Calculation Policy
Key Stages 1 - 2

Orchard Community Primary School

This policy was approved by the Governing Body of Orchard Primary School at their meeting on...........................

Signed...................................... Chair of Governors

Addition

Year 1	Year 2	Year 3
Statutory requirements **Number and place value** ▪ given a number, identify one more and one less **Number – addition and subtraction** ▪ read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs ▪ represent and use number bonds and related subtraction facts within 20 ▪ add and subtract one-digit and two-digit numbers to 20, including zero ▪ solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = - 9	**Statutory requirements** **Number – addition and subtraction** ▪ solve problems with addition and subtraction: ▪ using concrete objects and pictorial representations, including those involving numbers, quantities and measures ▪ applying their increasing knowledge of mental and written methods ▪ recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 ▪ add and subtract numbers using concrete objects, pictorial representations, and mentally, including: ▪ a two-digit number and ones ▪ a two-digit number and tens ▪ two two-digit numbers ▪ adding three one-digit numbers ▪ show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot ▪ recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	**Statutory requirements** **Number – addition and subtraction** ▪ add and subtract numbers mentally, including: ▪ a three-digit number and ones ▪ a three-digit number and tens ▪ a three-digit number and hundreds ▪ add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction ▪ estimate the answer to a calculation and use inverse operations to check answers ▪ solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

Addition

Year 1	Year 2	Year 3

+ = signs and missing numbers

Pupils memorise and reason with number bonds to 10 and 20 in several forms.
Stories of numbers to 20 and related subtraction facts.
Children need to understand the concept of equality before using the '=' sign. Calculations should be written either side of the equality sign so that the sign is not just interpreted as 'the answer'. Part whole models to be modelled and used by pupils.
Numicon and ten frames support understanding.

$16 = 9 + 7$
$9 + 7 = 8 + 8$
$16 = 16$
$4 + 4 + 4 = 8 + 4$

Missing numbers need to be placed in all possible places.

$3 + 4 = \square$ $\square = 3 + 4$
$3 + \square = 7$ $7 = \square + 4$
$\square + 4 = 7$ $7 = 3 + \square$
$\square + \nabla = 7$ $7 = \square + \nabla$

Children should realise the effect of adding or subtracting zero.
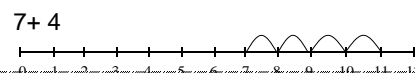
Activities
Children should have access to a wide range of counting equipment, everyday objects, as well as hoops, sorting trays, number tracks, numbered number lines and bead strings.

Teacher modelling
Drawing jumps on numbered number lines to support understanding of the mental method

Children
To create their own jumps using rulers, fingers, pens, bodies etc.

$7 + 4$

0 1 2 3 4 5 6 7 8 9 10 11 12

+ = signs and missing numbers
Continue using a range of equations as in Year 1 but with appropriate, larger numbers.
Extend to
$14 + 5 = 10 + \square$
and
$32 + \square + \square = 100$ $35 = 1 + \square + 5$

Partition into tens and ones and recombine
$12 + 23 = 10 + 2 + 20 + 3$
           $= 30 + 5$
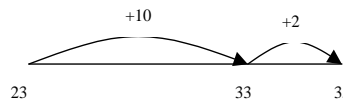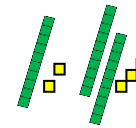 $= 35$

Count on in tens and ones
$23 + 12 = 23 + 10 + 2$
           $= 33 + 2$
           $= 35$

+10   +2

23   33   35
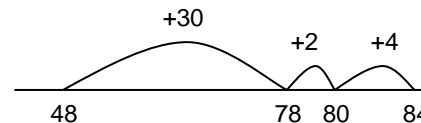
Add a near multiple of 10 to a two-digit number
Secure mental methods by using a number line to model the method. Continue as in Year 1 but with appropriate numbers
 e.g. $35 + 19$ is the same as $35 + 20 - 1$.

Children need to be secure adding multiples of 10 to any two-digit number including those that are not multiples of 10.
$48 + 36 = 84$

+30   +2   +4

48   78   80   84

Pencil and paper procedures
Use of place value apparatus to develop conceptual understanding and use of jotting to record their steps (see Steps to Success – Addition 1)
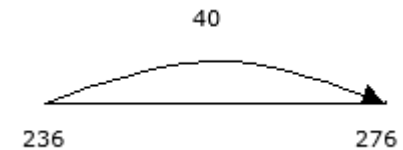e.g.   or
   25 $= $ $20 + 5$
$+ \underline{47}$ $\underline{+ 40 + 7}$
            $60 + 12 = 72$

+ = signs and missing numbers
Continue using a range of equations as in Year 1 and 2 but with appropriate, larger numbers.

Add and subtract numbers mentally
e.g. $236 + 40 = 276$

40

236   276

Children develop the ability to decide best strategy for different calculations

Pencil and paper procedures
Continue the use of place value apparatus to develop conceptual understanding

Using rounding to estimate answers
$367 + 185 = 552$ $400 + 200 = 600$

Steps to Success – Addition 2

   367 $= $ $300 + 60 + 7$
$+\underline{185}$ $\underline{100 + 80 + 5}$
            $400 + 140 + 12 = 552$

Leading to compact method when ready
(Steps to success – Addition 3 and 4)

   367
$+\ \underline{185}$
   $\underline{552}$
   $_1\ _1$

Addition

| Year 4	Year 5	Year 6
Statutory requirements	**Statutory requirements**	**Statutory requirements**
Number - Addition and subtraction	**Number - addition and subtraction**	**Number - addition and subtraction**
• add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • estimate and use inverse operations to check answers to a calculation	▪ add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) ▪ add and subtract numbers mentally with increasingly large numbers ▪ use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy ▪ solve problems involving number up to three decimal places	Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large and decimal numbers to aid fluency

Addition

Year 4	Year 5	Year 6

+ = signs and missing numbers
Continue using a range of equations as in previous years but with appropriate numbers.

Partition into hundreds, tens and ones and recombine to support mental calculations
Either partition both numbers and recombine or partition the second number only e.g.
358 + 73 = 358 + 70 + 3
= 428 + 3
= 431

+70   +3

358   428   431
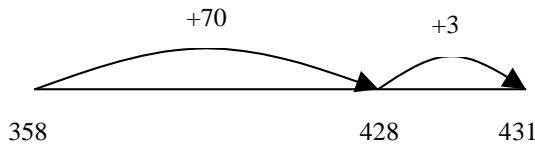
Add or subtract the nearest multiple of 10 or 100, then adjust
Continue as in Year 2, 3 but with appropriate numbers e.g.
458 + 79 = is the same as 458 + 80 - 1

Written Methods
Use of place value equipment to support conceptual understanding
Revert to expanded methods if the children experience any difficulty.
Extend to numbers with at least four digits
3587 + 675 = 4262

```
  3587
+  675
  4262
  1 1 1
```

Extend to up to two places of decimals (same number of decimals places) and adding several numbers (with different numbers of digits) in the context of measures and money.
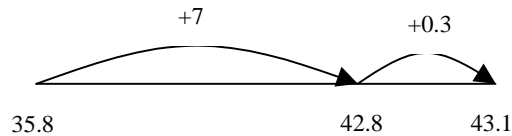```
   72.8
  +54.6
  127.4
     1
```

**+ = signs and missing numbers**
Pupils continue to practise both mental methods and columnar addition with increasingly large numbers to aid fluency

**Partition into hundreds, tens, ones and decimal fractions and recombine**
Either partition both numbers and recombine or partition the second number only e.g.
35.8 + 7.3 = 35.8 + 7 + 0.3
= 42.8 + 0.3
= 43.1

+7                +0.3

35.8                42.8        43.1

**Add the nearest multiple of 10, 100 or 1000, then adjust**
Continue as in Year 2, 3 and 4 but with appropriate numbers including extending to adding 0.9, 1.9, 2.9 etc

**Written Methods**

Extend to whole numbers with more than four digits and decimals with up to 2 decimal places. Also add several numbers with different numbers of digits. Place value counters used to support conceptual understanding.
13.86 + 9.481 = 23.341

```
   13.86
+  9.481
  23.341
   1 1  1
```

Consolidating and extending Year 5 work

Written Methods

Extend to numbers any number of digits and decimals with 1, 2, and /or 3 decimal places, e.g. 13.86 + 9.481 = 23.341

Subtraction

Year 1	Year 2	Year 3

Statutory requirements

Number – addition and subtraction

- given a number, identify one more and one less

- read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs

- represent and use number bonds and related subtraction facts within 20

- add and subtract one-digit and two-digit numbers to 20, including zero

- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 =   - 9.

Statutory requirements

Number – addition and subtraction

- solve problems with addition and subtraction:
    - using concrete objects and pictorial representations, including those involving numbers, quantities and measures
    - applying their increasing knowledge of mental and written methods

- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
    - a two-digit number and ones
    - a two-digit number and tens
    - two two-digit numbers
    - adding three one-digit numbers

- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot

- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Statutory requirements (excluding rapid recall)

- add and subtract numbers mentally, including:
    - a three-digit number and ones
    - a three-digit number and tens
    - a three-digit number and hundreds

- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction

- estimate the answer to a calculation and use inverse operations to check answers

- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.
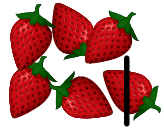
Subtraction

Year 1	Year 2	Year 3

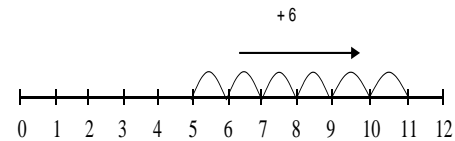**- = signs and missing numbers**

7 - 3 = ☐   ☐ = 7 - 3
7 - ☐ = 4   4 = ☐ - 3
☐ - 3 = 4   4 = 7 - ☐
☐ - ∇ = 4   4 = ☐ - ∇

- Understand subtraction as 'take away'

- Find a 'difference' by counting up;

I have saved 5p. The socks that I want to buy cost 11p. How much more do I need in order to buy the socks?

+ 6

0 1 2 3 4 5 6 7 8 9 10 11 12

- Use practical and informal written methods to support the subtraction of a one-digit number from a one digit or two-digit number and a multiple of 10 from a two-digit number.

I have 6 toy cars. There are 2 cars too many to fit in the garage. How many cars fit in the garage?

1	2	3	4	5	6	7	8	9	10

Use the vocabulary related to addition and subtraction and symbols to describe and record addition and subtraction number sentences

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- = signs and missing numbers
Continue using a range of equations as in Year 1 but with appropriate numbers.
Extend to 14 + 5 = 20 - ☐

Find a small difference by counting up
42 – 39 = 3

Subtract 9 or 11. Begin to add/subtract 19 or 21
35 – 9 = 26

Use known number facts and place value to subtract
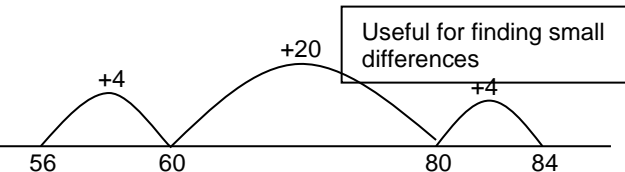(partition second number only)
37 – 12 = 37 – 10 – 2
       = 27 – 2
       = 25

Use place value apparatus to support understanding.
Complementary addition
84 – 56 = 28

+20

+4   +4

Useful for finding small differences

56   60   80   84

Pencil and paper procedures
Pupils use appropriate equipment, e.g. Diennes to physically subtract. 64 – 23 = 41
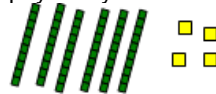
Begin to model TU – TU expanded method with equipment (Steps to Subtraction Success 1)

56	=	50	+	6		
- 21	-	20	+	1		
		30	+	5	=	35

- = signs and missing numbers
Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

Find a small difference by counting up
Continue as in Year 2 but with appropriate numbers e.g. 102 – 97 = 5

Subtract mentally a 'near multiple of 10' to or from a two-digit number
Continue as in Year 2 but with appropriate numbers e.g. 78 – 49 is the same as 78 – 50 + 1

Use known number facts and place value to subtract
92 – 25 = 67

With practice, children will need to record less information and decide whether to count back or forward. It is useful to ask children whether counting up or back is the more efficient for calculations (use of jottings) such as 57 – 12, 86 – 77 or 43 – 28.

Written Methods
Continue to look at expanded column method for subtraction using place value apparatus for support.

		50		10+		
63	=	6̶0̶	+	3		
- 27	-	20	+	7		
		30	+	6	=	36

356	=	300	+	50	+	6		
- 212	-	200	+	10	+	2		
		100	+	40	+	4	=	144

Subtraction

Year 4	Year 5	Year 6
Statutory requirements	**Statutory requirements**	**Statutory requirements**
Number – addition and subtraction	**Number – addition and subtraction**	**Number –addition and subtraction**
▪ add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate ▪ estimate and use inverse operations to check answers to a calculation ▪ solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction ▪ solve simple measure and money problems involving fractions and decimals to two decimal places.	▪ add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) ▪ add and subtract numbers mentally with increasingly large numbers ▪ use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy ▪ solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why ▪ solve problems involving number up to three decimal places.	▪ solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Subtraction

Year 4	Year 5	Year 6

- = signs and missing numbers
Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

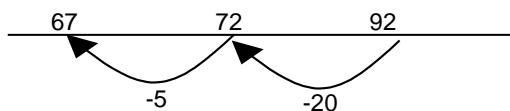**Find a small difference by counting up**
e.g. 5003 – 4996 = 7
This can be modelled on an empty number line (see complementary addition below). Children should be encouraged to use known number facts to reduce the number of steps.

Subtract the nearest multiple of 10 or 100, then adjust.
Continue as in Year 2 and 3 but with appropriate numbers.

Use known number facts and place value to subtract
92 – 25 = 67

67   72   92

-5   -20

Written Methods
Continue to look at expanded column method for subtraction using place value apparatus for support.

$$\begin{array}{rcrcrcc} & & & & & & 10+ \\ 354 & = & 300 & + & \cancel{50} & + & 4 \\ & & & & 40 & & \\ -\ 216 & - & 200 & + & \cancel{10} & + & 6 \\ \hline & & 100 & + & 30 & + & 8 & = & 138 \\ & & & & 40 & & \end{array}$$

Moving to compact method as appropriate.

$$\begin{array}{ccc} {}^{3}\cancel{4} & {}^{1}3 & 6 \\ -\ 2 & 8 & 5 \\ \hline 1 & 5 & 1 \end{array}$$

- = signs and missing numbers
Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

Find a small difference by counting up
e.g. 8006 – 2993 = 5013
This can be modelled on an empty number line
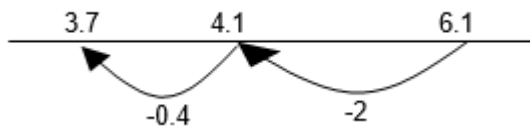To make this method more efficient, the number of steps should be reduced to a minimum through children knowing:
- Complements to 1, involving decimals to two decimal places (0.16 + 0.84)
- Complements to 10, 100 and 100

Subtract the nearest multiple of 10, 100 or 1000, then adjust
Continue as in Year 2, 3 & 4 but with appropriate numbers.
Use known number facts and place value to subtract
6.1 – 2.4 = 3.7

3.7   4.1   6.1

-0.4   -2

Or counting on along the number line
Written methods
Using place value apparatus move towards the compact column method. Extend to decimals.

$$\begin{array}{cccc} {}^{3}\cancel{4} & {}^{1}3 & {}^{5}\cancel{6} & {}^{1}3 \\ -\ 3 & 5 & 3 & 6 \\ \hline 8 & 2 & 7 \end{array}$$

Children should learn when this method is / is not the most appropriate, e.g. small differences or crossing lots of noughts.

Find a difference by counting up

e.g. 8000 – 2785 = 5215
To make this method more efficient, the number of steps should be reduced to a minimum through children knowing:
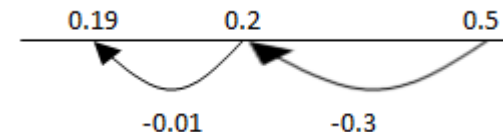- Complements to 1, involving decimals to two decimal places (0.16 + 0.84)
- Complements to 10, 100 and 1000

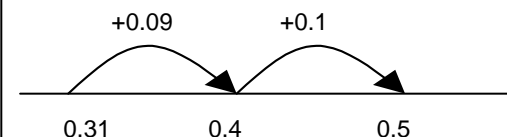**Subtract the nearest multiple of 10, 100 or 1000, then adjust**
Continue as in Year 2, 3, 4 and 5 but with appropriate numbers.

Use known number facts and place value to subtract
0.5 – 0.31 = 0.19

0.19   0.2   0.5

-0.01   -0.3

Or counting up number line.

+0.09   +0.1

0.31   0.4   0.5

Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large and decimal numbers to aid fluency

Pupils identify most appropriate strategy.

Multiplication

Year 1	Year 2	Year 3

Statutory Requirements

Number - multiplication and division

- 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.

Statutory Requirements

Number - multiplication and division

- 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.

Statutory Requirements

Number - multiplication and division

- 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

Year 1	Year 2	Year 3

Multiplication is related to doubling and counting groups of the same size.

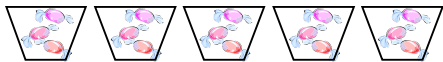| Looking at columns	Looking at rows
2 + 2 + 2	3 + 3
3 groups of 2	2 groups of 3

Counting using a variety of practical resources
Counting in 2s e.g. counting socks, shoes, animal's legs…
Counting in 5s e.g. counting fingers, fingers in gloves, toes…
Counting in 10s e.g. fingers, toes…

Pictures / marks

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

Arrays (with support of teacher) use of Numicon and physical objects

● ● ● ●   4 x 2 or 4 + 4
● ● ● ●
2 x 4 or 2 + 2 + 2 + 2

Doubling
Doubling numbers 10

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x = signs and missing numbers
7 x 2 = □   □ = 2 x 7
7 x □ = 14   14 = □ x 7
□ x 2 = 14   14 = 2 x □
□ x ∇ = 14   14 = □ x ∇

x / ÷ fact families
7 x 2 = 14
2 x 7 = 14
14 ÷ 2 = 7
14 ÷ 7 = 2

Continue to use pictorial representations of equal sets / groups

Arrays and repeated addition

●   ●   ●   ●   4 x 2 or 4 + 4
●   ●   ●   ●

2 x 4 or 2 + 2 + 2 + 2

0 1 2 3 4 5 6 7 8
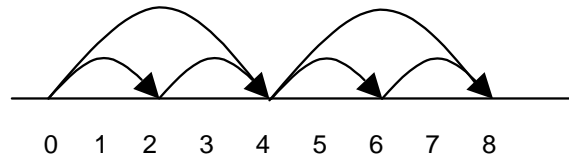
Doubling
All numbers to 20
Multiples of 5 and 10 up to 50, e.g. **15 x 2 = 30**

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x = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers.

Mental recall of 2, 3, 4, 5, 8 & 10 times tables up to 12 x
Knowledge of fact families
Multiplying and dividing by 10
Arrays and repeated addition
Continue to understand multiplication as repeated addition and continue to use arrays (as in Year 2).
● ● ● ● ● ● ● ●   8 x 3 = 24
● ● ● ● ● ● ● ●   or 8 + 8 + 8 = 24
● ● ● ● ● ● ● ●
3 x 8 = 24 or 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 24

Doubling all numbers up to 50
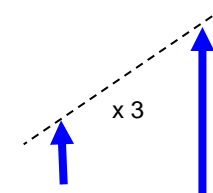36 x 2 = 72

Partition

30 + 6

60 + 12 = 72

Use known facts and place value to carry out simple multiplications
Using rounding to approximate answers
Use the same method as above (partitioning), e.g.
32 x 3 = 96

x	30	2	= 96
3	90	6	

Use scaling in measurement problems
e.g. three times as tall

x 3

Multiplication

Year 4	Year 5	Year 6

Statutory requirements

Number - multiplication and division

- 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.

Statutory requirements

Number - multiplication and division

- 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
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})
- solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

Statutory requirements

Number - multiplication and division

- 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

Number – Fractions

- Multiply one-digit number with up to two decimal places by whole numbers

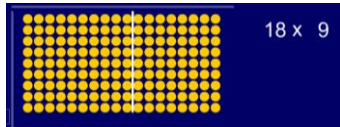# Multiplication

Year 4	Year 5	Year 6

x = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers(times table facts to 12 x 12)

Multiplying and dividing by 10 and 100

Partition
Continue to use arrays:

18 x 9

$18 \times 9 = 162$ $18 \times 9 = (10 \times 9) + (8 \times 9) = 162$
This can be related to work on area

Use the grid method of multiplication (as below)

Pencil and paper procedures
Grid method
23 x 7 is approximately 20 x 7 = 140

x	20	3
7	140	21

= 161

236 x 7 is approximately 200 x 7 = 1400

X	200	30	6
7	1400	210	42

= 1652

Introduce column method when place value is secure

```
      3   8
  x       7
  ─────────
  2   6   6
```

Scaling problems related to measurement and shape work

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x = signs and missing numbers
Continue using a range of equations as in Year 4 but with appropriate numbers

Pencil and paper procedures

Introduce formal written method for numbers up to 4-digits x 1 digit

```
   345
X    6
─────
 2070
```

Extend to simple decimals with one decimal place.

Link grid method to standard algorithm to multiply by 2-digits

x	10	8
10	100	80
3	30	24

```
  180
+  54
─────
  234
```

```
      1   8
  ×   1   3
  ─────────
      5   4    (18 x 3)
  1   8   0    (18 x 10)
  ─────────
  2   3   4
```

---

x = signs and missing numbers
Continue using a range of equations as in Year 5 but with appropriate numbers

124×26 becomes

```
      1   2
  1   2   4
×     2   6
─────────────
  7   4   4    (124 x 6)
2   4   8   0  (124 x 20)
─────────────
3   2   2   4
  1   1
```

Answer: 3224

Extend to multiplying one digit numbers with up to two decimal places by one digit and two digit whole numbers.

Division

Year 1	**Year 2**	**Year 3**
Statutory requirements	**Statutory requirements**	**Statutory requirements**
Number – Multiplication and division	**Number – Multiplication and division**	**Number – Multiplication and division**
▪ 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.	▪ 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.	▪ 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.

Division

Year 1	**Year 2**	**Year 3**

Year 1

Sharing
Requires secure counting skills
- see number and place value programme of study

Relate to fraction programme of study
- Find one half, one quarter of shapes and sets of objects

Sharing
6 sweets are shared between 2 people. How many do they have each?

Practical activities involving sharing, distributing cards when playing a game, putting objects onto plates, into cups, hoops etc.

Grouping
Sorting objects into 2s / 3s/ 4s etc.
How many pairs of socks are there?

There are 12 crocus bulbs. Plant 3 in each pot. How many pots are there?
Jo has 12 Lego wheels. How many cars can she make?

Year 2

÷ = signs and missing numbers

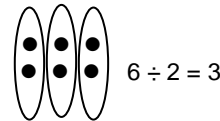|	
$6 \div 2 = \square$	$\square = 6 \div 2$
$6 \div \square = 3$	$3 = 6 \div \square$
$\square \div 2 = 3$	$3 = \square \div 2$
$\square \div \nabla = 3$	$3 = \square \div \nabla$

x / ÷ fact families
$7 \times 2 = 14$
$2 \times 7 = 14$
$14 \div 2 = 7$
$14 \div 7 = 2$

Grouping and sharing
Count up to 100 objects by grouping them and counting in tens, fives or twos; …
Find one quarter, two quarters, three quarters and one third of shapes and sets of objects

$6 \div 2$ can be modelled as:
There are 6 strawberries.
How many people can have 2 each? How many 2s make 6?

$6 \div 2$ can be modelled as: $6 \div 2 = 3$

In the context of money count forwards and backwards using 2p, 5p and 10p coins
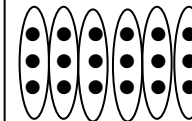
Practical grouping e.g. in PE
12 children get into teams of 4 to play a game. How many teams are there?

Year 3

÷ = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers.
Use doubling to connect the 2, 4 and 8 multiplication tables

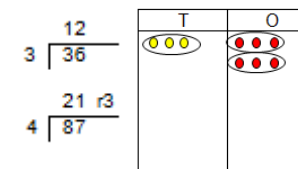**Understand division as sharing and grouping**

Use of arrays to link division with multiplication

Remainders
$16 \div 3 = 5 \text{ r}1$
Sharing - 16 shared between 3, how many left over?
Grouping – How many 3's make 16, how many left over?
e.g.

Written Methods

Once children are confident with dividing numbers up to 12 x 12 using above methods, introduce formal method using place value equipment (Steps to Success – Dividing 1), e.g.

Division

Year 4	Year 5	Year 6
Statutory requirements **Number - multiplication and division** ▪ 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 ▪ 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. **Number – Fractions** ▪ solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number ▪ find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.	**Statutory requirements** **Number - multiplication and division** ▪ 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 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 ▪ solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes ▪ solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign ▪ solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	**Statutory requirements** **Number - addition, subtraction, multiplication and division** ▪ **divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context** ▪ **divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context** ▪ 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 ▪ solve problems involving addition, subtraction, multiplication and division ▪ use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. **Number - Fractions** ▪ divide proper fractions by whole numbers (e.g. 1/3 ÷ 2 = 1/6)

Division

Year 4	Year 5	Year 6

÷ = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers.
Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency.

Written Methods

Develop bus stop method to larger numbers, e.g. 3-digit ÷ single digit numbers. Remainders as whole numbers - Steps to success 1, 2 & 3 (place value counters to be modelled alongside method).

432 ÷ 5 becomes

8 6 r 2

5 | 4̶ ^{4}3 ^{3}2

Answer: 86 remainder 2

÷ = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers.
Pupils apply all the multiplication tables and related division facts frequently and use them confidently to make larger calculations

Remainders
Interpret non-integer answers appropriate to context of problem, including with remainders, as fractions, as decimals or by rounding

Written Methods

Develop bus stop method to larger numbers, e.g. 4-digit ÷ single digit numbers. Remainders in the context of the problem

2 2 6 r1

6 | 1̶ ^{1}3^{1}5^{3}7

Remainder could be 1/6

Undertake mental calculations with increasingly large numbers and more complex calculations.
Pupils explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9.
Common factors can be related to finding equivalent fractions.

Continuing short division as per Year 5 with more complex numbers.

432 ÷ 15 = 28 r 12   or 28

2 8 r12

15 | 4̶ ^{4}3 ^{13}2

Or 432 ÷ 15 = 28.8

2 8 8

15 | 4̶ ^{4}3 ^{13}2 ^{12}0

Alternatively introduce long division.

432 ÷ 15 becomes

```
          2  8 · 8
1  5 | 4  3  2 · 0
        3  0  ↓
        1  3  2
        1  2  0  ↓
           1  2  0
           1  2  0
                 0
```

Answer: 28·8

This policy contains the key mathematical procedures for the four rules that will be taught within our school. It has been written to ensure consistency and progression throughout the school and reflects the requirements of the national curriculum for mathematics (2014).

The national curriculum for mathematics aims to ensure that all pupils:

- **become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.**
- **reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language**
- **can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.**

During their time at this school children will be encouraged to see mathematics as both a written and spoken language. Teachers will support and guide children through the following concrete, pictorial and abstract stages:
- using physical objects to solve problems in a logical fashion;
- developing the use of pictures and models and a mixture of words and symbols to represent numerical activities;
- using standard symbols and conventions;
- use of jottings to aid a mental strategy;
- development of formal written methods.

This policy concentrates on the introduction of standard symbols, the use of jottings to aid mental calculation and on the introduction of pencil and paper procedures. Children will always be encouraged to look at a calculation/problem and then decide which is the best method to choose – pictures, mental calculation with or without jottings or a structured recording. Our long-term aim is for children to be confident mathematicians who are competent in the use of formal written method.