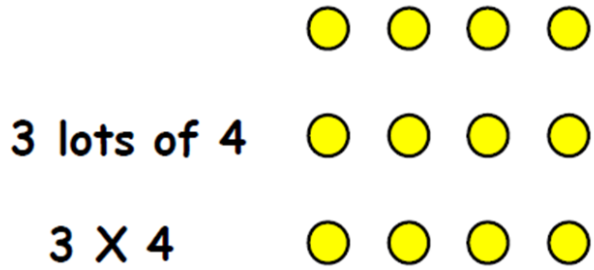
Pembridge Hall School

CALCULATION POLICY: Multiplication

Stage 1

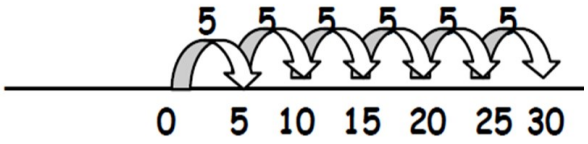
Children are taught to understand multiplication as repeated addition. It can also describe an array



Each girls has 2 feet. How many feet do 4 girls have?

2 + 2 + 2 + 2

6 X 5 =



Vocabulary **lots of, groups of , times, multiply, twice, three times… ten times, times as (big, long, wide… and so on), repeated addition, array, row, column, double.**

National Curriculum Learning Objectives

Pupils should be taught to:

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

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Stage 2

Times tables

In Year 2 the children will start to learn and have a weekly times table test.

5 x, 10 x

2 x 4 x 8 x

3x 6x 9x 12x

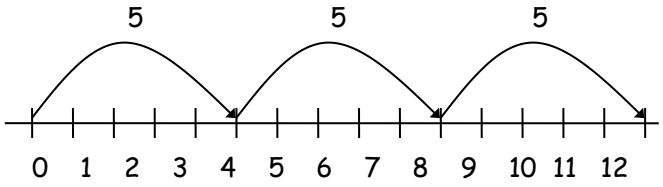
By end of year the majority of children should know their times tables to 10 x 10.

Children will develop their understanding of multiplication and use jottings to support calculation:

Repeated addition

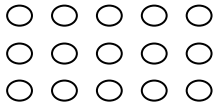
3 times 5 is 5 + 5 + 5 = 15 or 3 lots of 5 or 5 x 3

Repeated addition can be shown easily on a number line:



Arrays

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

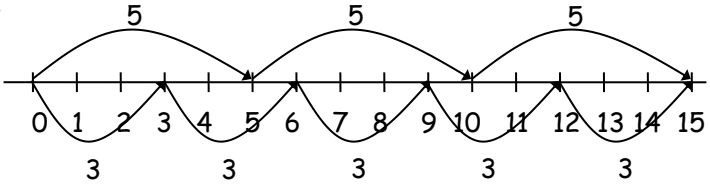


5 x 3 = 15

3 x 5 = 15

Commutative

Children should know that 3 x 5 has the same answer as 5 x 3. This can also be shown on the number line.



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Stage 3

Times Tables

Derive and recall quickly all multiplication facts up to 12 x 12.

Using and applying division facts

Children should be able to utilise their tables knowledge to derive other facts.

e.g. If I know 3 x 7 = 21, what else do I know?

30 x 7 = 210, 300 x 7 = 2100, 3000 x 7 = 21 000, 0.3 x 7 = 2.1 etc

Grid method

TU x U

(Short multiplication – multiplication by a single digit)

14 x 6

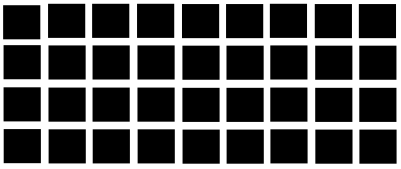
x	10	4
6	60	24

60
+ 24
84

Arrays

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

Arrays



9 x 4 = 36

9 x 4 = 36

Scaling

e.g. Find a ribbon that is 4 times as long as the ribbon

Short Multiplication Compact Method

237
x 4
948
1 2

Vocabulary

Lots of, groups of, times, multiply, multiplication, multiplied by multiple of, product, once, twice, three times… ten times… times as, repeated addition, array, row, column, double, grid method

National Curriculum Learning Objectives

Pupils should be taught to:

- 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.

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CALCULATION POLICY: Multiplication

Stage 4

Times Tables

Derive and recall quickly all multiplication and division facts up to 12 x 12.

Using symbols to stand for unknown numbers complete equations using inverse operations

£ x 5 = 20 3 x r = 18 £ x = 32

Grid method

TU x U

(Short multiplication – multiplication by a single digit)

23 x 8

x	20	3
8	160	24

160
+ 24
184

Compact Method

Children will also be taught the compact method of multiplication depending on individual needs and ability

34
x 28
272
680
952
1

Vocabulary

multiply, multiplied by, multiple of, times, array divide, divided by, divisible by, factor, product, inverse

National Curriculum Learning Objectives

Pupils should be taught to:

- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- 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 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
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

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CALCULATION POLICY: Multiplication

Stage 5

Grid method

TU x U

(Short multiplication – multiplication by a single digit)

23 x 8

Children will approximate first

x	20	3
8	160	24

160
+ 24
184

TU x TU

(Long multiplication – multiplication by more than a single digit)

72 x 38

Children will approximate first

72 x 38 is approximately 70 x 40 = 2800

x	70	2
30	2100	60
8	560	16

2100
+ 560
+ 60
+ 16
2736
1

Compact Method and Long Multiplication

24 × 6 becomes

24
× 6
144
2

Answer: 144

342 × 7 becomes

342
× 7
2394
2 1

Answer: 2394

327
x 53
981 ← 327 x 3
16350 ← 327 x 50
17331

Vocabulary lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times… ten times… times as, repeated addition, array, row, column, double, grid method, short multiplication.

National Curriculum Learning Objectives

Pupils should be taught to:

- recall multiplication and division facts for multiplication tables up to 12 × 12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 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 such as n objects are connected to m objects.

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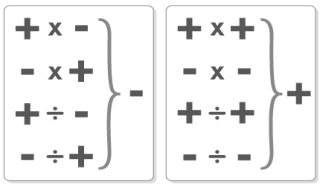
CALCULATION POLICY: Multiplication

Stage 6

Compact Method for Long Multiplication

96
32 x
192 ⇦ this is 96 x 2
2880 ⇦ this is 96 x 30
3072 ⇦ this is 96 x 32

Multiplication of Negative Numbers

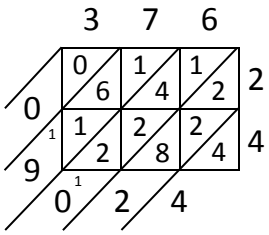


Long Multiplication for Decimals

0.67 (2 decimal places)
x 0.4 (1 decimal place)
0.268 (3 decimal places)

Napier Bones

Children are introduced post exams to Napier Bones method.



Multiplication of Fractions

$\frac{2}{5} \times \frac{6}{7} = \frac{2 \times 6}{5 \times 7} = \frac{12}{35}$

$\frac{1}{4} \times \frac{2}{3} = \frac{1 \times 2}{4 \times 3} = \frac{2}{12} =$ reduces to $\frac{1}{6}$

Vocabulary

times, multiply, multiplied by, product, multiple of, divide, divided by, divisible by, quotient, factor, inverse decimal, decimal point, tenths, hundredths, thousandths

National Curriculum Learning Objectives

Pupils should be taught to:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations