

MULTIPLICATION KEY TEACHING POINTS

3×4 Is this 3 groups of 4 or 4 groups of 3?

At Brampton we say: without a picture or a context to tell us which is the multiplicand and which is the multiplier, it can be either.
(N.B. White Rose follow the Shanghai way of working which only allows the multiplier first, so this would be 3 groups of 4; NCETM encourages children to see this both ways so is in line with our policy.)

Start by representing this with an array so that children can see both 3 lots of 4 and 4 lots of 3.
Also represent as repeated groups  and 



The Language of Multiplication

factor x factor = product A factor is a whole number, so this wouldn't be appropriate language when multiplying decimals

multiplicand x multiplier = product When we have a picture or a context, we can tell which number is the multiplier and which number is the multiplicand.

Multiplicand is 2 Multiplier is 4



The 2 represents the number of flowers, the 4 represents the number of vases.

Y1 Objectives

- 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

Key skills:

Explore equal and unequal groups
Skip count in 2s, 5s and 10s.
Recognise the structure of multiplication as repeated addition

Start by exploring unequal groups

Move on to exploring equal groups



There are 3 groups of 5 eggs. There are 3 fives. 1 five, 2 fives, 3 fives.

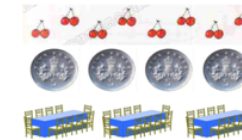


There are some pencils. The pencils have been grouped. There are 3 groups.



There are some footballs. The footballs have been grouped. There are 3 groups.

- Developing fluency in counting in 2, 5 and 10:



5, ____, 15, 20, ____, ____, etc

Language used: unequal, equal, groups of, counting sets eg. 1 group of 5, 2 groups of 5 etc.

Y2 Objectives

- recall and use multiplication facts 2, 5 and 10 multiplication tables
- calculate mathematical statements using symbolic representation $2 \times 5 = 10$
- show that multiplication is commutative eg. $2 \times 3 = 3 \times 2$
- solve problems involving multiplication using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts

Use real life context examples

Recap on unequal and equal groups

Move from repeated addition to using the multiplication sign



$2 + 2 + 2 + 2$
 2×4 or 4×2

What does each number represent?

Use arrays to draw attention to the commutative structure of multiplication

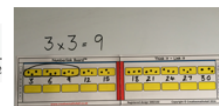


4×3
and
 3×4

$3 \times 4 = 4 \times 3$

12 is equal to 3 groups of 4 or 4 groups of 3

Skip counting, counting in the ... times table



If children need support working out multiples initially, they can draw dots to show the cardinality of the number and count the dots.

When formal written methods are introduced, please encourage children to continue to use **NUMBER SENSE**. Stop, think, consider the numbers involved in the calculation before choosing an efficient method for solving. 99×4 could be solved by adjusting 100×4 rather than using a column method. Prior to calculating, start with a **stem sentence** "I think that the best way of working this out ..."

Simple numbers are used to teach formal algorithms initially. 43×2 can be worked out mentally but is used to show how the algorithm works. We are not suggesting that a column method is usually used for this calculation.

At Brampton, **carried figures are put at the top of the columns**. NB. White Rose puts carried figures at the bottom.

When multiplying 2dn or 3dn by 1dn (Y3 and Y4) give children experience in reasoning activities like the one shown below.

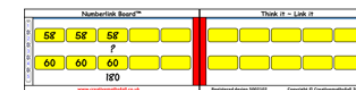
Expose misconceptions as shown below.

Unitising will help to avoid this error: say 4 tens x 2 rather than 40×2

Using the digit cards in the multiplication below how close can you get to 100?



Use the Numberlink Board to estimate answers.



Martin completes another calculation:

$$43 \times 2$$

Can you spot and explain his mistake?

	T	O
	4	3
x	2	
	8	0
	6	

Y3 Objectives

- 3, 4 and 8 times tables
- Multiply 2dn by 1dn using an appropriate method, including column multiplication

Use context problems

eg. There are 23 pens in a pot and I have got 3 pots. How many pens are there altogether?

Represent the calculation using place value counters/Dienes initially. Estimate the answer using the Numberlink Boards.

The expanded method of multiplication is not used.

Unitise to avoid errors.

23 x 3 Initially use numbers which don't involve renaming.

$$\begin{array}{r} 23 \\ \times 3 \\ \hline 69 \end{array}$$

"3 ones times 3 equals 9 ones.
2 tens times 3 equals 6 tens."

Move on to using numbers which involve renaming.

$$\begin{array}{r} +5 \\ 47 \\ \times 8 \\ \hline 376 \end{array}$$

"7 ones times 8 equals 56 ones. The 50 ones are renamed into 5 tens and written above the tens column. 4 tens times 8 equals 32 tens, add the 5 tens equals 37 tens."

Y4 Objectives

- All times tables up to 12 x 12
- Multiply 2dn by 1dn using an appropriate method, including column multiplication
- Multiply 3dn by 1dn using an appropriate method, including column multiplication.

Use numbers in context, eg. I have 6 jars of marbles. Each one has 245 marbles in. How many marbles are there in all 6 jars? Children build on previous steps to represent a three-digit number multiplied by a one-digit number initially with place value counters.

Teachers should be aware of misconceptions arising from 0 in the tens or ones column of a dividend. Children then move on to explore multiplication with renaming in one column first and then more than one column.

Encourage children to use flexible methods to solve multiplication calculations.

Practise multiplying by 5

$$46 \times 5 = 46 \times 10 \text{ halved} = 230$$

This is a really easy strategy to use with large numbers and decimals!

Try 32 x 5, or 126 x 5 or 6.4 x 5!

£1.99 x 6

Y5 Objectives

- 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
- multiply and divide numbers mentally drawing upon known facts
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

Use number link boards to support estimation of a 'sensible' answer

$$\begin{array}{r} +12 \\ 3126 \\ \times 4 \\ \hline 12504 \end{array}$$

COMPACT METHOD

Move from short to long multiplication.

Look at how the product changes when we increase the multiplicand or the multiplier.

$$\text{Procedural variation } 46 \times 6 = 276$$

What happens to the product when we increase the multiplicand by 1? Does the product increase by 1?

What happens to the product when we increase the multiplier by 1? Does the product increase by 1?

Use real life context examples

Y6 Objectives

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- multiply one-digit numbers with up to 2 decimal places by whole numbers
- perform mental calculations, including with mixed operations and large numbers

Use real life context examples and reasoning to build depth of understanding.

Eg. present children with an image of seats in a stadium to represent the calculation 28 x 26. How could this calculation be solved?

What calculations could we generate here?

Use long multiplication to multiply number with up to 4 digits by 2 digit numbers

$$\begin{array}{r} +1 \\ +3 \\ 4308 \\ \times 24 \\ \hline 17232 \\ 86160 \\ \hline 103392 \end{array}$$

Use the number link board to support estimation of a 'sensible' answer.

$$\begin{array}{r} +6 \\ +4 \\ 3.87 \\ \times 7 \\ \hline 27.09 \end{array}$$