

MULTIPLICATION

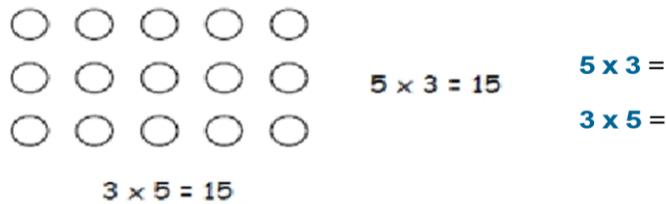
Key Objective

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

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...

1 Use arrays:



Use arrays to help teach children to understand the commutative law of multiplication, and give examples such as $3 \times _ = 6$.

2

Repeated addition:

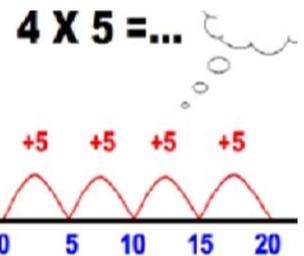
$$3 \times 2 =$$

$$2 + 2 + 2 =$$

3

Use repeated addition on a number line:

- Starting from zero, make equal jumps up on a number line to work out multiplication facts and write multiplication statements using x and = signs.



4

Partitioning

$$15 \times 2 = 30$$

$$10 \times 2 = 20$$

$$5 \times 2 = 10$$

5

Use mental Recall:

Begin to recall multiplication facts for 2, 5 and 10

Year 2

MULTIPLICATION

Key skills for subtraction at Y2:

- 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.
- Show 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.
- Pupils use a variety of language to discuss and describe multiplication.

MULTIPLICATION

Key Objective

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

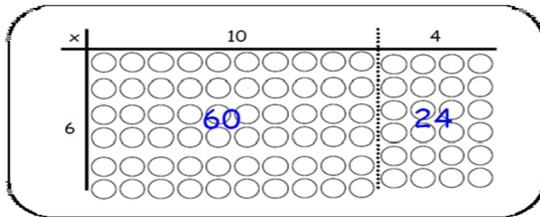
Key Vocabulary

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, partition, grid method, multiple, product,

Introduce the **grid method** for multiplying 2-digit by single-digits:

1

Link the layout of the grid to an array initially:



2

Eg. $23 \times 8 = 184$

X	20	3
8	160	24

$160 + 24 = 184$

Introduce the grid method with children physically making an array to represent the calculation, then translate this to grid method format

$10 \times 6 = 60$ $4 \times 6 = 24$ $60 + 24 = 84$

x	30	4
3	90	12

Add using expanded column

Add using compact column

Add

$90 + 12 = 102$

		90
+		12
		2
	100	
	102	

		90
+		12
		2
	100	
	102	

Year 3

MULTIPLICATION

Key skills for multiplication at Y3:

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

MULTIPLICATION

Key Objective

Multiply two-digit and three-digit numbers by a one-digit number using formal written layout and to become fluent in the formal written method of short multiplication.

Key Vocabulary

groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, array, column, row, commutative, groups of, sets of, lots of, equal groups, times, multiply, times

1

Expanded Column

		3	4		
x			3		
		1	2	(4 x 3)	
		9	0	(3 0 x 3)	
		1	0	2	

			3	4	
x				3	
			1	2	
			9	0	
			1	0	2

2

Developing the grid method:

Eg. $136 \times 5 = 680$

X	100	30	6
5	500	150	30

$$500 + 150 + 30 = 680$$

3

Compact column

		2	3	4	
x				3	
			1	2	
			9	0	
		6	0	0	
		7	0	2	

Year 4

MULTIPLICATION

Key skills for multiplication at Y4:

- recall multiplication facts for multiplication tables up to 12×12
- use place value, known and derived facts to multiply mentally, including: multiplying by 0 and 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit, integer scaling problems and harder correspondence problems.

MULTIPLICATION

Key Objective

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.

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..., partition, grid method, total, multiple, product, inverse, square, factor,

1

Introducing column multiplication

Introduce by comparing a grid method calculation to a short multiplication method, to see how the steps are related, but notice how there are less steps involved in the column method

Grid Method

$$\begin{array}{|c|c|c|c|} \hline \times & 300 & 20 & 7 \\ \hline 4 & 1200 & 80 & 28 \\ \hline \end{array}$$

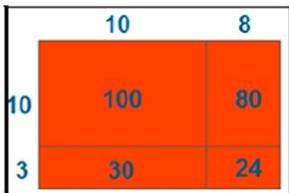


Short Multiplication

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

2

Introducing long multiplication for multiplying by 2 digits



		1	8
x	1	3	
	5	4	
	2		
1	8	0	
2	3	4	

3

$$\begin{array}{r} 564 \\ \times 23 \\ \hline 1692 \\ \underline{11280} \\ 12972 \end{array}$$

4

$$\begin{array}{r} 2564 \\ \times 23 \\ \hline 7692 \\ \underline{51280} \\ 58972 \end{array}$$

Year 5

MULTIPLICATION

Key skills for subtraction at Y5:

- Identify multiples and factors, using knowledge of **multiplication tables to 12x12.**
- Solve problems where larger numbers are decomposed into their factors
- Multiply and divide integers and decimals by 10, 100 and 1000
- Recognise and use square and cube numbers and their notation
- Solve problems involving combinations of operations, choosing and using calculations and methods appropriately.

MULTIPLICATION

Key Objectives

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

Key Vocabulary

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

1 Short column method Multiplying an integer by a decimal

$$\begin{array}{r}
 13.85 \\
 \times 5 \\
 \hline
 69.25
 \end{array}$$



Long column method

2

$ \begin{array}{r} 2564 \\ \times 23 \\ \hline 7692 \\ 51280 \\ \hline 58972 \end{array} $	$ \begin{array}{r} 2.49 \\ \times 24 \\ \hline 9.96 \\ 49.80 \\ \hline 59.76 \end{array} $	$ \begin{array}{r} 249 \\ \times 43 \\ \hline 747 \\ 9960 \\ \hline 10707 \end{array} $	$ \begin{array}{r} 2.49 \times 4.3 \text{ (3d.p.)} \\ = \\ 10.707 \end{array} $
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Take decimal points out, Multiply, Count total decimal places from original numbers

Year 6

MULTIPLICATION

Key skills for subtraction at Y6:

- Recall multiplication facts for all times tables up to 12×12 (as Y4 and Y5).
- Multiply multi-digit numbers, up to 4-digit \times 2-digit using long multiplication.
- Perform mental calculations with mixed operations and large numbers.
- Solve multi-step problems in a range of contexts, choosing appropriate combinations of operations and methods.
- Estimate answers using round and approximation and determine levels of accuracy.
- Round any integer to a required degree of accuracy.