Addition – Year 3 – 6
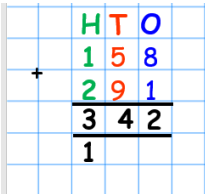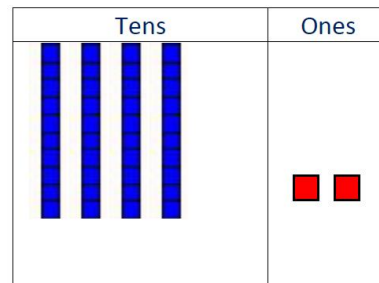
Year Group	Statutory Requirements	Prior knowledge/understanding required	Steps to success	End of year outcome
3	Find 10 or 100 more than a given number. Recognise the place value of each digit in a three-digit number (hundreds, tens, ones). Add numbers with up to 3 digits using the formal written methods of column addition.	Understanding of addition using the whole –part - whole model. Place value of 3 digit numbers – partitioning in to hundreds, tens and ones.	**Bar model:** Whole Part Whole <table><tr><td colspan="2">Whole</td></tr><tr><td>Part</td><td>Part</td></tr></table> e.g. 12 + 5 = 17 <table><tr><td colspan="2">Whole = 17</td></tr><tr><td>Part = 12</td><td>Part = 5</td></tr></table> **Partitioning –** Dienes blocks 42 = 40 + 2 40 = 4 tens	Children use formal method of column addition to add numbers with up to 3 digits (including calculations where regrouping is required) E.g. *Note:* *The regrouped ten or regrouped hundred is just as important as any other number, therefore, it should be written as clear and as large as any other number, and placed at the bottom of the column in which it is to be added*

2 = 2 ones

Tens	Ones

Regrouping:
Pupils should be confidently able to manipulate place value groups and show numbers in different representations. This should initially be supported with the use of manipulatives such as dienes blocks and move to the abstract concept below.

e.g.
6 + 5 = 11
11 = 1 ten and 10 ones

90 + 20 = 110

110 = 1 hundred and 1 ten

Expanded Addition – 2 digits
42 + 36 =

```
T O
2 3
+ 1 4
─────
  7   ( 3 + 4)
3 0   (2 0 + 1 0 )
3 7   ( 3 0 + 7 )
```

Expanded Addition – 3 digits

```
H T O
1 5 8
+ 2 4 1
─────
    9  (8 + 1)
  9 0  (5 0 + 4 0)
3 0 0  (1 0 0 + 2 0 0)
3 9 2  (3 0 0 + 9 0 + 2)
```

Formal Column addition – 2 digits – no regrouping

```
T O
3 6
+ 2 2
─────
5 8
```

Formal Column addition – 3 digits – no regrouping

```
  H T O
+ 1 5 8
  2 4 1
  3 9 9
```

Formal Column addition – 2 digits – regrouping

```
    T O
    3 8
  + 2 3
    6 1
    1
```

Note: *The regrouped ten or regrouped hundred is just as important as any other number, therefore, it should be written as clear and as large as any other number, and placed at the bottom of the column in which it is to be added.*

Formal Column addition – 3 digits – regrouping

```
    H T O
    1 5 8
  + 2 6 1
    3 1 9
    1
```

			Note: **The regrouped ten or regrouped hundred is just as important as any other number, therefore, it should be written as clear and as large as any other number, and placed at the bottom of the column in which it is to be added**	

| 4 | Add numbers with up to 4 digits using the formal method of column addition. | Understanding of addition using the whole –part - whole model.

Understanding of place value up to 4 digits and able to partition 4 and 5 digit numbers in order to show the value. | **Progression should follow on from Year 3.**
In addition, it should include:

Partitioning of numbers with up to 4 digits.

1463 = 1000 + 400 + 60 + 3

Regrouping:
Pupils should be confidently able to manipulate place value groups and show numbers in different representations. This should initially be supported with the use of manipulatives such as dienes blocks and move to the abstract concept below.

e.g.
6 + 5 = 11
11 = 1 ten and 10 ones

90 + 20 = 110

110 = 1 hundred and 1 ten

800 + 600 = 1400
1400 = 1 thousand and 4 hundreds

Expanded method with 4 digits: | By the end of year 4, pupils should be adding numbers up to 4 digits using compact column addition method.

Note: The regrouped ten or regrouped hundred is just as important as any other number, therefore, it should be written as clear and as large as any other number, and placed at the bottom of the column in which it is to be added |

Th	H	T	O		
3	1	3	8		
+ 2	2	6	1		
			9	(8 + 1)	
		9	0	(3 0 + 6 0)	
	3	0	0	(1 0 0 + 2 0 0)	
5	0	0	0	(3 0 0 0 + 2 0 0 0)	
5	3	9	9		

Formal written method with 4 digits and no regrouping:

Th	H	T	O
3	1	3	8
+ 2	2	6	1
5	3	9	9
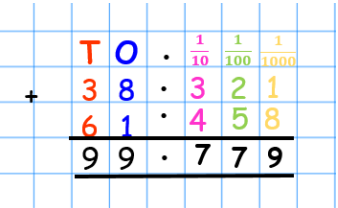
Formal written method with 4 digits and regrouping.

Th	H	T	O
3	1	5	8
+ 2	2	6	1
5	3	1	9
		1	

Note: *The regrouped ten or regrouped hundred is just as important as any other number, therefore, it should be written as clear and as large as any other number, and placed at the bottom of the column in which it is to be added*

This is the end of year expectation and should also include calculations in

			which regrouping is required from Thousands to Ten Thousands.	

| 5 and 6 | Add numbers with more than 4 digits using the formal method of column addition.

Add numbers with up to 3 decimal places. | Place value understanding of up to hundred thousands.

Place value understanding past the decimal point.
Tenths, hundredths, thousandths. | **Partitioning of numbers with 5 and 6digits.**

54,326 = 50 thousand (50,000) + 4 thousand (4000) + 3 hundred (300) + 2 tens (20) + 6 ones (6)

Partitioning of numbers with decimal points – 1 decimal point.

4.1 = 4 + 0.1 or 4 ones + 1/10

Partitioning of numbers with decimal points – 2 decimal point.

4.21 = 4 + 0.2 + 0.01 or 4 ones + 2/10 + 1/100
Partitioning of numbers with decimal points – 3 decimal points

4.521 = 4 + 0.5 + 0.02 + 0.001 or 4 ones + 5/10 + 2/100 + 1/1000

Regrouping:
Pupils should be confidently able to manipulate place value groups and show numbers in different representations. This should initially be supported with the use of manipulatives such as dienes blocks and move to the abstract concept below.

e.g.
6 + 5 = 11
11 = 1 ten and 10 ones | **End of Y5/6 outcome:**
Addition with 5 or more digits and regrouping.

Addition of numbers with up to 3 decimal places and regrouping.

 |

			90 + 20 = 110 110 = 1 hundred and 1 ten 800 + 600 = 1400 1400 = 1 thousand and 4 hundreds 6000 +7000 = 13,000 13,000 = 1 ten thousand + 3 thousands. **Regrouping with decimals:** **0.8 + 0.5 = 1.3** Or 8/10 + 5/10 = 13/10 1.3 – 1 one and 3 tenths 13/10 = 1 and 3/10 **0.03 + 0.09 = 0.12** Or 3/100 + 9/100 = 12/100 0.12 = 1 tenth and 2 hundredths 12/100 – 1/10 + 2/100 **0.008 + 0.006 = 0.014** Or 8/1000 + 6/1000 = 14/1000 0.014 = 1 hundreth and 4 thousandths 14/1000 = 1/100 + 4/1000 **Note:** **Resources such as dienes blocks and place value counters should**	

continue to be used to physically represent the abstract concept of place value in the older years. Teachers should be confident that pupils hold a secure knowledge of place value to 3 digits and 4 digits before moving forward.

Formal Addition of 5 digit numbers – without regrouping

	Tth	Th	H	T	O
	2	3	1	3	8
+	5	2	2	6	1
	7	5	3	9	9

Formal Addition of 5 digit numbers - with regrouping

	Tth	Th	H	T	O
	2	3	1	3	8
+	5	8	2	6	1
	8	2	3	9	9
	1				

Note: The regrouped ten or regrouped hundred is just as important as any other number, therefore, it should be written as clear and as large as any other number, and placed at the bottom of the column in which it is to be added

Formal addition of numbers with 1 decimal place - without regrouping

T	O	.	$\frac{1}{10}$
	3	8	.	3
+	6	1	.	4
	9	9	.	7

Formal addition of numbers with 2 decimal places - without regrouping

T	O	.	$\frac{1}{10}$	$\frac{1}{100}$
	3	8	.	3	2
+	6	1	.	4	5
	9	9	.	7	7

Formal addition of numbers with 3 decimal places no regrouping

T	O	.	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
	3	8	.	3	2	1
+	6	1	.	4	5	8
	9	9	.	7	7	9

Formal addition of numbers with 1 decimal place with regrouping.

T	O	.	$\frac{1}{10}$
	3	7	.	9
+	6	1	.	4
	9	9	.	3
		1		

Formal addition of numbers with 2 decimal places with regrouping.

T	O	.	$\frac{1}{10}$	$\frac{1}{100}$
	3	8	.	3	9
+	6	1	.	4	5
	9	9	.	7	4
			1		

Formal addition of numbers with 3 decimal places and regrouping.

T	O	.	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
	3	8	.	3	2	5
+	6	1	.	4	5	8
	9	9	.	7	8	3
				1		

Subtraction – Year 3 – 6

Year	Statutory requirements	Prior knowledge/understanding required	Steps to success	End of Year outcomes
3	Subtract numbers with up to 3 digits using a formal written method.	Understanding as subtraction Whole – Part = P art Able to subtract a 3 digit number and: - Ones - Tens - Hundreds	**Bar model: Whole – part = part** e.g. **14 – 11 = 3** | **Whole : 14**	
Part : 11	**Part: 3**	 **Exchanging and regrouping:** Pupils need to be taught to exchange between place value columns. Pupils must be clear that: 1 ten is equal to 10 ones. 1 hundred is equal to 10 tens. This should be done initially with the support of base 10 blocks and pictorial representations but should move towards: 24 = 2 tens + 4 ones Or 24 = 1 ten + 14 ones 273 = 2 hundreds + 7 tens + 3 ones Or	**Formal subtraction of 3 digits with exchanging.** **Calculations may include exchanging from more than one place value column.**

273 = 1 hundred + 17 tens + 3 ones

Column subtraction – 2 digits – no exchanging.

$$
\begin{array}{r}
\mathsf{T\ O} \\
-\ \ 3\ 7 \\
2\ 1 \\
\hline
1\ 6
\end{array}
$$

Pupils are taught to start the calculation at the ones column. Subtracting ones from ones then tens from tens.

Column subtraction 2 digits – with exchanging

$$
\begin{array}{r}
\mathsf{T\ O} \\
2 \\
-\ \ \cancel{3}\,16 \\
2\ 9 \\
\hline
0\ 7
\end{array}
$$

Building on method without exchanging, pupils are taught to start

the calculation at the ones column.6 – 9
is not possible and so they must
exchange from the tens column.
One ten is exchanged into ten ones.
The calculation in the ones column is
now 16 – 9 which is possible.
Pupils then must subtract tens from
tens taking into consideration that 1 ten
has been exchanged.
**Pupils must be clear *when* exchanging
is necessary and that it is not required
in every calculation.**

**Column subtraction 3 digits – no
exchanging**

Pupils are taught to start the calculation
at the ones column.
Subtracting ones from ones then tens
from tens and hundreds from hundreds.

**Column subtraction 3 digits –
exchanging.**

Building on method without exchanging, pupils are taught to start the calculation at the ones column.30 – 70 (3 tens – 7 tens) is not possible and so they must exchange from the hundreds column.

One hundred is exchanged into ten tens.

The calculation in the ones column is now 130 – 70 (13 tens – 7 tens) which is possible.

Pupils then must subtract hundreds from hundreds, taking into consideration 1 hundred has been exchanged.

Pupils must be clear *when* exchanging is necessary and that it is not required in every calculation and that there will be calculations where exchanging is required from more than one place value column.

| 4 | Subtract numbers up to 4 digits using a formal method of column subtraction. | Understanding of subtraction as Whole – part = part

Place value understanding up to 4 digits.

Column subtraction with up to 3 digits and including exchanging. | **Progression should follow on from Year 3. In addition, it should include:**

Exchanging and regrouping up to 4 digits:
e.g

1000 = 10 hundreds

4326 = 4 thousands + 3 hundreds + 2 tens + 6 ones

Or

4326 = 3 thousands + 13 hundreds + 2 tens + 6 ones

Column subtraction – 4 digits – no exchanging

Th H T O
5 4 9 6
– 2 2 7 3
3 2 2 3

Column subtraction 4 digits – exchanging | **Formal subtraction – 4 digits and exchanging**

Th H T O
2
– 4̸ 15 3 6
1 9 2 3
2 6 1 3

Calculations may include exchanging from more than one place value column. |

Th	H	T	O
2			
~~3~~ 15	~~5~~ 15	3	6
1	9	2	3
2	6	1	3

Building on method without exchanging, pupils are taught to start the calculation at the ones column. 500 – 900 (5 hundreds – 9 hundreds) is not possible and so they must exchange from the thousands column.

One thousand is exchanged into ten hundreds.

The calculation in the ones column is now 1500 – 900 (15 hundreds – 9 hundreds) which is possible.

Pupils then must subtract thousands from thousands, taking into consideration 1 thousand has been exchanged.

Pupils must be clear *when* exchanging is necessary and that it is not required in every calculation. In some calculations, exchanging from more than one place value column may be necessary.

| 5/6 | Subtract whole numbers with more than 4 digits using a formal method of column subtraction.

Solve subtraction problems involving decimals with up to 3 decimal places. | | **Progression should follow on from Year 3 and 4.**
In addition, it should include:

Exchanging and regrouping up to 5 digits

10,000 = 10 one thousands

43326 = 4 ten thousands + + 3 one thousands + 3 hundreds + 2 tens + 6 ones

Or

43326 = 3 thousands + 13 one thousands +3 hundreds + 2 tens + 6 ones

Column subtraction – 5 digits – with exchanging

Column subtraction 1 decimal place – with exchanging | **Columns subtraction – 5 digits – exchanging**

Calculations may include exchanging from more than one place value column.

Column subtraction – up to 3 decimal places
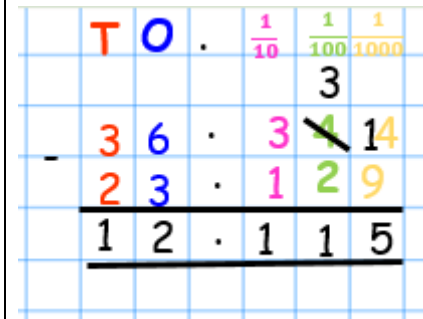
Calculations may include exchanging from more than one place value column. |

$$\begin{array}{ccc} \mathsf{T} & \mathsf{O} & . & \frac{1}{10} \\ & 5 & & \\ 3 & \cancel{6} & . & 13 \\ - \; 2 & 3 & . & 7 \\ \hline 1 \;\; 2 & & . & 6 \end{array}$$

Column subtraction – 2 decimal places – with exchanging

$$\begin{array}{cccc} \mathsf{T} & \mathsf{O} & . & \frac{1}{10} & \frac{1}{100} \\ & & & 2 & \\ 3 & 6 & . & \cancel{3} & 14 \\ - \; 2 & 3 & . & 1 & 8 \\ \hline 1 \;\; 2 & & . & 1 & 6 \end{array}$$

Column subtraction – 3 decimal places – with exchanging.
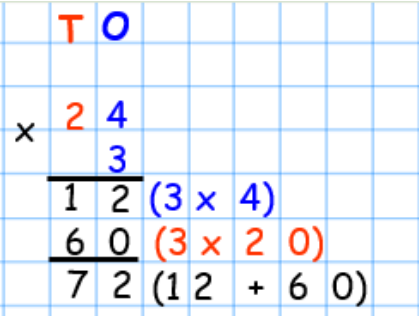
T	O	.	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
				3	
3	6	.	3	4̷	¹4
2	3	.	1	2	9
1	2	.	1	1	5

Multiplication – Year 3 – 6

Year	Statutory Requirements	Prior knowledge/understanding required	Steps to success	End of year outcomes
3	**Recall and use multiplication facts for 3,4 and 8 times tables.** **Write and calculate mathematical statements using the tables that they know including 2 digit numbers multiplied by 1 digit numbers using mental methods and progressing to formal methods.**	Understanding of multiplication: As equal groups and repeated addition. 3 x 8 = 24 = 8 + 8 + 8 = 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 Place value understanding and portioning of 2 digit numbers.	**Show multiplication as repeated addition:** 3 x 8 = 24 = 8 + 8 + 8 = 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 **Show multiplication as equal groups** **3 x 8 = 24** | 24		
---	---	---
8	8	8	 **3 equal groups of 8.** **Multiplying by 10 using place value** To multiply by 10, children should use place value charts to show that the digit moves a column to the left. The value of the digit is increasing by 10.	**Expanded method of short division**

36 x 10

H	T	O
	3	6

H	T	O
3	6	0

0 used as a placeholder

Multiplying by 1 digit by multiples of 10.

$$4 \times 40 = 4 \times 4 \times 10$$
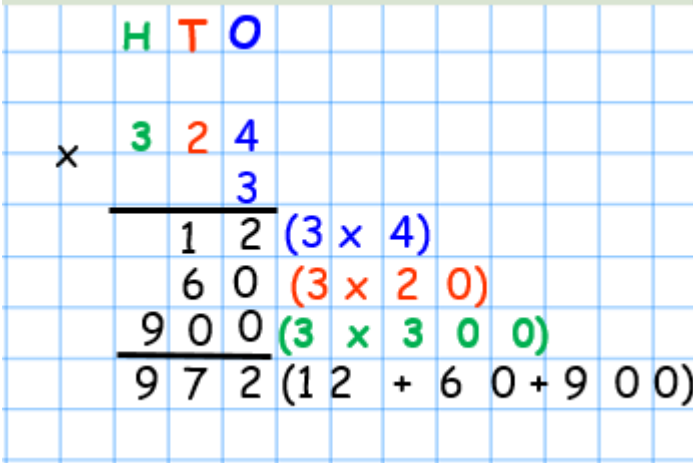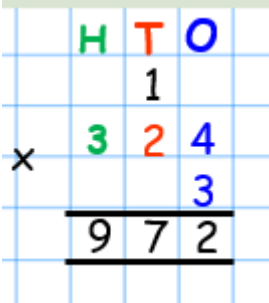$$4 \times 4 = 16$$
$$16 \times 10 = 160$$

Expanded method 2-digit x 1 digit.

```
   T  O
   2  4
×     3
   1  2  (3 × 4)
   6  0  (3 × 2 0)
   7  2  (1 2 + 6 0)
```

Note: In the calculations, the multiplier should be written first every time. It is important that children do this now in order to progress to multiplying by 2 digit numbers in later years.

| 4 | Recall multiplication facts up to 12x12.

Multiply 2 and 3 digit numbers by 1 digit numbers using a formal written layout. | As above and in addition:

Able to use the expanded method of multiplication for 2 digit numbers | **Progression should follow on from Year 3.**
In addition, it should include:

Expanded method – 3 digits x 1 digit

H T O

   3 2 4
×
      3
   1 2 (3 × 4)
   6 0 (3 × 2 0)
  9 0 0 (3 × 3 0 0)
  9 7 2 (1 2 + 6 0 + 9 0 0)

Note: In the calculations, the multiplier should be written first every time. It is important that children do this now in order to progress to multiplying by 2 digit numbers in later years.

Short multiplication – 2-digit x 1 digit | **Short multiplication – 3-digit x 1 digit**

  H T O
     1
   3 2 4
×   3
   9 7 2 |

```
  T O
  1
  2 4
×   3
─────
  7 2
```

Note: Pupils should be taught to verbalise the calculation they are using in each part of the method but writing in a compacted method. For consistency, the pupils should be encouraged to say the multiplier first. It is important that children do this now in order to progress to multiplying by 2 digit numbers in later years.
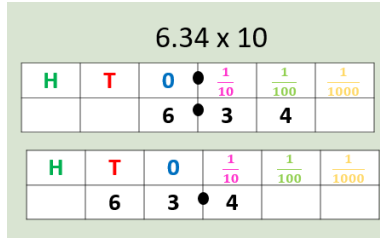
Short multiplication – 3-digit x 1 digit.

```
  H T O
    1
  3 2 4
×     3
───────
  9 7 2
```

Pupils should be taught to verbalise the calculation they are using in each part of the method but writing in a compacted method. For consistency, the pupils should be encouraged to say the multiplier first. It is important that children do this now in order to progress to multiplying by 2 digit numbers in later years.

| 5 | Multiply whole numbers and decimals by 10, 100 and 1000.
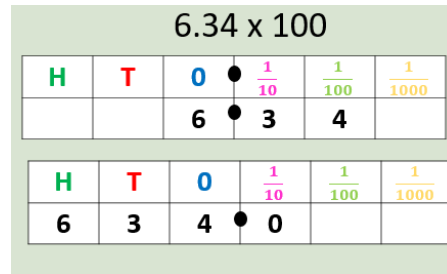
Multiply numbers up to 4 digits by a one or two digit number. | | Progression should follow on from Year 3 and 4. In addition, it should include:

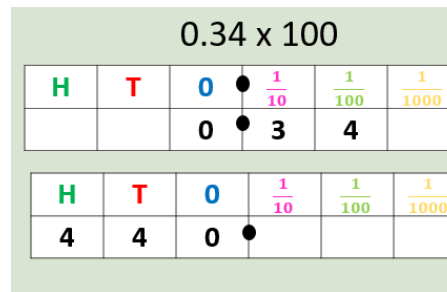**Using place value charts to multiply by 10.**

6.34 x 10

H	T	0	1/10	1/100	1/1000
		6	3	4	

H	T	0	1/10	1/100	1/1000
		6	3	4	

Using place value charts to multiply by 100.

6.34 x 100

H	T	0	1/10	1/100	1/1000
		6	3	4	

H	T	0	1/10	1/100	1/1000
6	3	4	0		

Using place value charts to multiply by 1000.

0.34 x 100

H	T	0	1/10	1/100	1/1000
		0	3	4	

H	T	0	1/10	1/100	1/1000
4	4	0			
Multiply 4-digit x 1-digit using compact method

Multiply up to 4 digits x 2 digit using long multiplication

 |

Formal (compact) multiplication of a 4-digit number and a 1-digit number.

```
Th  H  T  O
    1  2
 3  2  5  8
×        3
 9  7  7  4
```

Pupils should be taught to verbalise the calculation they are using in each part of the method but writing in a compacted method. For consistency, the pupils should be encouraged to say the multiplier first. It is important that children do this now in order to progress to multiplying by 2 digit numbers.

Formal (long) multiplication of a 4-digit number and a 2-digit number.

Tth	Th	H	T	O
	1	1		
		1	2	
	3	2	5	8
×			2	3
	9	7	7	4
6	5	1	6	0
7	4	9	3	4
1		1		

Pupils should be taught to verbalise the calculation they are using in each part of the method but writing in a compacted method.

For consistency, the pupils should be encouraged to say the multiplier first and start with the ones and then the tens.

For some pupils it may be necessary to use an expanded form to initially solve these calculations.

Pupils should be supported in reaching this method by practicing first with smaller numbers:
2 digit x 2 digit
3 digit x 2 digit

| 6 | Multiply numbers up to 4 digits by a 2 digit number using long multiplication.

Multiply one digit numbers with up to 2 decimal places by whole numbers using compact multiplication. | | Progression should follow on from Year 3, 4 and 5. In addition, it should include:

Formal (long) multiplication of a 4 digit number and a 2 digit number.

Pupils should be taught to verbalise the calculation they are using in each part of the method but writing in a compacted method.
For consistency, the pupils should be encouraged to say the multiplier first and start with the ones and then the tens.
For some pupils it may be necessary to use an expanded form to initially solve these calculations.

Formal (compact) multiplication 1 digit and 1 decimal place multiplied by a whole number. | **Formal (long) multiplication of a 4 digit number and a 2 digit number.**

Formal (compact) multiplication 1 digit and 2 decimal places multiplied by a whole number. |

$$
\begin{array}{r}
1 \\
7~.~4 \\
\times~~~~3 \\
\hline
2~2~.~2
\end{array}
\qquad
\begin{array}{r}
1~~~~1 \\
7~.~4~5 \\
\times~~~~~~3 \\
\hline
2~2~.~3~5
\end{array}
$$

Formal (compact) multiplication 1 digit and 2 decimal places multiplied by a whole number.

$$
\begin{array}{r}
1~~~~1 \\
7~.~4~5 \\
\times~~~~~~3 \\
\hline
2~2~.~3~5
\end{array}
$$

Division – Year 3 – 6

Year	Statutory Requirements	Prior knowledge/understanding required	Steps to success	End of year outcomes
3/4	Year 3 statutory requirement: Recall and use division facts for the 3, 4 and 8 multiplication tables Write and calculate mathematical statements for division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal	Understanding of division as **sharing** into **equal** groups.	**Showing division as sharing – using a bar model.** $36 \div 4 = 9$ 	Whole : 36				 	9	9	9	9	 **Short division – no remainders and each digit a multiple of divisor.** $$3\overline{)96} = 32$$ **Short division – no remainders, each digit <u>not</u> a multiple of divisor.**	**Year 3** **Short division – no remainders, each digit <u>not</u> a multiple of divisor.** $$4\overline{)7\,{}^32} = 18$$ **Year 4** **Short division (3 digits) – no remainders, each digit <u>not</u> a multiple of divisor.** $$5\overline{)1\,8\,{}^35} = 037$$

written methods Year 4 statutory requirement: **Note - there isn't a statutory objective for division.**

$$18$$
$$4\overline{)7\ ^32}$$

Remember to develop connections between fractions and division and rephrase these calculations as 1/3 of 96; ¼ of 72, ¼ of 872 and 1/5 of 185.
Note: Year 3 fraction objective - *Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators;* **Year 4 fraction objective:** *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.*

Year 4 – extend to 3 digits

$$218$$
$$4\overline{)8\ 7\ ^32}$$

$$\begin{array}{r} 0\ 3\ 7 \\ 5\overline{)1\ 8\ ^35} \end{array}$$

Extend to 3-digit number first where the divisor can go into the first number and then progress to when the divisor cannot go into the first number.

| 5 | 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 | **Understanding of remainders**

Able to use short method of division for 2 and 3 digit numbers | **As above but to include in addition:**

Short division – 4 digits – remainders

$$8\overline{)2^2 1^5 8}\quad 2\,7\;r\,2$$

Extend to expressing results in different ways according to the context, including with remainders as fractions, as decimals or by rounding. For example:

• Whole number remainder $= 27\;r\;2$
• Fraction remainder $= 27\frac{2}{8} = 27\frac{1}{4}$
• Decimal remainder $= 27\frac{1}{4} = 27\frac{25}{100} = 27.25$ | **Short division – 4 digits – remainders**

$$8\overline{)2^2 1^5 8}\quad 2\,7\;r\,2$$ |

| 6 | 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 | | **As above but to include in addition:**

Long division to divide by a 2-digit number

0 2 4 r 1 2
2 4 ⟌ 5 8 8
− 4 8
1 0 8
− 9 6
1 2 | **Long division to divide by a 2-digit number**

0 2 4 r 1 2
2 4 ⟌ 5 8 8
− 4 8
1 0 8
− 9 6
1 2 |