Multiplication—Step 1

Steps to success

Solve problems using doubling within 20

Mental Maths

Count in multiples of 1 and 2

Examples

Grouping objects into pairs and then counting them in twos, for example socks.

Doubling with ladybirds spots. Everything practical.

Vocabulary

compare
double
half, halve
pair
count out, share out
left, left over

Outcomes for end of Foundation Stage

Children solve problems using doubling (concrete objects) within 20.

Multiplication—Step 2

Written Methods– Steps to success

Step 1:

Grouping

Practical e.g. numicon. Counting in 2's, 5's and 10's within context of 1 step practical problems.

Step 2 : Arrays

Bun trays, egg boxes. Place objects onto grids of squared paper.

Record as 'lots of' or 'groups of'.

2's, 5's and 10's

Mental Maths

Count in multiples of 2, 5 and 10.

Double and halve numbers.

Examples

Grouping objects into pairs and then counting them in twos, for example socks, bundles of 10 straws, fingers and toes. Everything practical.

Vocabulary

Double, near double

Half, halve,

count out, share out, left, left over

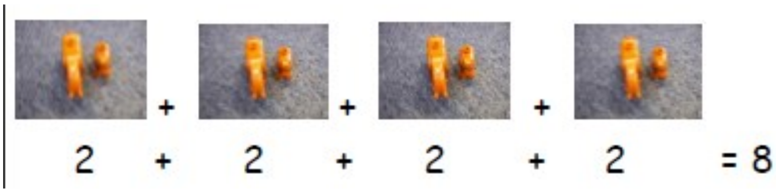
Outcomes for the end of Year 1

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

Multiplication—Step 3

Written Methods– Steps to success

Step 1: **Repeated Addition e.g Numicon. Know tables: 2,5,10.**



Use practical equipment and pictorial representations including arrays.

Step 2: Commutative law **(still using equipment, pictures and arrays)**

Use symbols to record multiplication (x =) in any order. Find related sentences.

2 x 3 = 6
3 x 2 = 6

Mental Maths

Recall multiplication for 2, 5 and 10 times tables. Count in 3s.
To recognise odd and even numbers .
Double and halve numbers.

Examples

2 X 5 = 10
5 X 5 = 25
5 X 10 = 50

Vocabulary

lots of, groups of
´, times, multiply, multiplied by
multiple of
once, twice, three times… ten times…
times as (big, long, wide… and so on)
repeated addition
array
row, column
double,

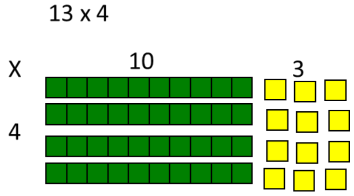
Outcomes for the end of Year 2

Children recall and use multiplication facts for 2, 5 and 10 times tables. Children calculate mathematical statements for multiplication within the 2,5,10 times tables and write them using the X and = signs.

Multiplication—Step 4

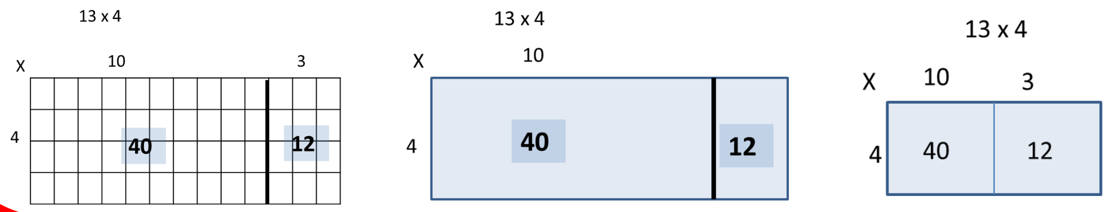
Written Methods– Steps to success

Step 1: **Arrays (extending to teens numbers using appropriate equipment e.g towers of 10 cubes, Base 10)**



Step 2: **Link using base 10 to build arrays (showing teens x single digits) to paper rectangles on squared paper to show the grid method. Finally, rectangles to represent the arrays, leading to the grid method.**

Calculate addition either mentally or written addition



Mental Maths

Recall multiplication for the 3, 4, and 8 times tables .
Count in 4s, 8s, 50s, 100s.
Double and halve numbers.

Examples

Using Arrays to support new multiplication.
2 Digit X1 digit (not within 12X12 but using times table facts they know) i.e. 16X3, 18X4

Vocabulary

Lots of, groups of.. times, multiply,
multiplication, multiplied by
multiple of, product
once, twice, three times... ten times...
times as (big, long, wide... and so on)
repeated addition
array
row, column
double, halve

Outcomes for the end of Year 3

Children write and 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 the grid method.
Recall and use multiplication facts for 3, 4 and 8

Multiplication—Step 5

X6, X7, X9, X25 and X100 plus multiplication from previous years

Written Methods– Steps to success

Step 1: Use the grid method

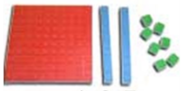
(link back to arrays, or base 10 as Y3)

13 x 4

X	10	3
4	40	12

Step 2: Link the grid method to expanded short multiplication

x	100	20	7
6	600	120	42



```
  1 2 7
  X   6
  -----
    4 2
  1 2 0
  6 0 0
  -----
  7 6 2
```

Step 3: Short Multiplication only when children are ready.

```
  1  2  7
     x  6
  1  4
  -------
  7  6  2
```

2 digit X 1 digit

3 digit X1 digit

Mental Maths

- Double and halve numbers.
- All times tables up to 12 X 12
- **New for year 4:** X6, X7, X9, X25 and X100
- **Associative law:**
  - 2 x 3 x 4 becomes
  - (2 x 3) x 4 = 6 x 4 or
  - 2 x (3 x 4) = 2 x 12

Examples

Grid Method up to 3 digit by 1 digit

i.e. 127 X 3

Formal Written Method up to 3 digit by 1 digit i.e. 364 X 4

Vocabulary

lots of, groups of

times, multiply, multiplication,

multiplied by

multiple of, product

once, twice, three times... ten times...

times as (big, long, wide... and so on)

repeated addition

array

Outcomes for the end of Year 4

Children multiply two digit and three digit numbers by a one-digit number using formal written layout.

Children recall multiplication facts for multiplication up to 12 X 12

Multiplication—Step 6

Written Methods– Steps to success

Step 1: **Continue with grid method (see Y3) moving to Short Multiplication if children are ready (up to 4 digit by 1 digit)**

```
  1 2 7
    x 6
  ¹ ⁴
  7 6 2
```

```
  2 7 4 1
      x 6
  ⁴ ²
1 6 4 4 6
```

Step 2: **If short multiplication is secure, Long Multiplication relate back to the grid method (using arrays of base 10 equipment, paper rectangles on squared paper). If short not secure, continue with grid method.**

	10	8
10	100	80
3	30	24

```
    1 8
  × 1 3
    5 4
  1 8 0
  2 3 4
```

This can become 'messy' as two lots of 'exchange are now needed, 1 for multiplication and 1 for addition.

Mental Maths

- Double and halve numbers.
- Recap all Times Tables.
- X10, x100, x1000,
- **Associative law—use factors to multiply**
  - 28 x 4 becomes
  - 28 x 2 x 2 becomes
  - 56 x 2 = 112
  - 2 x (3 x 4) = 2 x 12

Examples

Examples in stages:

1) 6 X 1234 2) 24 x 16
3) 124 X 26 4) 1231 x 18

Vocabulary

lots of, groups of
times, multiply, multiplication,
multiplied by
multiple of, product
once, twice, three times… ten times…
times as (big, long, wide… and so on)
repeated addition
array
row, column
double, halve

Outcomes for the end of Year 5

Children multiply numbers up to 4 digit by a one or two-digit numbers
using a formal written method, including long multiplication for two-digit numbers
Children multiply numbers mentally drawing upon known facts

Multiplication—Step 7

Written Methods– Steps to success

Step 1: **Formal long multiplication (if children are ready) upto 4 digit x 2 digit whole numbers**

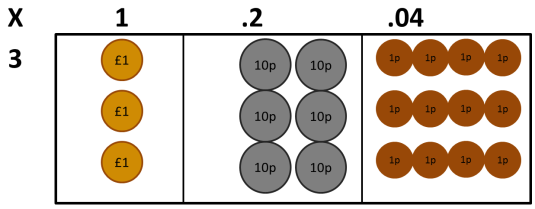
124 × 26 becomes

$$\begin{array}{rrrrr} & & {}^{1} & {}^{2} & \\ & & 1 & 2 & 4 \\ \times & & & 2 & 6 \\ \hline & & 7 & 4 & 4 \\ & 2 & 4 & 8 & 0 \\ \hline & 3 & 2 & 2 & 4 \\ \hline & {}_{1} & {}_{1} & & \end{array}$$

Answer: 3224

This can become 'messy' as two lots of 'exchange are now needed, 1 for multiplication and 1 for addition.

Step 2 : **Multiplication of decimals using grid method. Build arrays using coins.**



x	1	.2	.04
3	3	.6	.12

Include decimals: 1 digit number with 2 decimal places multiplied by a whole number

Mental Maths

- Double and halve numbers.
- Recap all times tables.
- X10, x100, x1000,
- **Associative law—use factors to multiply**
  - 36 x 25 becomes
  - 4 x 9 x 25 becomes
  - 25 x 4 x 9 becomes
  - 100 x 9 = 900

Examples

Examples in stages:

1) 24 X 16
2) 124 X 26
3) 1231 X 18
4) 6 X 4.3
5) 34 X 4.26

Vocabulary

lots of, groups of

times, multiply, multiplication, multiplied by

multiple of, product

once, twice, three times… ten times…

times as (big, long, wide… and so on)

repeated addition

array, row, column

double, halve

Outcomes for the end of Year 6

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

Children multiply one– digit numbers with up to two decimal places by whole numbers.