written method of long multiplication
- Multiply numbers up to 4-digits by a 1-digit whole number using the formal written method of short multiplication
- Use formal written methods to multiply money and measures, and to multiply numbers with up to 2 decimal places by a single digit.
- Perform mental calculations, including with mixed operations and large numbers
- Solve multiplication problems in a range of contexts.

Key vocabulary:

groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, _times as big as, once, twice, three times..., partition, grid method, multiple, product, tens, units, value, inverse, *prime*, *prime factor*, *composite*, square, factor, integer, decimal, short/long multiplication, carry, *tenths*, *hundredths*, *decimal*