ST FAITH ST MARTIN
CHURCH OF ENGLAND
JUNIOR SCHOOL

Mathematics
Calculation Policy

At St Faith and St Martin Church of England Junior School, we believe that children should be introduced to the process of calculation through practical, oral and mental activities. As children begin to understand the underlying ideas, they develop ways of recording to support their thinking and calculation methods, use particular methods that apply to special cases, and learn to interpret and use the signs and symbols involved.

Choosing the appropriate strategy, recoding in mathematics and in calculation in particular is an important tool both for furthering the understanding of ideas and for communication those ideas to others. A useful written method is one that helps children carry out a calculation and can be understood by others.

Written methods are complementary to mental methods and should not be seen as separate from them. The aim is that children use mental methods when appropriate, but for calculations they cannot do in their heads, they use an efficient written methods of calculation for addition, subtraction, multiplication and division which they know they can rely on when mental methods are not appropriate.

By the end of Year 6, children should be able to choose an efficient method: mental, written, calculator, which is appropriate to a given task. This policy contains the key pencil and paper procedures that will be taught within our school alongside practical resources. It has been written to ensure consistency and progression throughout the school and reflects a whole school agreement.

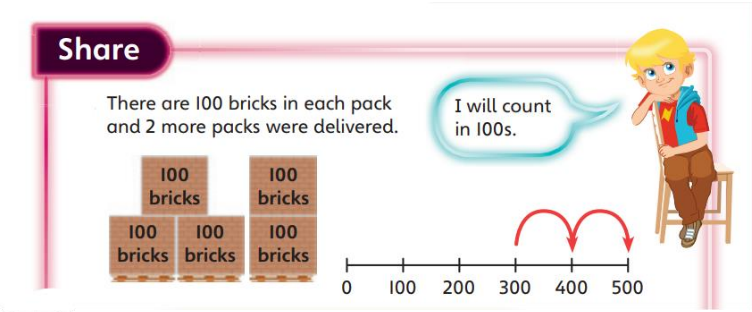
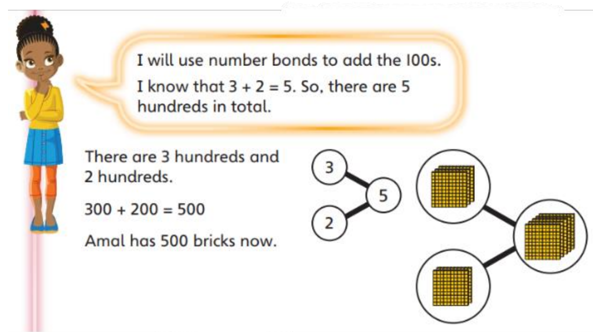
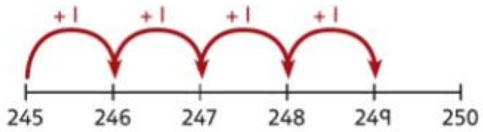
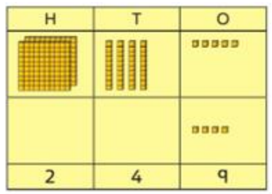
Addition

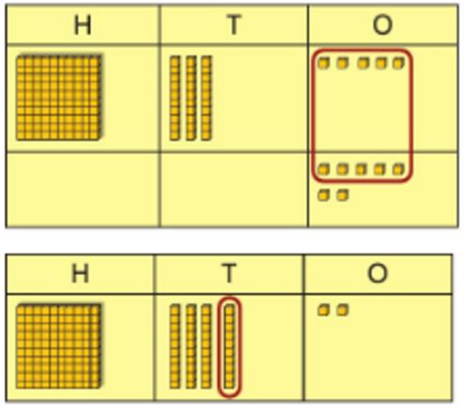
YEAR 3

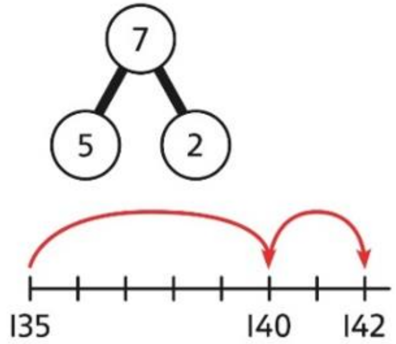
ADDITION

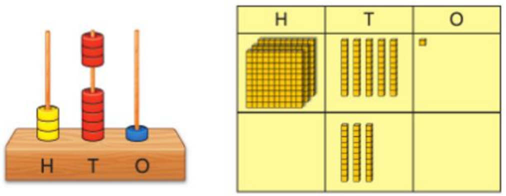
KEY VOCABULARY: add, increase, total, plus, sum, more, altogether, column addition, estimate, inverse, double, near double, bond, one more, ten more… one hundred more, how many more to make …? how many more is… than …? how much more is…?, ones, tens, hundreds, exchange, boundary, bridge

part + part = whole
addend + addend = total

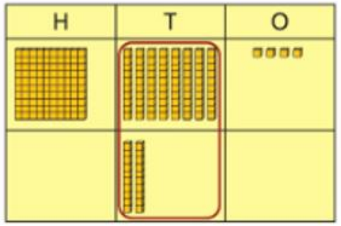
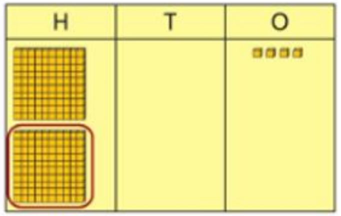
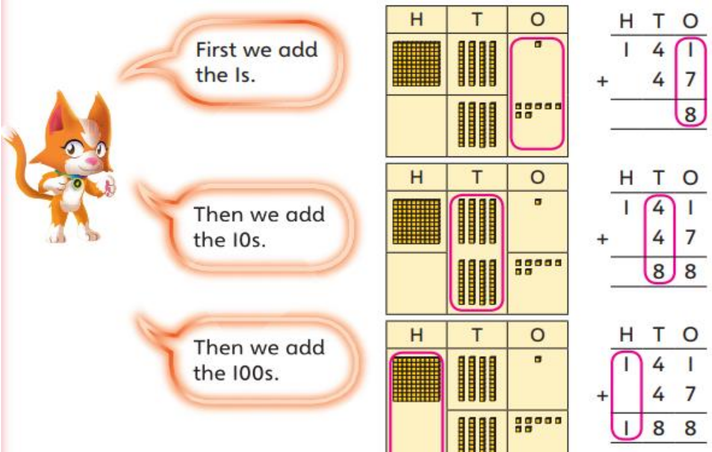
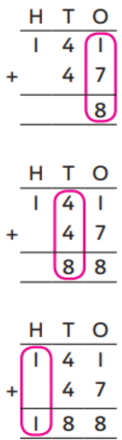
Method:	Example/Representation:	
Children will use their knowledge of number bonds within 10 to add multiples of 100, up to 1,000.	First, use of a number line to count on: 	Then, use of number bonds within 10 to add multiples of 100: 
Children will add a single digit to a 3-digit number, using their understanding of place value. They will use number lines to count on and then be encouraged to use the more efficient method of using numbers bonds to add the ones.	First, use a number line to count on: *245 + 4* 	Then, use place value equipment to support the use of number bonds to add the ones: *245 + 4* *5 + 4 = 9* *245 + 4 = 249* 

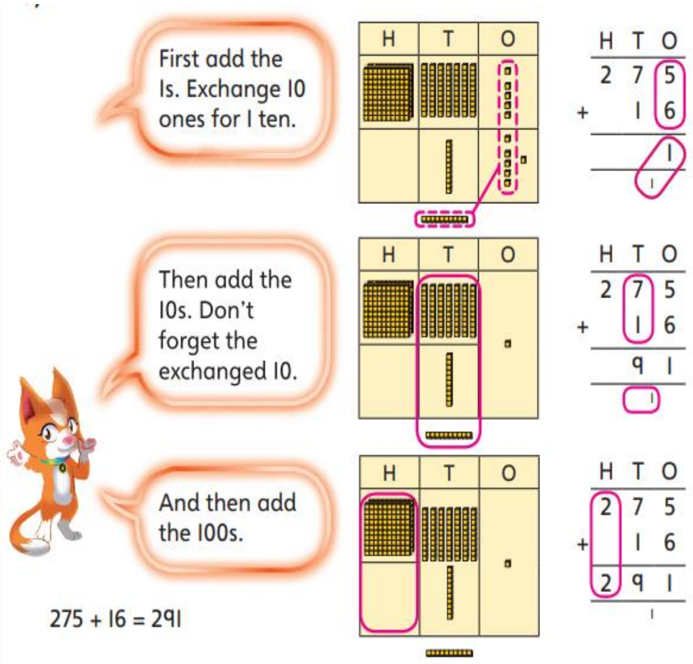
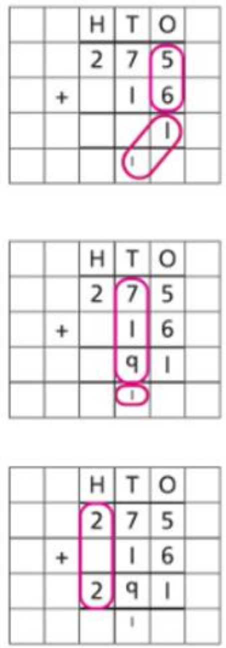
<table>
<tr>
<td>Children will understand how to recognise additions where they will bridge a ten and know how to use the exchange of 10 ones for 1 ten.</td>
<td>First, use a place value grid to support the understanding of the need to exchange 10 ones for 1 ten:


135 + 7 = 142</td>
<td>Then, use partitioning of the ones to bridge to the next multiple of 10:


135 + 7 = ?
135 + 5 + 2 = 142</td>
</tr>
<tr>
<td>Children will add a multiple of 10 to a 3-digit number by using their knowledge of number bonds to add the digits in the 10s column.</td>
<td>First, use of place value equipment to support understanding and visualisation of forming the number bond for the digits in the 10s column.
351 + 30 = ?


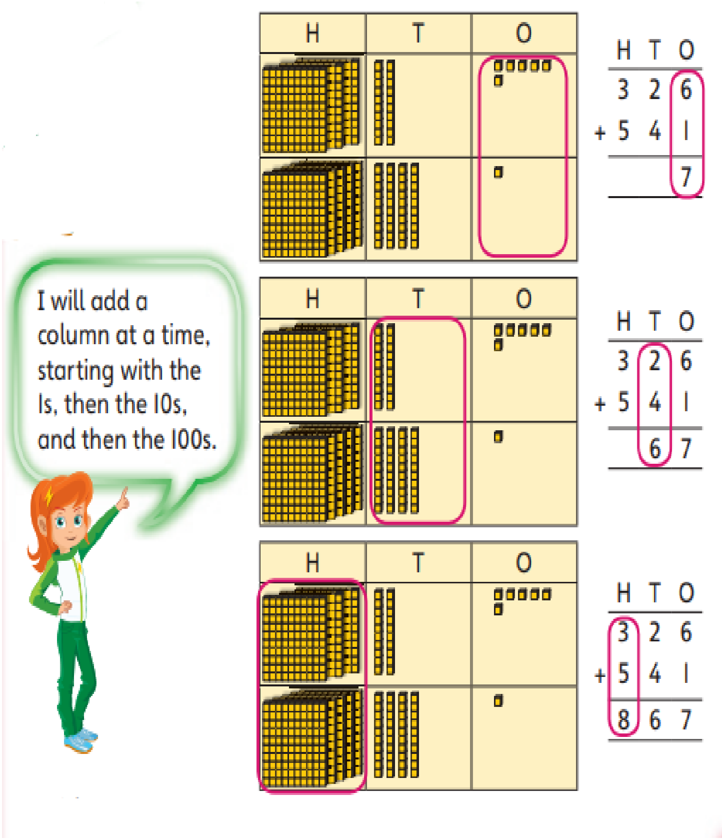
5 tens + 3 tens = 8 tens
351 + 30 = 381</td>
<td>Then, calculate mentally by forming the number bond for the digits in the 10s column.
$7\boxed{5}3 + \boxed{4}0$
I know that 5 + 4 = 9
So, 50 + 40 = 90
$7\boxed{5}3 + \boxed{4}0 = 7\boxed{9}3$</td>
</tr>
</table>

Children will develop their understanding of adding 10s to a 3-digit number, including examples that require an exchange of 10 tens for 1 hundred.	First, use place value equipment to understand the need to exchange 10 tens for 1 hundred: *184 + 20 = ?*  *184 + 20 = 204*  	Then, progress to mental methods to solve efficiently: *385 + 50* *There are 8 tens and 5 tens.* *That is 13 tens.* *385 + 50 = 300 + 130 + 5* *385 + 50 = 435*
Children will learn the more formal written method of column addition to add a 3-digit and a 2-digit number where no exchange is required.	First, use place value equipment to support understanding of formal written method:  	Then, use the formal written method to solve efficiently, using known bonds: 

Children will develop their understanding of the formal written method of column addition where exchange of 10s and 1s is required.	First, use the place value equipment to support understanding of the formal written method and the need to exchange:  	Then, use the formal written method to solve efficiently, using known bonds:  275 + 16 = 291
	Note: In this example, a mental method may be more efficient. The numbers for the example calculation have been chosen to allow children to visualise the concept and see how the method relates to place value. Children will be encouraged at every stage to select methods that are efficient and accurate.	

Children will develop their understanding of the more formal written method of column addition to add two 3-digit numbers where no exchange is required.

First, use the place value equipment to support understanding of the formal written method:

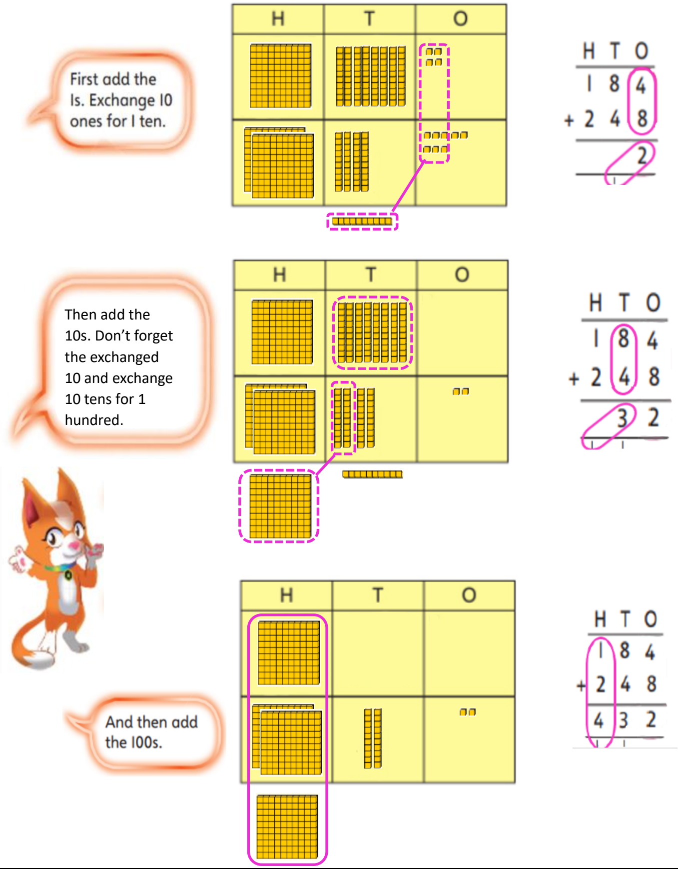
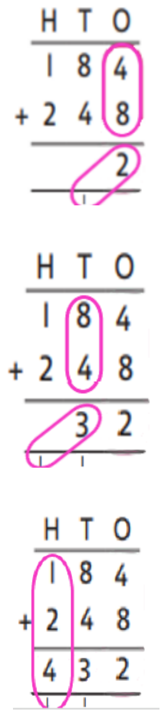


Then, use the formal written method to solve efficiently, using known bonds:

		H	T	O
		3	2	6
	+	5	4	1
				7

		H	T	O
		3	2	6
	+	5	4	1
			6	7

		H	T	O
		3	2	6
	+	5	4	1
		8	6	7

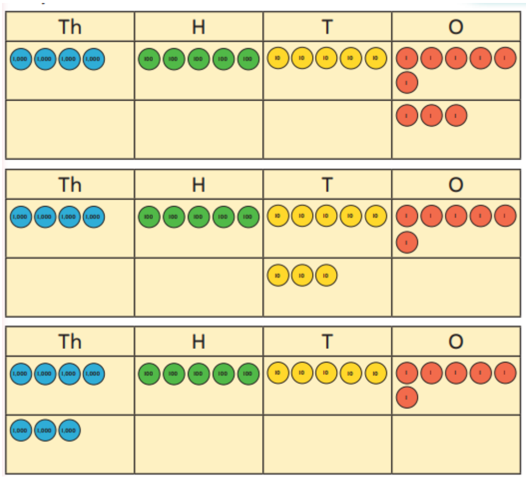
Children will learn to add two 3-digit numbers where exchange may be required and to recognise when it is or is not necessary.	First, use the place value equipment to support understanding where exchange is needed across more than one place value column:  	Then, use the formal written method to solve efficiently, using known bonds: 
Mental strategies:	- Add numbers mentally, including: ▪ a three-digit number and a single digit number ▪ a 3-digit number and multiples of 10 ▪ a 3-digit number and multiples of 100	- Estimate the answer to a calculation and use inverse operations to check answers - Know number pairs that total 1000 (multiples of 100) - Calculate 10 or 100 more than any given number

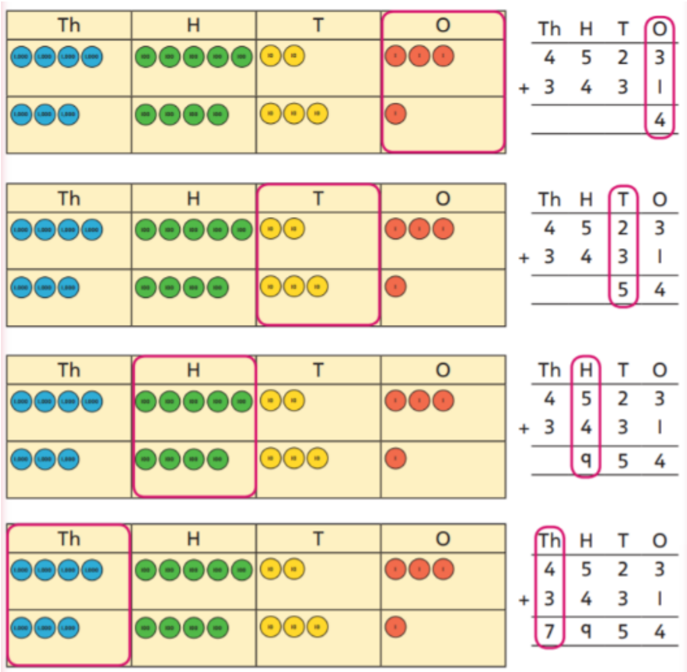
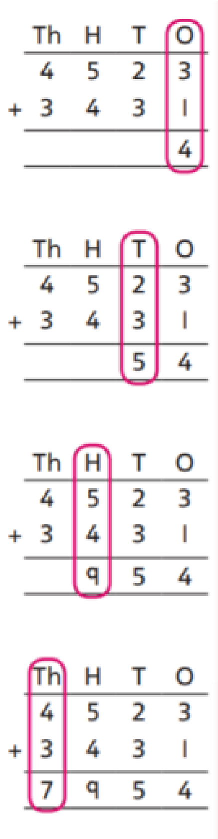
YEAR 4

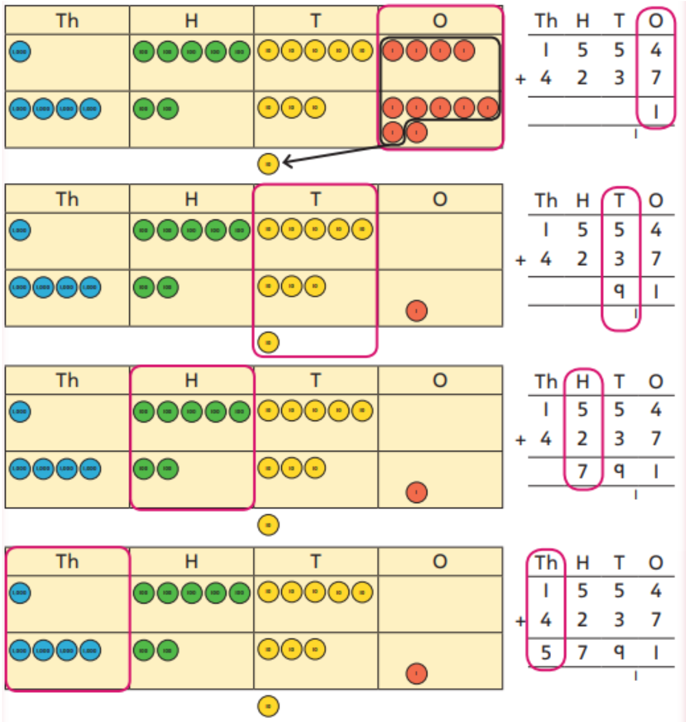
ADDITION

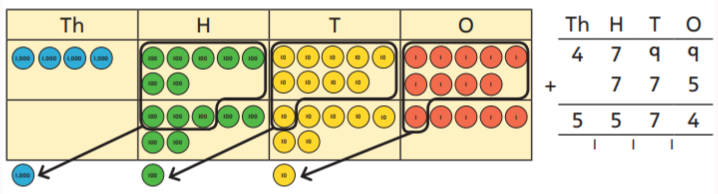
KEY VOCABULARY: add, increase, total, plus, sum, more, altogether, column addition, estimate, inverse, double, near double, bond, one more, ten more… one hundred more, one thousand more, how many more to make …? how many more is… than …? how much more is…?, tens, hundreds, thousands, exchange, bridge, boundary

part + part = whole
addend + addend = total

Method:	Example/Representation:	
Children will use their knowledge of place value to add 1s, 10s, 100s and 1,000s to 4-digit numbers.	First, place value equipment will be used to support understanding:  4,556 + 3 = 4,559 4,556 + 30 = 4,586 4,556 + 3,000 = 7,556	Use known facts to support mental calculations: $4,\boxed{2}56 + \boxed{3}00 = ?$ $2 + 3 = 5$ $200 + 300 = 500$ $4,\boxed{2}56 + \boxed{3}00 = 4,\boxed{5}56$

Children will add 4-digit numbers using the formal written method of column addition where there is no requirement for exchange.	First, place value equipment will be used to deepen understanding: 	Then, use the formal written method to solve efficiently, using known bonds: 

Children will add 4-digit numbers using the formal written method of column addition where an exchange is required in one place value column.	First, place value equipment will be used to deepen understanding where exchange is needed in one place value column: 	Then, use the formal written method to solve efficiently, using known bonds: $\begin{array}{rcccc} & Th & H & T & O \\ & 1 & 5 & 5 & 4 \\ + & 4 & 2 & 3 & 7 \\ \hline & & & & 1 \\ & & & 1 & \end{array}$ $\begin{array}{rcccc} & Th & H & T & O \\ & 1 & 5 & 5 & 4 \\ + & 4 & 2 & 3 & 7 \\ \hline & & & 9 & 1 \\ & & & 1 & \end{array}$ $\begin{array}{rcccc} & Th & H & T & O \\ & 1 & 5 & 5 & 4 \\ + & 4 & 2 & 3 & 7 \\ \hline & & 7 & 9 & 1 \\ & & & 1 & \end{array}$ $\begin{array}{rcccc} & Th & H & T & O \\ & 1 & 5 & 5 & 4 \\ + & 4 & 2 & 3 & 7 \\ \hline & 5 & 7 & 9 & 1 \\ & & & 1 & \end{array}$

<table>
<tr>
<td>Children will add 4-digit numbers using the formal written method of column addition where an exchange is required across more than one place value column.</td>
<td>First, place value equipment will be used to deepen understanding where exchange is needed across more than one place value column:

</td>
<td>Then, use the formal written method to solve efficiently, using known bonds:
Th H T O
4 7 9 9
+ 7 7 5
5 5 7 4
1 1 1</td>
</tr>
<tr>
<td>Mental Strategies:</td>
<td colspan="2">- Add numbers mentally, including:
• a four-digit number and multiples of one, ten, a hundred and a thousand.
• Use knowledge of doubles to derive related facts (e.g 15 + 16 = 31 because 15 + 15 = 30 and 30 + 1 = 31).
• Know number pairs that total 1000 (multiples of 10).
• Estimate the answer to a calculation and use inverse operations to check answers.</td>
</tr>
</table>

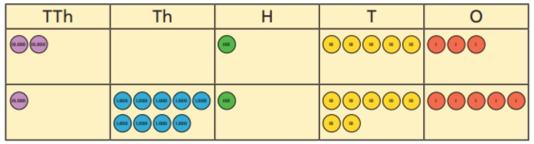
YEAR 5

ADDITION

KEY VOCABULARY: add, addition, more, plus, increase, sum, total, altogether, boundary, ones, tens, hundreds, thousands, tenths, hundredths, inverse, exchange, efficient, round, estimate

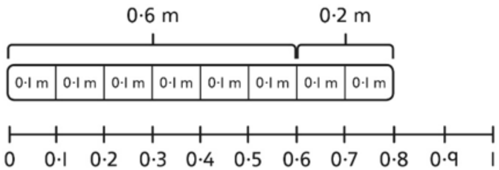
part + part = whole
addend + addend = total

<table>
<tr><th>Method:</th><th colspan="2">Example/Representation:</th></tr>
<tr>
<td>Children will use the formal written method of column addition to add whole numbers with more than 4 digits, recognising the importance of place value.</td>
<td>First, place value equipment will be used to support and deepen understanding as we move beyond adding 4-digit whole numbers:



$$\begin{array}{cccccc} & TTh & Th & H & T & O \\ & 2 & 0 & 1 & 5 & 3 \\ + & 1 & 9 & 1 & 7 & 5 \\ \hline & 3 & 9 & 3 & 2 & 8 \\ \hline & & & 1 & & \end{array}$$</td>
<td>Then, use the formal written method to solve efficiently, using known bonds:

$$\begin{array}{cccccc} & TTh & Th & H & T & O \\ \hline & 2 & 0 & 1 & 5 & 3 \\ + & 1 & 9 & 1 & 7 & 5 \\ \hline & 3 & 9 & 3 & 2 & 8 \\ \hline & & & 1 & & \end{array}$$</td>
</tr>
<tr>
<td>Children will learn to add decimal numbers (tenths), recognising the importance of place value.</td>
<td>First, use of representations such as a bar model with a number line to add tenths:

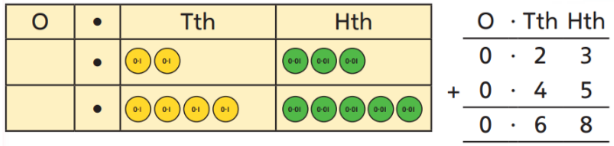
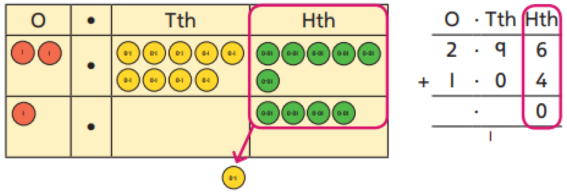
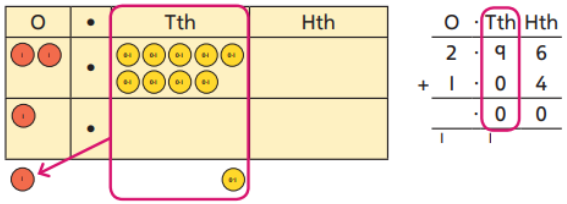
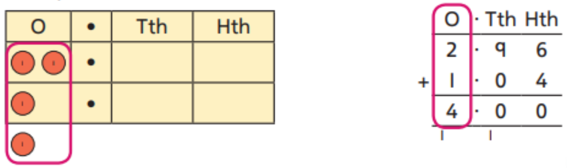


0·6 + 0·2 = 0·8
6 tenths + 2 tenths = 8 tenths</td>
<td>Then, link adding decimal tenths to tenths as fractions:

$$\frac{6}{10} + \frac{2}{10} = \frac{8}{10}$$

6 tenths + 2 tenths = 8 tenths

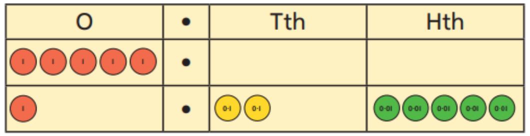
0·6 + 0·2 = 0·8</td>
</tr>
</table>

Children will use the formal written method of column addition to add decimal numbers that are less than 1, recognising the importance of place value.	First, use place value equipment to support the importance of recognising place value: 	Then, use the formal written method to solve efficiently, using known bonds: $\begin{array}{rcrr} & \text{O} & \cdot\ \text{Tth} & \text{Hth} \\ \hline & 0 & \cdot\ 2 & 3 \\ + & 0 & \cdot\ 4 & 5 \\ \hline & 0 & \cdot\ 6 & 8 \\ \hline \end{array}$
Children will add two numbers that have the same number of decimal places: this will start with two numbers below 1 that add together to make a number greater than 1 and then progress to any decimal number with the same number of decimal places.	First, use place value equipment to support the importance of recognising place value: Add the hundredths first.  Add the tenths next.  Finally, add the Is. 	Then, use the formal written method to solve efficiently, using known bonds: $\begin{array}{rcrr} & \text{O} & \cdot\ \text{Tth} & \text{Hth} \\ \hline & 2 & \cdot\ 9 & 6 \\ + & 1 & \cdot\ 0 & 4 \\ \hline & & \cdot & 0 \\ \hline & & {\scriptstyle 1} & \end{array}$ $\begin{array}{rcrr} & \text{O} & \cdot\ \text{Tth} & \text{Hth} \\ \hline & 2 & \cdot\ 9 & 6 \\ + & 1 & \cdot\ 0 & 4 \\ \hline & & \cdot\ 0 & 0 \\ \hline & {\scriptstyle 1} & {\scriptstyle 1} & \end{array}$ $\begin{array}{rcrr} & \text{O} & \cdot\ \text{Tth} & \text{Hth} \\ \hline & 2 & \cdot\ 9 & 6 \\ + & 1 & \cdot\ 0 & 4 \\ \hline & 4 & \cdot\ 0 & 0 \\ \hline & {\scriptstyle 1} & {\scriptstyle 1} & \end{array}$

<table>
<tr>
<td>Children will add numbers with a different number of decimal places, including whole numbers. It also includes examples where at least one exchange is required across the place value columns.</td>
<td>First, place value equipment will be used to support understanding and help pupils recognise the importance of place value:

Whole number + decimal number (no exchange):

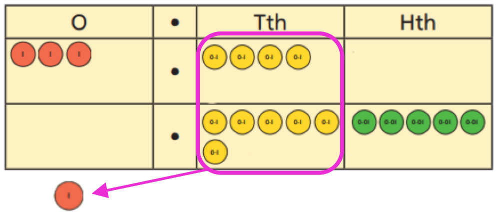
5 + 1.25 = ?



$$\begin{array}{rcccc} & O & \cdot & Tth & Hth \\ \hline & 5 & \cdot & 0 & 0 \\ + & 1 & \cdot & 2 & 5 \\ \hline & 6 & \cdot & 2 & 5 \\ \hline \end{array}$$

Decimal number + decimal number (with exchange):

? = 0.65 + 3.4



$$\begin{array}{rcccc} & O & \cdot & Tth & Hth \\ \hline & 3 & \cdot & 4 & 0 \\ + & 0 & \cdot & 6 & 5 \\ \hline & 4 & \cdot & 1 & 5 \\ \hline & 1 & & & \end{array}$$

</td>
<td>Then, use the formal written method to solve efficiently, using known bonds:

5 + 1.25 = ?

$$\begin{array}{rcccc} & O & \cdot & Tth & Hth \\ \hline & 5 & \cdot & 0 & 0 \\ + & 1 & \cdot & 2 & 5 \\ \hline & 6 & \cdot & 2 & 5 \\ \hline \end{array}$$

? = 0.65 + 3.4

$$\begin{array}{rcccc} & O & \cdot & Tth & Hth \\ \hline & 3 & \cdot & 4 & 0 \\ + & 0 & \cdot & 6 & 5 \\ \hline & 4 & \cdot & 1 & 5 \\ \hline & 1 & & & \end{array}$$

</td>
</tr>
<tr>
<td>Mental Strategies</td>
<td colspan="2">
- Add increasingly large numbers mentally (e.g 10,162 + 2,300 = 12,462)
- Mentally add tenths (e.g 0.2 + 0.6 = 0.8) and 1-digit whole numbers and tenths (8 + 0.3 = 8.3)
- Use number bonds to 100 knowledge to calculate complements to one using hundredths (e.g 0.83 + 0.17 = 1)
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.
</td>
</tr>
</table>

YEAR 6

ADDITION

KEY VOCABULARY: add, addition, more, plus, increase, sum, total, altogether, ones, tens, hundreds, thousands, ten thousands, millions, tenths, hundredths, thousandths inverse, exchange, efficient, round, estimate

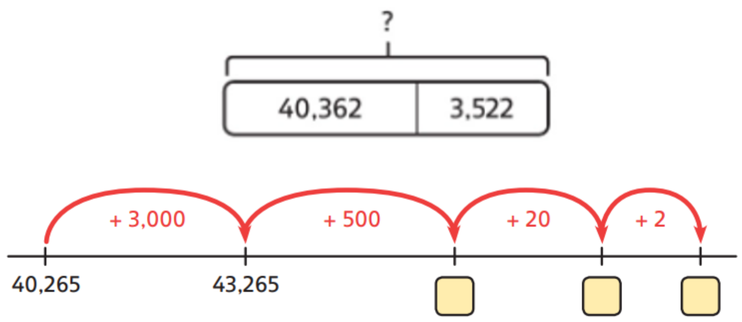
part + part = whole
addend + addend = total

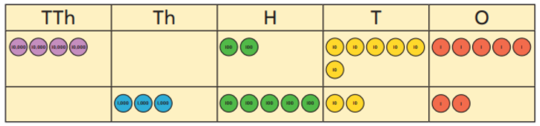
Method:

Children will discuss similarities and differences between methods of addition, and choose efficient methods based on the specific calculation.

Example/Representation:

First, compare written and mental methods alongside place value representations:





	TTh	Th	H	T	O
	4	0	2	6	5
+		3	5	2	2

Then, use the formal written method of column addition to add whole numbers and decimal numbers when mental strategies are not efficient:

	HTh	TTh	Th	H	T	O
	3	1	2	0	5	7
	4	2	2	1	2	1
+			4	8	0	1
	7	3	8	9	7	9

	H	T	O •	Tth	Hth
	1	4	0 •	0	9
+		4	9 •	8	9
	1	8	9 •	9	8
				1	

Mental Strategies:	- Add increasingly large numbers mentally, e.g: • 2,411,301 + 500,000 (use place value knowledge to add 5 to the hundred thousand column) • 257,000 + 99,000 (add 100,000 then subtract 1,000) • 195,000 + 6,000 (use partitioning of second addend into 5,000 & 1,000 so 195,000 + 6,000 = 195,000 + 5000 + 1,000) - Add decimal numbers mentally (up to 2 decimal places) - Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

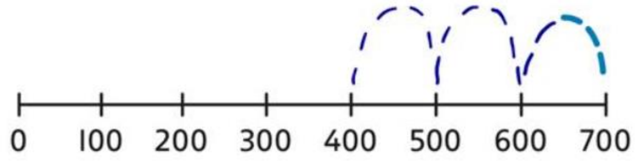
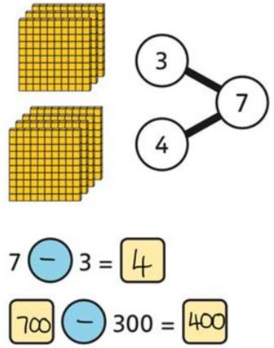
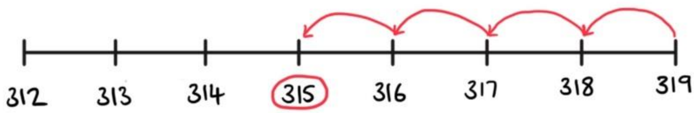
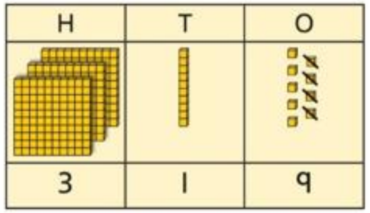
Subtraction

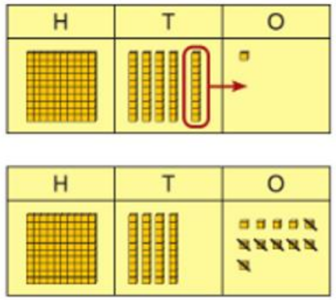
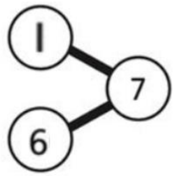
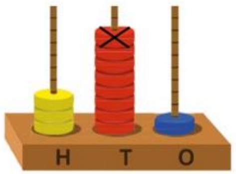
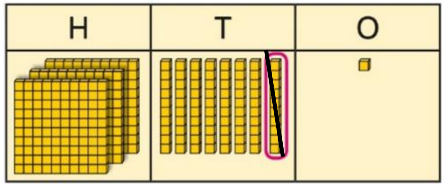
YEAR 3

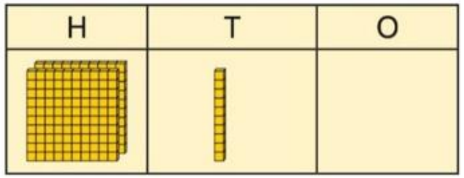
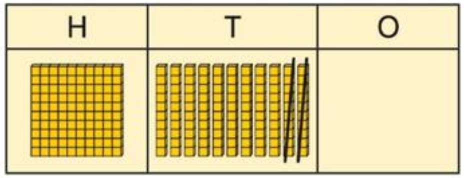
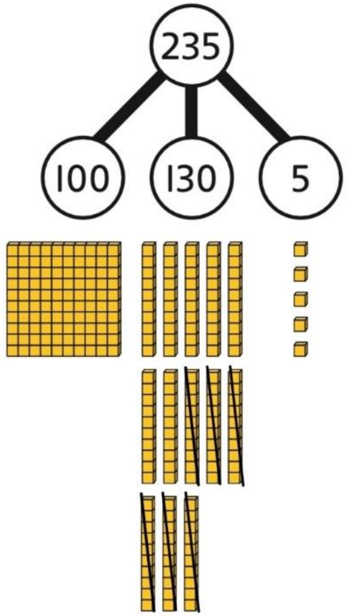
SUBTRACTION

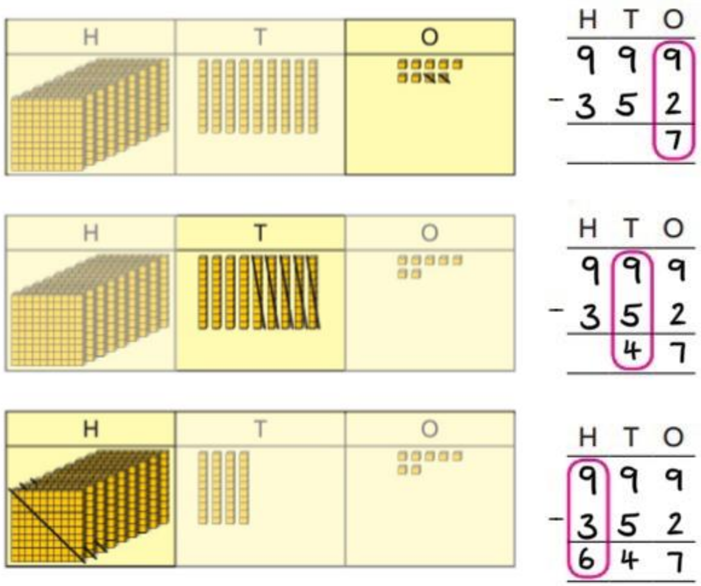
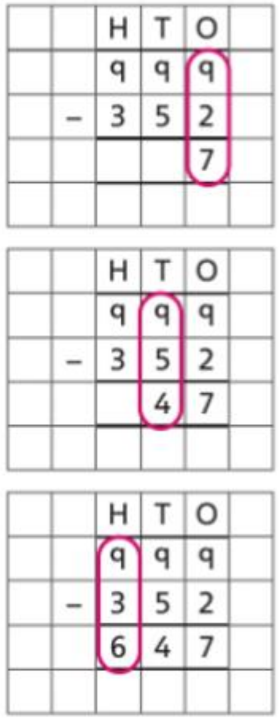
KEY VOCABULARY: leave, subtract, less, minus, column subtraction, inverse, decomposition, exchange, how many are left/left over?, difference between, how many more/fewer is… than…?, how much more/less is…?, Is the same as, equals, sign. multiple, ones, tens, hundreds

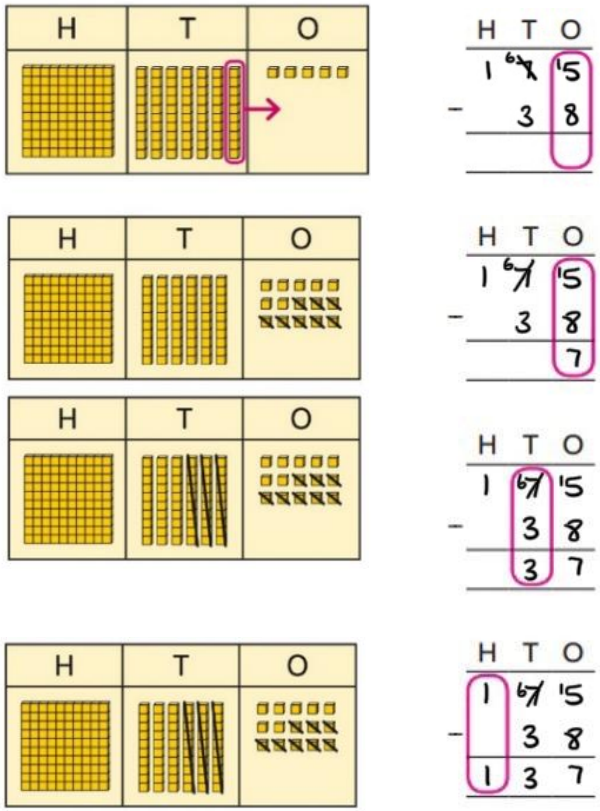
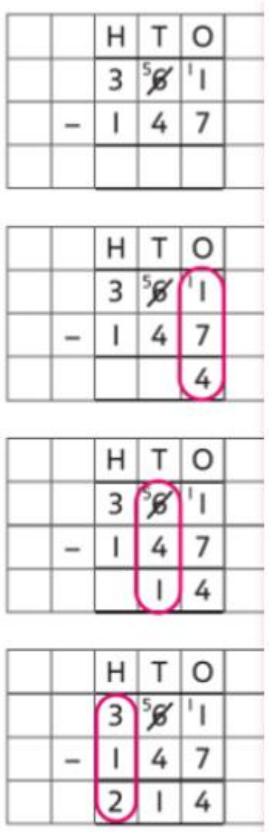
Whole – part = part

Method:	**Example/Representation:**	
Children will use their knowledge of number bonds within 10 to subtract multiples of 100, up to 1,000.	First, use a number line to count back: 700 – 300 = 400 	Then, use of number bonds within 10 to subtract multiples of 100: 
Children will subtract a single digit from a 3-digit number, using their understanding of place value. They will use number lines to count back and then be encouraged to use the more efficient method of using number bonds to subtract the ones.	First, use a number line to count back: 319 – 4 = 315 	Then, use place value equipment to support the use of number bonds to subtract the ones:  319 − 4 = ? 9 − 4 = 5 319 − 4 = 315

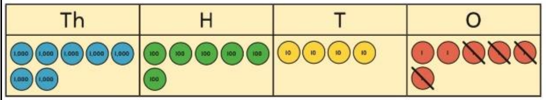
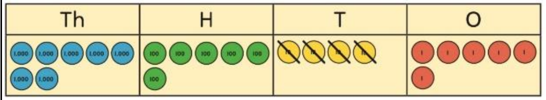
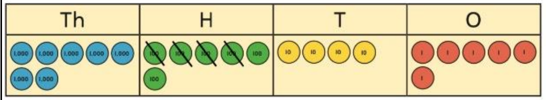
Children will subtract a single-digit number from a 3-digit number where the subtraction bridges a 10. Children understand how to exchange 1 ten for 10 ones.	First, use place value equipment to support understanding of the need to exchange 1 ten for 10 ones: *151 − 7 = ?* 	Then, use partitioning of the ones to bridge through 10:  *151 − 7 = ?* *151 − 1 − 6 = 144*
Children will subtract a multiple of 10 from a 3-digit number by using their knowledge of number bonds to subtract the 10s digits where no exchange is required.	First, use of place value equipment to support understanding and visualisation of using the number bond to subtract the digits in the 10s column:  *381 − 10 = ?* *8 tens with 1 removed is 7 tens.* *381 − 10 = 371*	Then, calculate mentally by using the number bond to subtract the digits in the 10s column. *372 − 50 = ?* *70 − 50 = 20* *So, 372 − 50 = 322*

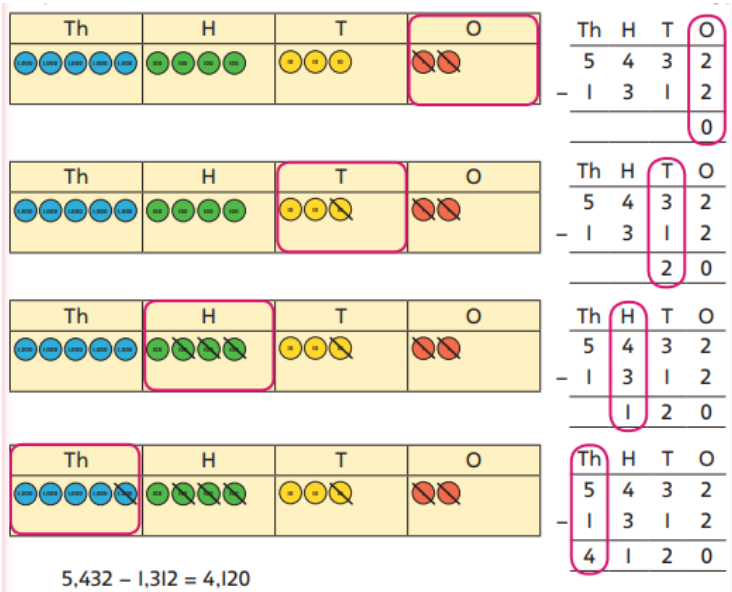
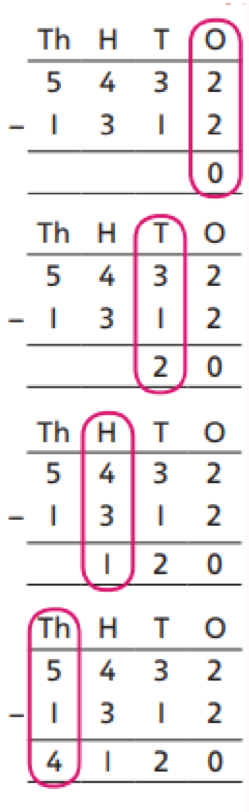
Children will subtract a multiple of 10 from a 3-digit number, including where they must exchange 1 hundred for 10 tens.	First, use place value equipment to support understanding of the need to exchange 1 hundred for 10 tens: *210 – 20 = ?*  *I need to exchange 1 hundred for 10 tens, to help subtract 2 tens.*  *210 – 20 = 190*	Then, progress to mental methods to solve efficiently: 235 – 60 = ?  235 = 100 + 130 + 5 ? = 100 + 70 + 5 235 – 60 = 175

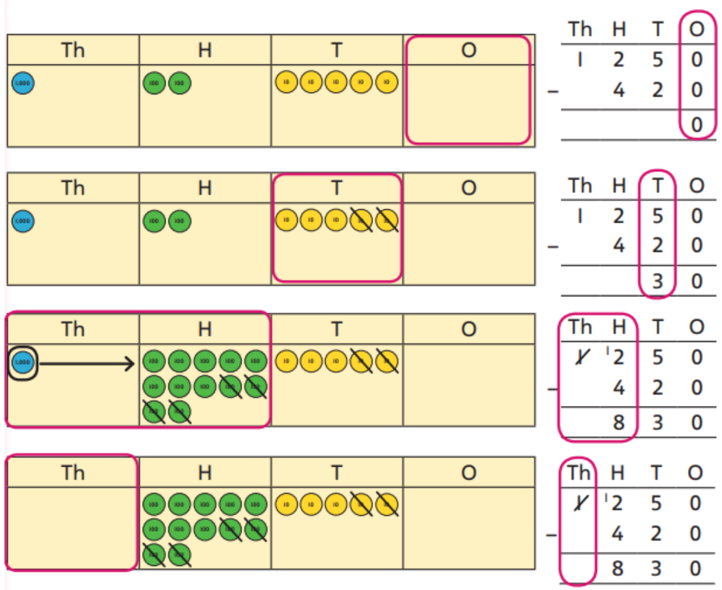
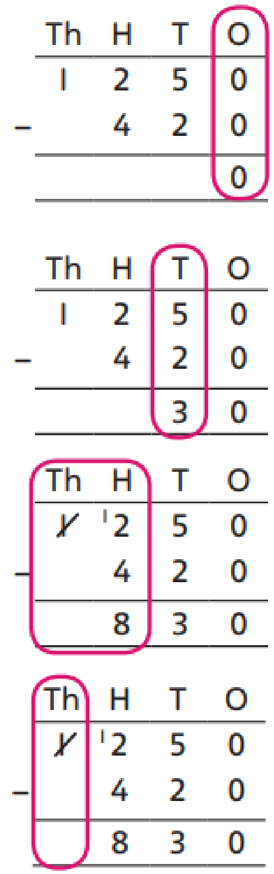
Children will learn the more formal written method of column subtraction to subtract a 3-digit from a 3-digit number where no exchange is required.	First, use place value equipment to support understanding of formal written method: 	Then, use the formal written method to solve efficiently, using known bonds: 

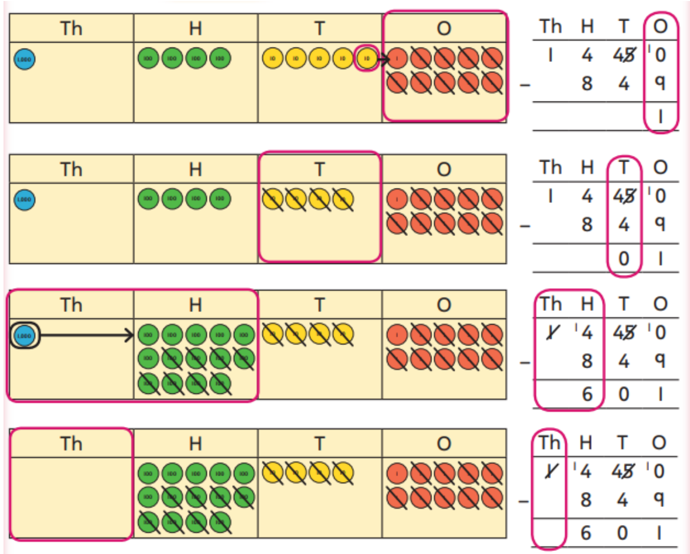
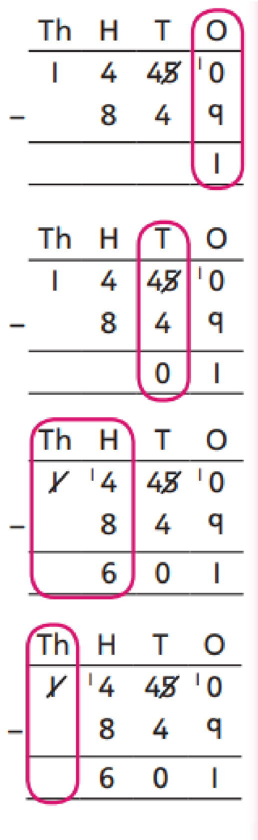
Children will develop their understanding of the formal written method of column subtraction where exchange of 10s and 1s is required. They will also understand how to exchange in calculations where there is a zero in the 10s column.	First, use place value equipment to support understanding of the formal written method and the need for exchange: *175 − 38 = ?* *I need to subtract 8 ones, so I will exchange a ten for 10 ones.* 	Then, use the formal written method to solve efficiently, using known number bonds: 

Mental Strategies:	- Subtract numbers mentally, including: ▪ Subtracting a single-digit number from a 3-digit number ▪ Subtracting a multiple of 10 from a 3-digit number ▪ Subtracting a multiple of 100 from a 3-digit number - Estimate the answer to a calculation and use inverse operations to check answer - Calculate 10 or 100 less than any given number

YEAR 4		
SUBTRACTION		
KEY VOCABULARY: subtract, subtraction, minus, *decrease*, leave, how many are left/left over?, difference between, how many more/fewer is… than…?, how much more/less is…?, Is the same as, equals, sign, column subtraction, decomposition, exchange, multiples of thousand, inverse, exchange Whole – part = part		
Method:	**Example/Representation:**	
Children will use their knowledge of place value to subtract 1s, 10s, 100s and 1,000s from 4-digit numbers.	First, place value equipment will be used to support understanding:  7646 – 4 = 7642  7646 – 40 = 7602  7646 – 400 = 7242	Then, use known facts to support mental calculations: $3{,}501 - 2{,}000$ $\boxed{3}$ thousands − $\boxed{2}$ thousands = $\boxed{1}$ thousand $\boxed{3},501 - \boxed{2},000 = \boxed{1},501$

Children will subtract 4-digit numbers using the formal written method of column subtraction where there is no requirement for exchange.	First, place value equipment will be used to deepen understanding: 	Then, use the formal written method to solve efficiently, using known number bonds: 

Children will subtract 4-digit numbers using the formal written method of column subtraction where an exchange is required in one place value column:	First, use place value equipment to deepen understanding of when an exchange is needed in one place value column:  1,250 – 420 = 830	Then, use the formal written method to solve efficiently, using known number bonds: 

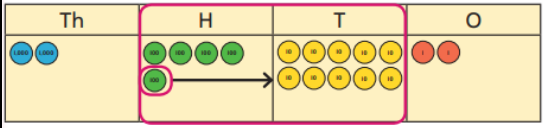
Children will subtract 4-digit numbers using the formal written method of column subtraction where an exchange is required across more than one place value column.	First, use place value equipment to deepen understanding of where exchange is needed across more than one place value column:  1,450 – 849 = 601	Then, use the formal written method to solve efficiently, using known number bonds: 

Children will subtract 4-digit numbers using the formal written method of column subtraction where an exchange is required across more than one place value column and when there is a zero in the column to be exchanged from.

First, use place value equipment to support understanding of how to exchange when there is a zero in the column to be exchanged from:

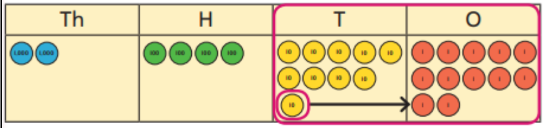
2502 – 243 = ?

First, Bella should exchange 1 hundred for 10 tens.



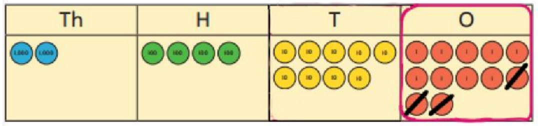
	Th	H	T	O
	2	4~~5~~	¹0	2
−		2	4	3

Then she can exchange 1 ten for 10 ones.

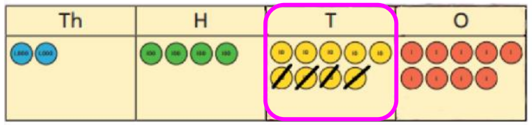


	Th	H	T	O
	2	4~~5~~	9¹~~0~~	¹2
−		2	4	3

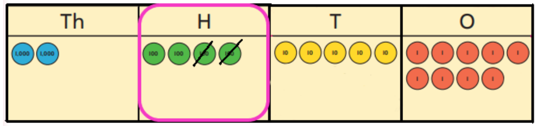
Then she can perform the subtraction, working from right to left.



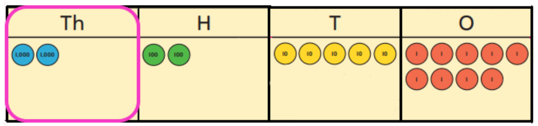
	Th	H	T	O
	2	4~~5~~	9¹~~0~~	¹2
−		2	4	3
				9



	Th	H	T	O
	2	4~~5~~	9¹~~0~~	¹2
−		2	4	3
			5	9



	Th	H	T	O
	2	4~~5~~	9¹~~0~~	¹2
−		2	4	3
	2	2	5	9



	Th	H	T	O
	2	4~~5~~	9¹~~0~~	¹2
−		2	4	3
	2	2	5	9

Then, use the formal written method to solve efficiently, using known number bonds:

	Th	H	T	O
	2	4~~5~~	¹0	2
−		2	4	3

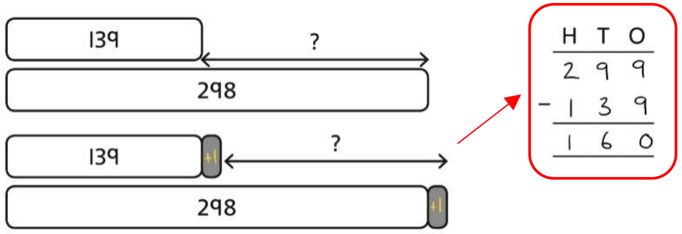
	Th	H	T	O
	2	4~~5~~	9¹~~0~~	¹2
−		2	4	3

	Th	H	T	O
	2	4~~5~~	9¹~~0~~	¹2
−		2	4	3
				9

	Th	H	T	O
	2	4~~5~~	9¹~~0~~	¹2
−		2	4	3
			5	9

	Th	H	T	O
	2	4~~5~~	9¹~~0~~	¹2
−		2	4	3
	2	2	5	9

	Th	H	T	O
	2	4~~5~~	9¹~~0~~	¹2
−		2	4	3
	2	2	5	9

Children will learn the method of equivalent difference for subtraction.	First, use bar models to understand the concept of equivalent difference and deepen understanding that adjusting two numbers in the calculation so that the difference remains the same:  	Then, use mental methods or the formal written method to solve adjusted calculations: $\begin{array}{ccccc} & Th & H & T & O \\ \hline & {}^{0}\cancel{1} & {}^{1}\cancel{0}^{9} & {}^{1}\cancel{0}^{9} & {}^{1}0 \\ - & & 2 & 4 & 5 \\ \hline & 0 & 7 & 5 & 5 \\ \hline \end{array}$ ⇨ $\begin{array}{ccccc} & Th & H & T & O \\ \hline & & 9 & 9 & 9 \\ - & & 2 & 4 & 4 \\ \hline & & 7 & 5 & 5 \\ \hline \end{array}$
Mental Strategies:	- Subtract numbers mentally, including: • Subtracting multiples of one thousand from a 4-digit number • Adjusting two numbers in the calculation so that the difference remains the same - Use of number bonds that total 1000 (multiples of 100) to calculate subtraction (e.g 1000 – 300 = 700) - Estimate the answer to a calculation and use inverse operations to check answers	

YEAR 5

SUBTRACTION

KEY VOCABULARY: subtract, subtraction, minus, *decrease*, leave, how many are left/left over?, difference between, how many more/fewer is… than…?, how much more/less is…?, Is the same as, equals, sign, column subtraction, decomposition, exchange, multiples of a thousand, inverse, exchange

Whole – part = part

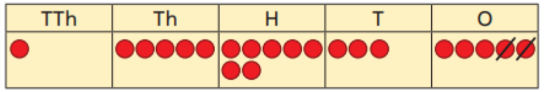
Method:

Children will use the formal written method of column subtraction to subtract whole numbers with more than 4 digits, in the context of taking away and of finding a difference. This includes examples where an exchange is required in one place value column.

Example/Representation:

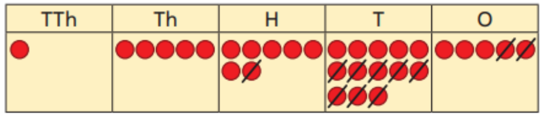
First, place value equipment will be used to support and deepen understanding as we move beyond subtracting whole numbers with more than 4-digits:

First subtract the 1s.



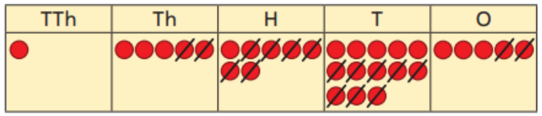
	TTh	Th	H	T	O
	1	5	7	3	5
−		2	5	8	2
					3

Now subtract the 10s. Exchange 1 hundred for 10 tens.



	TTh	Th	H	T	O
	1	5	⁶~~7~~	¹3	5
−		2	5	8	2
				5	3

Subtract the 100s, 1,000s and 10,000s.

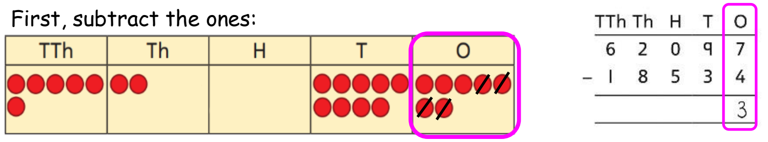
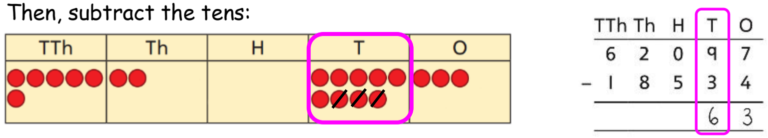
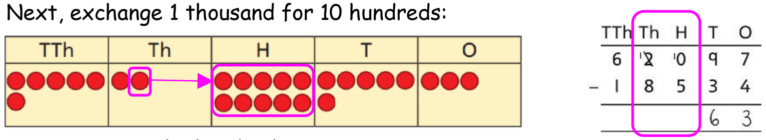
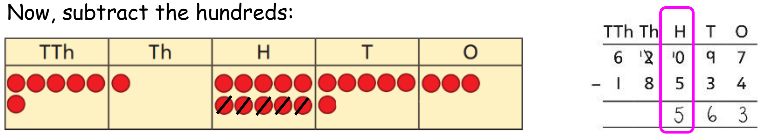
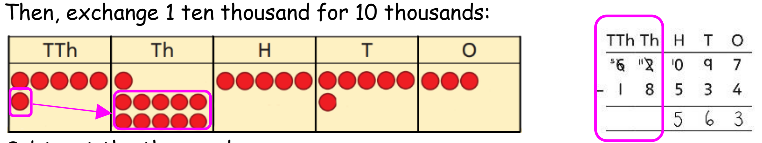
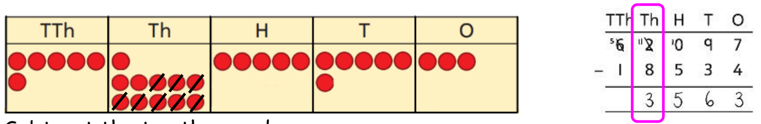
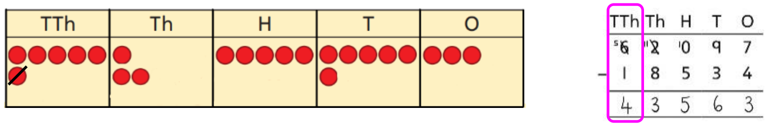


	TTh	Th	H	T	O
	1	5	⁶~~7~~	¹3	5
−		2	5	8	2
	1	3	1	5	3

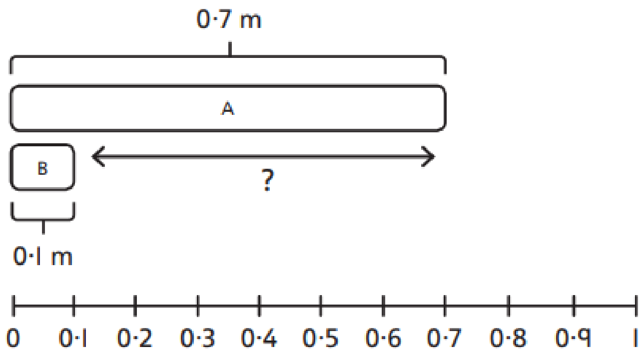
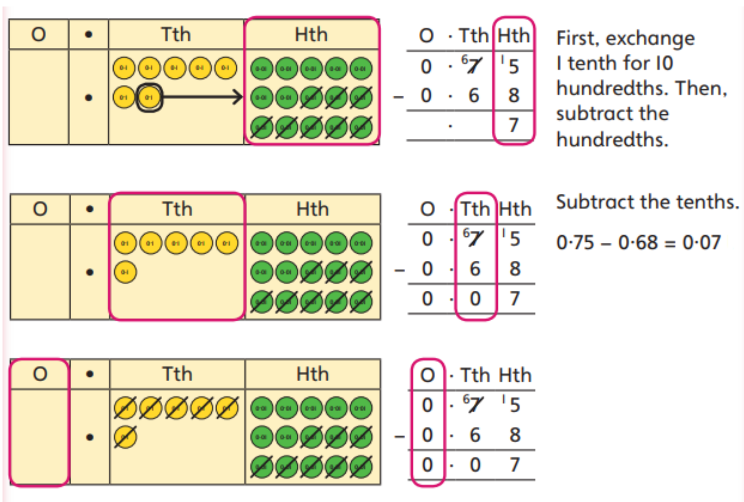
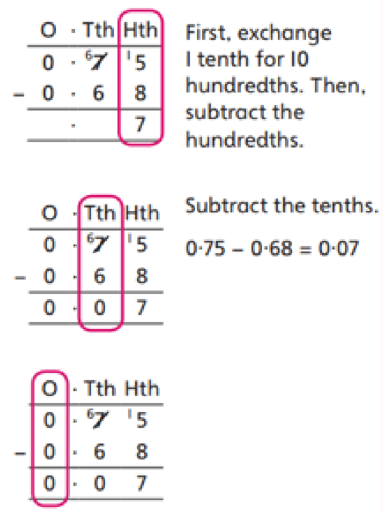
Then, use the formal written method to solve efficiently, using known bonds:

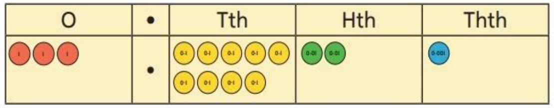
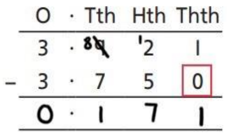
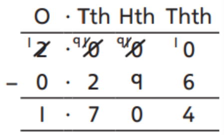
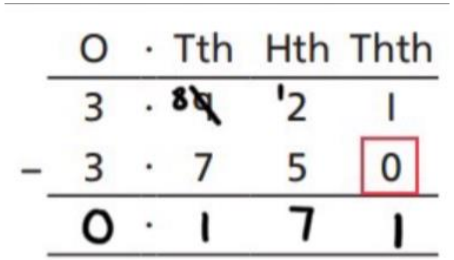
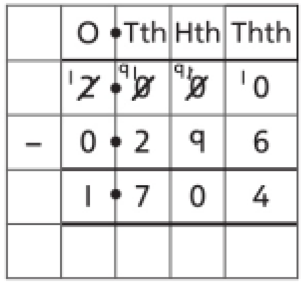
	TTh	Th	H	T	O
	7	⁴~~5~~	¹4	5	0
−	5	2	7	0	0
	2	2	7	5	0

<table>
<tr>
<td>Children will use the column method to subtract whole numbers with more than 4 digits, including where exchanges are needed in some or all columns.</td>
<td>First, use place value equipment to deepen understanding of subtraction where exchanges are needed across some or all place value columns:

First, subtract the ones:

Then, subtract the tens:

Next, exchange 1 thousand for 10 hundreds:

Now, subtract the hundreds:

Then, exchange 1 ten thousand for 10 thousands:

Subtract the thousands:

Subtract the ten thousands:
</td>
<td>Then, use the formal written method of subtraction to solve efficiently, using known number bonds:

$$\begin{array}{rccccc} & TTh & Th & H & T & O\\ \hline & {}^{5}\cancel{6} & {}^{11}\cancel{2} & {}^{1}0 & 9 & 7\\ - & 1 & 8 & 5 & 3 & 4\\ \hline & 4 & 3 & 5 & 6 & 3\\ \hline \end{array}$$</td>
</tr>
</table>

Children will learn to subtract decimal numbers (tenths), recognising the importance of place value.	First, use of representations such as a bar model with a number line to subtract tenths: 	Then, link adding decimal tenths to tenths as fractions: $\frac{7}{10} - \frac{1}{10} = \frac{6}{10}$ 7 tenths – 1 tenth = 6 tenths 0.7 – 0.1 = 0.6
Children will use the formal written method of column subtraction to subtract decimal numbers that are less than 1, recognising the importance of place value.	First, use place value equipment to support the importance of recognising place value: 	Then, use the formal written method to solve efficiently, using known bonds: 

Children will subtract numbers with a different number of decimal places, including whole numbers and where exchanges may be needed across more than one place value column.	First, place value equipment will be used to support understanding and help pupils recognise the importance of place value: **3.921 – 3.75 = ?**   **2 – 0.296 = ?**  	Then, use the formal written method to solve efficiently, using known bonds:  
Mental Strategies	- Subtract increasingly large numbers mentally (e.g 12, 654 – 1,341 = 11, 213) - Mentally subtract tenths (e.g 0.7 - 0.5 = 0.2) and 1-digit whole numbers and tenths (8 - 0.3 = 7.7) - Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	

YEAR 6

SUBTRACTION

KEY VOCABULARY: subtract, subtraction, minus, *decrease*, leave, how many are left/left over?, difference between, how many more/fewer is… than…?, how much more/less is…?, Is the same as, equals, sign, column subtraction, decomposition, exchange, multiples of a thousand, inverse, exchange

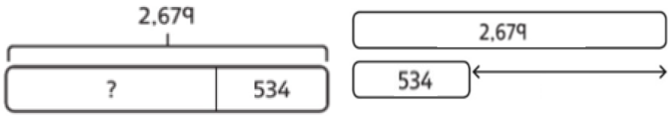
Whole – part = part

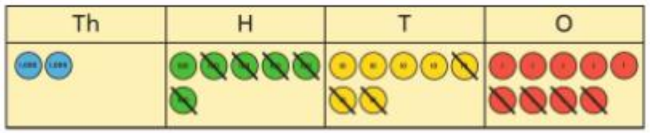
Method:

Children will discuss similarities and differences between methods of subtraction, and choose efficient methods based on the specific calculation.

Example/Representation:

First, compare written and mental methods alongside place value representations:





	Th	H	T	O
	2	6	7	9
−		5	3	4
	2	1	4	5

Then, use the formal written method of column subtraction to subtract whole numbers and decimal numbers when mental strategies are not efficient:

	Th	H	T	O
	$^{1}\cancel{2}$	$^{1}6$	$^{8}\cancel{9}$	$^{1}2$
−		8	7	5
	1	8	1	7

	H	T	O •	Tth	Hth
	3	0	9 •	6	0
−	2	0	6 •	4	0
	1	0	3 •	2	0

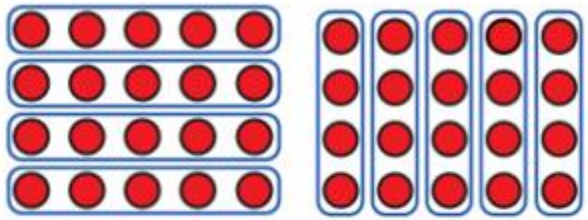
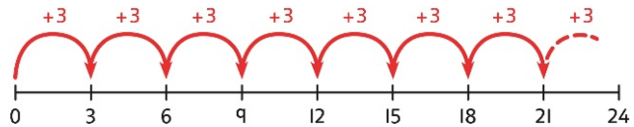
Multiplication

YEAR 3

MULTIPLICATION

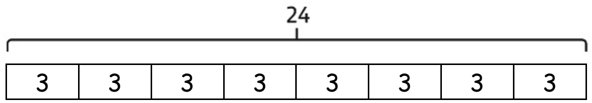
VOCABULARY: multiply, times, repeated addition, groups of, equal groups of, multiple of, multiplied by, estimate, inverse, grid multiplication, expanded column multiplication, partition, commutative, factor, product.

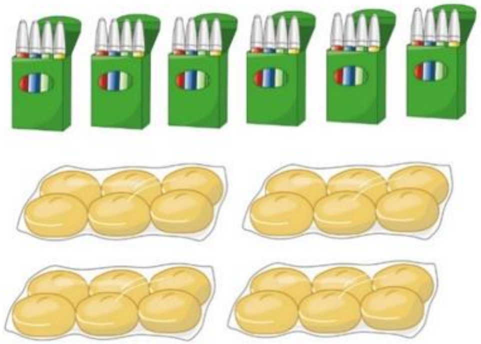
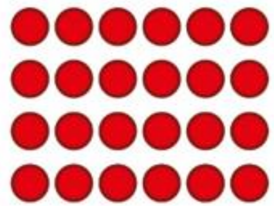
Factor x factor = product

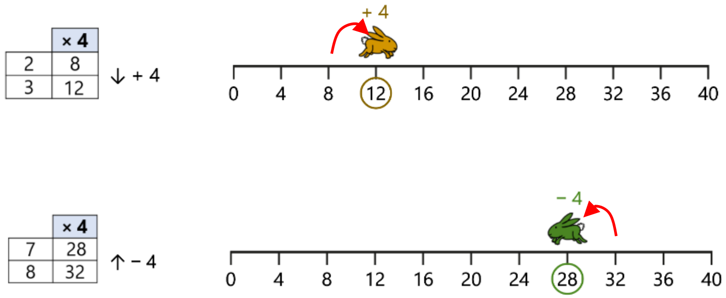
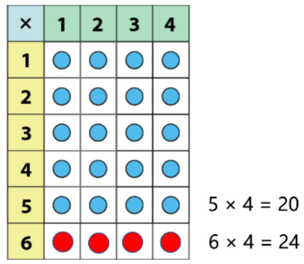
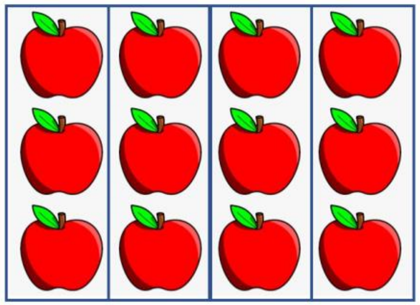
<table>
<tr><th>Method:</th><th colspan="2">Example/Representation:</th></tr>
<tr>
<td>Children will build their understanding of equal groups and the relationship with repeated addition.</td>
<td>First, use counters to understand that arrays demonstrate commutativity:

This is 4 groups of 5
This is 5 groups of 4</td>
<td>Then, pupils understand the link between repeated addition and multiplication:


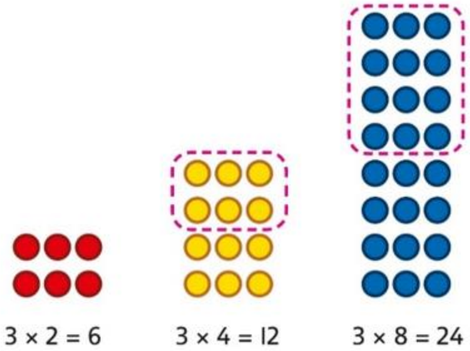
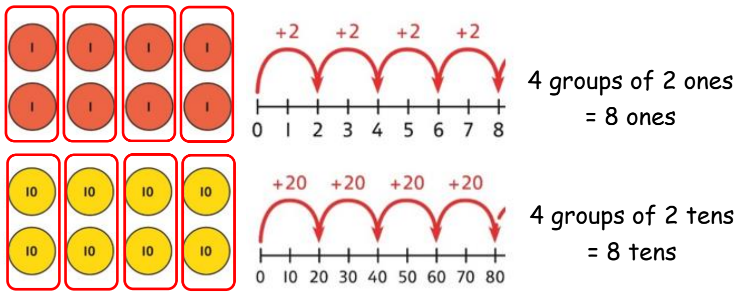
8 groups of 3 is 24.

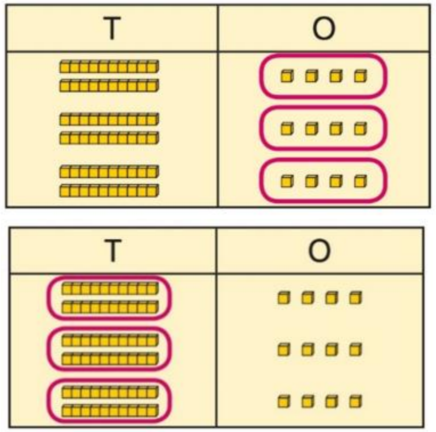
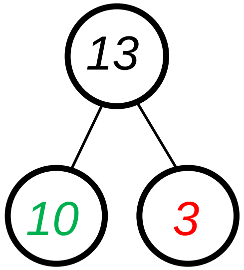
3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 24
8 × 3 = 24

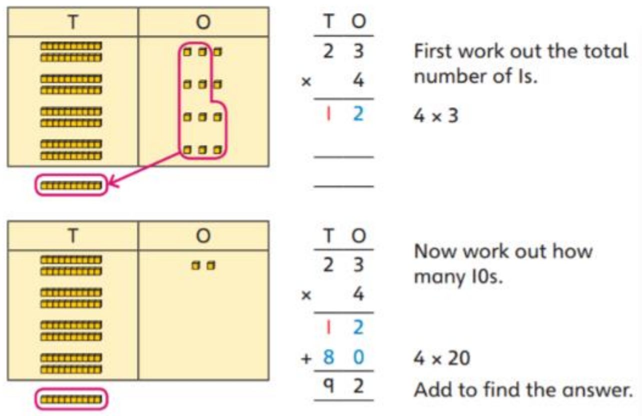
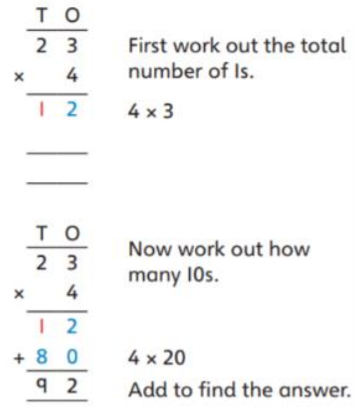
A bar model may represent multiplications as equal groups.

</td>
</tr>
</table>

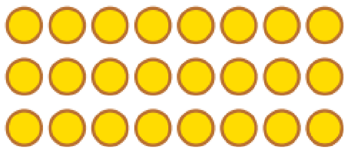
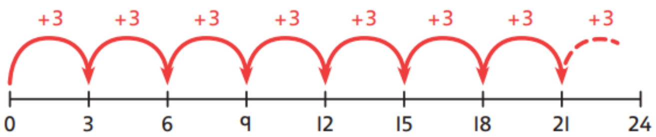
Children will use their understanding of commutativity to support understanding of times tables.	First, use real-life examples to understand how times-table facts can be used flexibly:  *There are 6 groups of 4 pens.* *There are 4 groups of 6 bread rolls.* *I can use 6 × 4 = 24 to work out both totals.*	Then, understand how commutativity relates to times table facts:  *6 × 4 = 24* *4 × 6 = 24*
Children will understand and use the 2x, 4x and 8x tables: they will learn the times tables as 'groups of' but apply their knowledge of commutativity.	First, use real-life examples to apply their knowledge of commutativity:  5 x 4 = 5 groups of 4 4 x 5 = 4, five times	Then, understand how commutativity relates to times table facts: 4 x 6 =? "I don't know what 4 groups of 6 is, but I know that 4 x 6 is 4, six times so 4 x 6 = 24."

Children will understand and use the 2x, 4x and 8x tables: they understand that adjacent multiples of the times table have the same difference.	First use number lines to support understanding that adjacent multiples in a times table have the same difference:  	Then, represent adjacent times table facts with mixed operation number sentences:  6 x 4 = 5 x 4 + 4
Children will understand and use the 2x, 4x and 8x tables: they will understand the related multiplication and division facts in known times-tables.	First, explore relationships between known times-table facts and the related division fact:  4 groups of 3 = 12 3, four times = 12 12 divided by 4 = 3	Then, explore relationships between known times-table facts and the related division fact: and express more formally: $4 \times 3 = 12$ $3 \times 4 = 12$ $12 \div 4 = 3$

Children will understand and use the 2x, 4x and 8x tables: they will understand how the ×2, ×4, and ×8 tables are related through repeated doubling.	First, use arrays to support understanding of the relationship between the 2x, 4x and 8x table: 	Then, use facts from known times tables to calculate products of related times tables: 3 x 2 = 6 x 2 x 2 3 x 4 = 12 x 2 x 2 3 x 8 = 24
Children will use known multiplication facts to solve related multiplication problems, particularly involving multiplying by 10.	First, use place value equipment and number lines to support understanding: 	Then, solve efficiently, using mental strategies: 4 x 2 = 8 so 4 x 20 = 80 3 x 4 = 12 so 3 x 40 = 120

Children will use the expanded method of multiplication to solve 2-digit by 1-digit number multiplications. They will demonstrate a secure understanding of partitioning and place value in their calculations.	First, use place value equipment to support how partitioning is linked with multiplying by a 2-digit number: $3 \times 24 = ?$  $3 \times 4 = \boxed{12}$ $3 \times 20 = \boxed{60}$ $\boxed{60} + \boxed{12} = 72$ $3 \times 24 = 72$	Then, use standard portioning to support jottings or mental strategies to solve 2-digit by 1-digit number multiplications: $4 \times 13 = ?$  $4 \times 3 = 12$ $\quad$ $4 \times 10 = 40$ $12 + 40 = 52$ $4 \times 13 = 52$

<table>
<tr>
<td>Children will use their understanding of place value to use written methods for solving multiplications using the expanded method in column format.</td>
<td>First, use place value equipment to support understanding of the written method:

</td>
<td>Then, use written method to solve efficiently, using known times table facts:

</td>
</tr>
<tr>
<td>Children will understand and use the 3x table.</td>
<td>First, use number lines and arrays to support understanding and learning of the 3x table:

8 x 3 = 8 groups of 3


</td>
<td>Then, use understanding of commutativity to apply learning of 3x table to solve related facts from unknown times tables:

3 x 12 = ?

"I don't know what 3 groups of 12 is, but I know that 3 x 12 is 3, twelve times so 3 x 12 = 36."</td>
</tr>
</table>

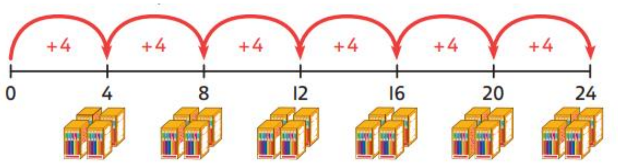
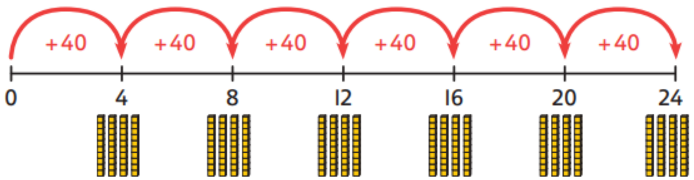
Mental Strategies:	- Count forwards and backwards in multiples of 4, 8, 50 & 100 - Know the 3, 4 and 8 times tables (in and out of order) - Connect the 2, 4 and 8 times tables through doubling - Use knowledge of place value to calculate multiplication using related facts(e.g. 2 x 2 = 4, 2 x 20 = 40, 2 x 200 = 400)

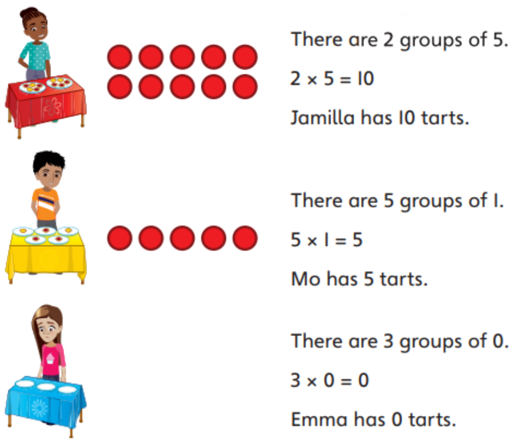
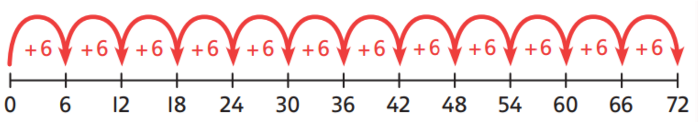
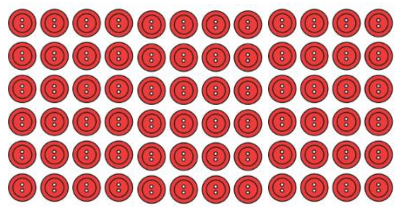
YEAR 4

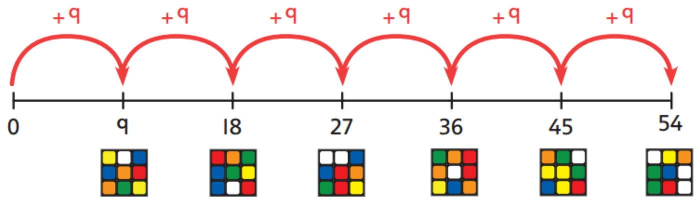
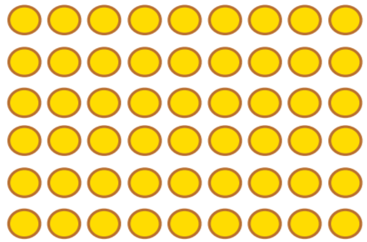
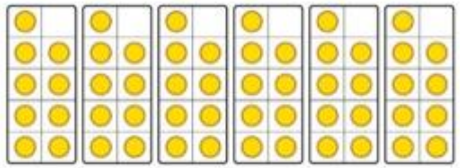
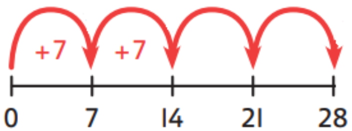
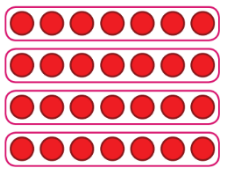
MULTIPLICATION

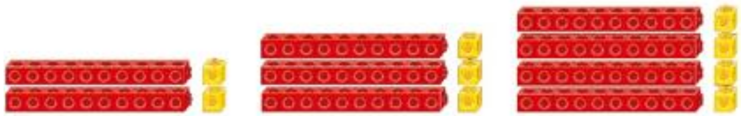
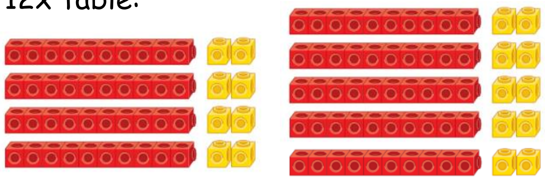
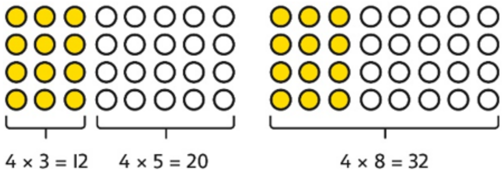
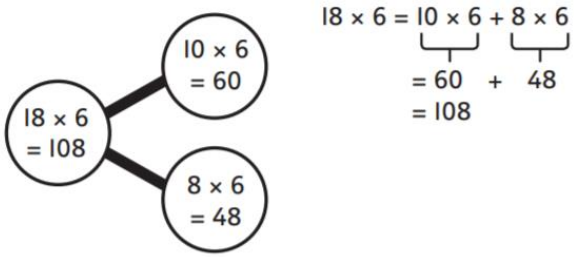
VOCABULARY: multiply, times, repeated addition, groups of, equal groups of, multiple of, multiplied by, estimate, inverse, expanded column multiplication, partition, commutative, factor, product.

factor x factor = product

Method:	Example/Representation:	
Children will learn how to multiply by multiples of 10 and 100 using known facts and place value knowledge.	First, use number lines and place value equipment to support understanding: 6 x 4 = 24 6 x 4 ones = 24 ones  6 x 40 = 240 6 x 4 tens = 24 tens  	Then, use known facts and understanding of place value and commutativity to multiply mentally. $4 \times 7 = 28$ $4 \times 70 = 280$ $40 \times 7 = 280$ $4 \times 700 = 2{,}800$ $400 \times 7 = 2{,}800$

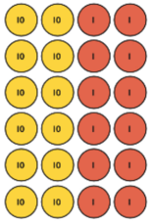
Children will learn how to multiply numbers by 0 and 1.	First, use real-life examples and arrays to support understanding:  	Then, solve efficiently using mental methods: "When you multiply any number by 0, the answer will always be 0." 0 x 3 = 0 and 3 x 0 = 0 "When you multiply a number by 1, the number will not change in value." 1 x 3 = 3 and 3 x 1 = 3
Children will understand and use the 6x table.	First, use number lines and arrays to support understanding and learning of the 6x table: 12 x 6 = 72  	Then, explore relationships between known times-table facts and the related division fact: **12 x 6 = 72** **6 x 12 = 72** **72 ÷ 6 = 12** Also, understand links between the 6x table and the 3x table: ***5 × 6 is double 5 × 3***

Children will understand and use the 9x table.	First, use number lines and arrays to support understanding and learning of the 9x table: 6 x 9 = 54  	Then, explore relationships between known times-table facts and the related division fact: **8 x 9 = 72** **9 x 8 = 72** **72 ÷ 9 = 8** Also, understand links between the 9x table and the 10x table:  **6 x 10 = 60** **6 x 9 = 60 - 6**
Children will understand and use the 7x table.	First, use number lines and arrays to support understanding and learning of the 7x table:  	Then, explore relationships between known times-table facts and the related division fact: **5 x 7 = 35** **7 x 5 = 35** **35 ÷ 5 = 7** Also, understand links between the 7x table and other times tables: **5 x 7 = (5 x 5) + (5 x 2) = 35**

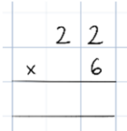
Children will understand and use the 11x and 12x tables.	First, use equipment to support understanding and learning of the 11x and 12x tables: 11x table:  *2 × 11 = 20 + 2* *3 × 11 = 30 + 3* *4 × 11 = 40 + 4* 12x table:  *4 × 12 = 40 + 8* *5 x 12 = 50 + 10*	Then, explore relationships between known times-table facts and the related division fact: **8 x 11 = 88** **11 x 8 = 88** **88 ÷ 11 = 8** **9 x 12 = 108** **12 x 9 = 108** **108 ÷ 12 = 9** Understand links between the 11x and 12x table and other times tables: 6 x 11 = (6 x 10) + (6 x 1) = 66 7 x 12 = (7 x 10) + (7 x 2) = 84
Children will understand that multiplying a number by two numbers added together is the same as doing separate multiplications and then adding the answers (known as the distributive law).	First, use equipment to support understanding:  *4 × 3 = 12* *4 × 5 = 20* *12 + 20 = 32* *4 × 8 = 32*	Then, use partitioning to multiply a 2-digit number by a 1-digit number: 

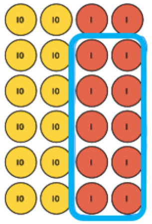
Children will start using the formal written method of short multiplication. They will progress to examples that require exchange of 1 ten, and then of more than 1 ten and will link with the partitioned column method taught in Year 3.

First, use place value equipment to support understanding of the written method:

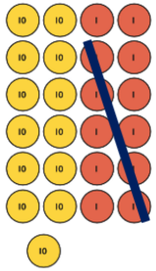


There are six rows, and each row has a value of 22.

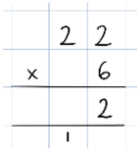


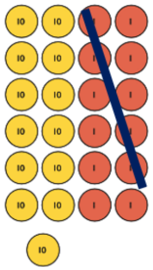


From the 12 ones, we can make one group of 10 and there are 2 ones left over.

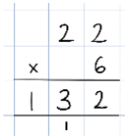


We represent this in the formal method like this:

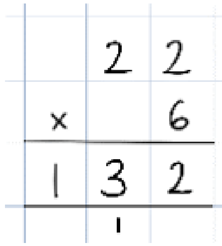


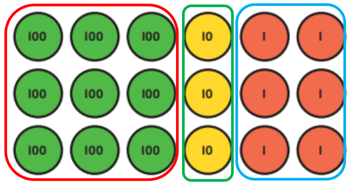
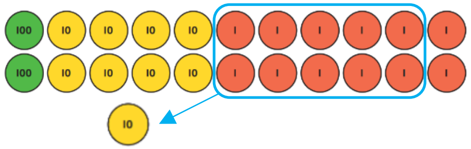
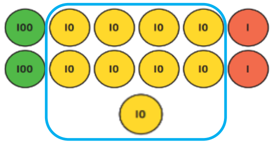
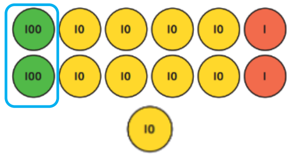


There are 13 tens which we represent like this:



Then, use the formal written method to solve efficiently, using known times-table facts:



Children will start multiplying 3-digit numbers by a 1-digit number. They will progress from no exchange to examples that require exchange of 1, then of more than 1.	First, use place value equipment to support understanding of the written method: <u>No exchange:</u>  $\begin{array}{r} 3\;1\;2 \\ \times\quad 3 \\ \hline \boxed{9}\boxed{3}\boxed{6} \\ \hline \end{array}$ <u>With exchange:</u>  $\begin{array}{r} 1\;4\;6 \\ \times\quad 2 \\ \hline 2 \\ \hline 1\; \end{array}$  $\begin{array}{r} 1\;4\;6 \\ \times\quad 2 \\ \hline \boxed{9}\;2 \\ \hline \boxed{1}\;\; \end{array}$  $\begin{array}{r} 1\;4\;6 \\ \times\quad 2 \\ \hline \boxed{2}\;9\;2 \\ \hline 1\;\; \end{array}$	Then, use the formal written method to solve efficiently, using known times-table facts: $\begin{array}{r} 1\;4\;6 \\ \times\quad 2 \\ \hline 2\;9\;2 \\ \hline 1\;\; \end{array}$

Children will learn to find more efficient ways to multiply. They will use the commutative properties of multiplication to calculate 'in a different order', such as 2 × 7 × 5 = 7 × 10, to increase their ability to calculate mentally.	First, use real-life examples and arrays to support understanding:  *Each sheet has 2 × 5 stickers.* *There are 3 sheets.* There are 2 x 5 x 3 stickers altogether. $\underbrace{2 \times 5}_{} \times 3 = 30$ $10 \times 3 = 30$	Then, use knowledge of factors to simplify some multiplications: $24 \times 5 = 12 \times 2 \times 5$ $12 \times \underbrace{2 \times 5}_{} =$ $12 \times 10 = 120$ So, $24 \times 5 = 120$
Mental strategies:	- Know all times tables up to and including 12 x 12 (by the end of Year 4) - Know corresponding division facts for all times tables up to 12 x 12 (by the end of Year 4) - Recognise and use factor pairs (e.g factor pairs for numbers up to and including 10) to simplify trickier multiplications.	

YEAR 5

MULTIPLICATION

VOCABULARY: composite numbers, prime number, prime factor, cube number, square number, factor pairs, formal written method, times, multiply, multiplied by, multiple of, product, grid multiplication, short multiplication, partition, long multiplication, exchange

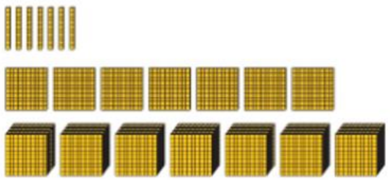
factor x factor = product

Method:

Children will use their understanding of place value to develop their ability to fluently multiply whole numbers by 10, 100 and 1,000.

Example/Representation:

First, use place value equipment to understand the repeated effect of multiplying by 10:



7 × 10 = 70

7 × 100 = 7,000

7 × 1,000 = 70,000

Then, understand how exchange across the place value columns relates to the digits when multiplying by 10, 100 and 1000:

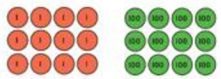
	TTh	Th	H	T	O
Number				3	7
× 10			3	7	0
× 100		3	7	0	0
× 1,000	3	7	0	0	0

Method:

Children will use their knowledge and understanding of multiplying by 10, 100 and 1,000 to reliably multiply numbers by multiples of 10, 100 and 1,000 using known multiplication facts.

Example/Representation:

First, use place value equipment to support understanding:



4 × 3 = 12
4 × 300 = 1,200

6 × 4 = 24
6 × 400 = 2,400

Then, use known facts to multiply mentally:

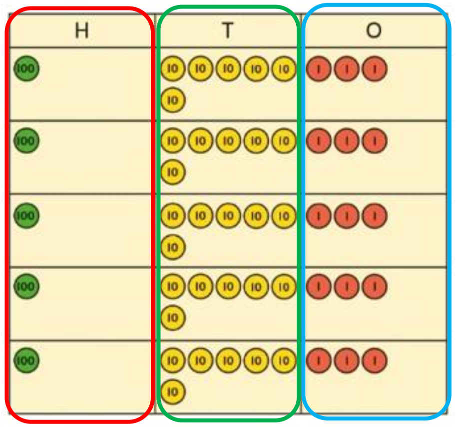
5 × 4 = 20
5 × 40 = 200
5 × 400 = 2,000
5 × 4,000 = 20,000

5,000 × 4 = 20,000

Children will learn to multiply numbers up to 4 digits by a 1-digit number. They will build on the short multiplication method taught in Year 4 and explore how the partitioning using grid method links to this.

First, use place value equipment to support understanding of the grid method:

163 x 5 = ?



3 x 5 = 15 | 60 x 5 = 300 | 100 x 5 = 500

	100	60	3
5	100 × 5 = 500	60 × 5 = 300	3 × 5 = 15

163 x 5 = 500 + 300 + 15 = 815

Then, link the grid method to formal written method of short multiplication:

	100	60	3
5	100 × 5 = 500	60 × 5 = 300	3 × 5 = 15

	1	6	3
x			5
	8	1	5
	3	1	

Children will learn to multiply two 2-digit numbers using the grid method and will explore the most appropriate way to partition the factors.

Use real-life examples to explore the most appropriate ways to partition one of the factors:

23 x 15 = 345

10 × 15 = 150

10 × 15 = 150

3 × 15 = 45

	H	T	O
	1	5	0
	1	5	0
+		4	5
	3	4	5
	1		

Then, use the grid method to explore the most appropriate way to partition both factors:

Method 1

	20	3
10	20 × 10 = 200	3 × 10 = 30
5	20 × 5 = 100	3 × 5 = 15

	H	T	O
	2	0	0
	1	0	0
		3	0
+		1	5
	3	4	5

Method 2

	23
10	23 × 10 = 230
5	23 × 5 = 115

	H	T	O
	2	3	0
+	1	1	5
	3	4	5

Children will learn to multiply numbers with up to 4-digits by 2-digit numbers.

First, use the grid method to support understanding:

143 x 12 = 1716

	100	40	3
10	100 × 10 = 1,000	40 × 10 = 400	3 × 10 = 30
2	100 × 2 = 200	40 × 2 = 80	3 × 2 = 6

	Th	H	T	O
	1	0	0	0
		4	0	0
		2	0	0
			8	0
			3	0
+				6
	1	7	1	6
		1		

Then, use the formal written method of long multiplication, using known times-table facts to support efficiency:

	Th	H	T	O	
		1	4	3	
×			1	2	
		2	8	6	143 × 2
	1	4	3	0	143 × 10
	1	7	1	6	143 × 12
		1			

Note: Progress to include examples that require multiple exchanges as understanding, confidence, and fluency build (see next page)

1274 x 32 =

First multiply 1,274 by 2.

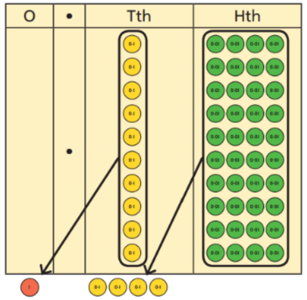
	TTh	Th	H	T	O	
		1	2	7	4	
×				3	2	
		2	5	4	8	1,274 × 2
			1			

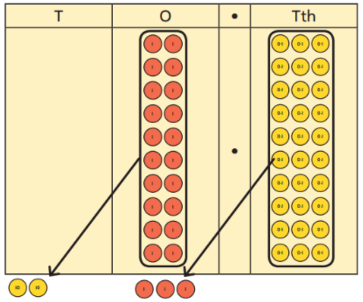
Then multiply 1,274 by 30.

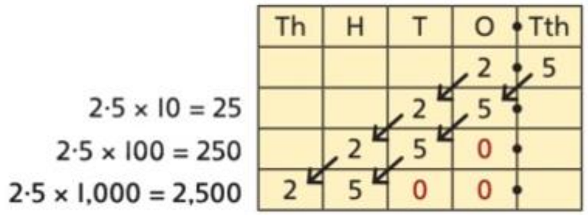
	TTh	Th	H	T	O	
		1	2	7	4	
×				3	2	
		2	5	4	8	1,274 × 2
	3	8	2	2	0	1,274 × 30
		2	1			

Finally add up the numbers.

	TTh	Th	H	T	O	
		1	2	7	4	
×				3	2	
		2	5	4	8	1,274 × 2
	3	8	2	2	0	1,274 × 30
	4	0	7	6	8	1,274 × 32
	1					

<table>
<tr>
<td>Children will use their understanding of place value to develop fluency in multiplying decimals by 10, 100 and 1,000.</td>
<td>First, use place value equipment to support understanding of exchange when multiplying by 10, 100 or 1000:


0.14 x 10 = 1.4


2.3 x 10 = 23</td>
<td>Then, understand how this exchange is represented on a place value chart:

</td>
</tr>
<tr>
<td>Mental Strategies:</td>
<td colspan="2">- Recognise and calculate factor pairs for any number
- Use times table knowledge to derive multiples of any number
- Establish whether a number is a prime number (up to 100) or a composite number (not prime) and recall prime numbers up to 19
- To know what a square number is and recall all square numbers (up to and including 144)
- To know what a cube number is and recall the first 5 cube numbers</td>
</tr>
</table>

YEAR 6

MULTIPLICATION

VOCABULARY: common factors, common multiples, prime, formal written method, multiply, multiplied by, multiple of, product, short and long multiplication, partition, scaling, decimal place, ones, tenths, hundredths, thousandths, exchange

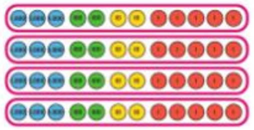
factor x factor = product

Method: | **Example/Representation:**

Children will develop their understanding of the multiplication of 4-digit numbers by 1-digit numbers.

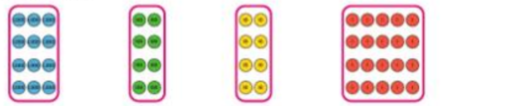
First, use place value equipment to explore methods:

Method 1



$$\begin{array}{rrrrr} & 3 & 2 & 2 & 5 \\ & 3 & 2 & 2 & 5 \\ & 3 & 2 & 2 & 5 \\ + & 3 & 2 & 2 & 5 \\ \hline 1 & 2 & 9 & 0 & 0 \\ {\scriptstyle 1} & & {\scriptstyle 1} & {\scriptstyle 1} & \end{array}$$

Method 2



Then, compare and select appropriate methods for specific multiplications:

Method 3

	3,000	200	20	5
4	12,000	800	80	20

12,000 + 800 + 80 + 20 = 12,900

Method 4

$$\begin{array}{rrrrr} & 3 & 2 & 2 & 5 \\ \times & & & & 4 \\ \hline 1 & 2 & 9 & 0 & 0 \\ {\scriptstyle 1} & & {\scriptstyle 1} & {\scriptstyle 2} & \end{array}$$

Children will develop their understanding of the multiplication of 4-digit numbers by 2-digit numbers.

First, use the grid method alongside the expanded method of long multiplication:

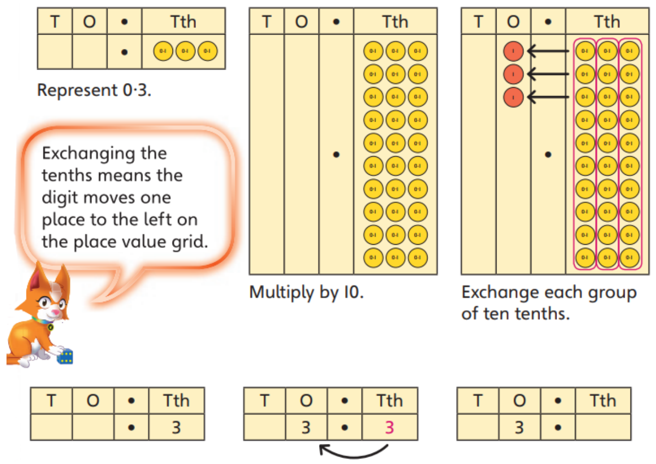
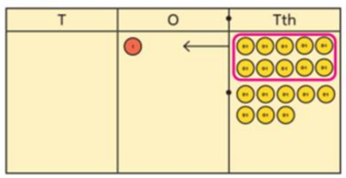
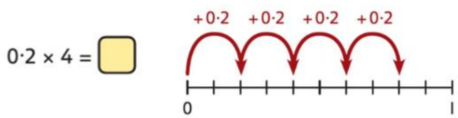
	200	30	5
20	4,000	600	100
1	200	30	5

4,200 + 630 + 105 = 4,935

$$\begin{array}{rrrrl} & 2 & 3 & 5 & \\ \times & & 2 & 1 & \\ \hline & & & 5 & 1 \times 5 \\ & & 3 & 0 & 1 \times 30 \\ & 2 & 0 & 0 & 1 \times 200 \\ & 1 & 0 & 0 & 20 \times 5 \\ & 6 & 0 & 0 & 20 \times 30 \\ 4 & 0 & 0 & 0 & 20 \times 300 \\ \hline 4 & 9 & 3 & 5 & 21 \times 235 \end{array}$$

Then, use the compact method of long multiplication to support efficiency:

$$\begin{array}{rrrrl} & 2 & 3 & 5 & \\ \times & & 2 & 1 & \\ \hline & 2 & 3 & 5 & 1 \times 235 \\ 4 & 7_{\cancel{1}} & 0 & 0 & 20 \times 235 \\ \hline 4 & 9 & 3 & 5 & 21 \times 235 \end{array}$$

Children will learn to multiply decimals by powers of 10. They will apply their knowledge from previous learning of multiplying whole numbers by 10 and 100.	First, use place value equipment to support understanding of how the exchange affects decimal numbers on the place value grid:  	Then, use knowledge of multiplying by 10, 100 and 1,000 to multiply by multiples of 10, 100 and 1,000. $8 \times 100 = 800$ $8 \times 300 = 800 \times 3$ $= 2{,}400$ $2{\cdot}5 \times 10 = 25$ $2{\cdot}5 \times 20 = 2{\cdot}5 \times 10 \times 2$ $= 50$
Children will learn to multiply a decimal number by a whole number.	First, use place value equipment to support understanding of the calculation: $6 \times 0{\cdot}3 = 1{\cdot}8$  Understand the link between multiplying decimals and repeated addition.  	Then, use known facts to multiply decimals: *4 × 3 = 12* *20 × 5 = 100* *4 × 0·3 = 1·2* *20 × 0·5 = 10* *4 × 0·03 = 0·12* *20 × 0·05 = 1* Find families of facts from a known multiplication: *I know that 18 × 4 = 72.* *This can help me work out:* *1·8 × 4 = ?* *18 × 0·4 = ?* *180 × 0·4 = ?* *18 × 0·04 = ?*

Mental Strategies:	- Identify common factors, common multiples and prime numbers - Use efficient strategies to multiply 2-digit numbers by 9 (e.g 45 x 9 = 45 x 10 – 45 x 1) - Use efficient strategies to multiply by 99 (e.g 4 x 99 = 4 x 100 – 4 x 1 - Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy

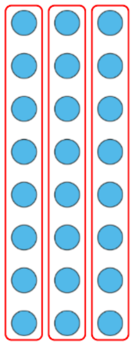
Division

YEAR 3

DIVISION

VOCABULARY: sharing, grouping, divided by, divide, divided into, divisor, short division, remainder, inverse

dividend ÷ divisor = quotient

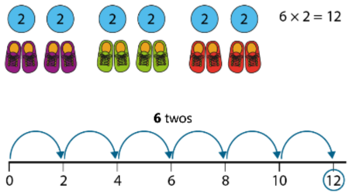
Method:	**Example/Representation:**	
Children will use knowledge of known times table facts to calculate divisions.	First, use arrays to support understanding of how known times table facts can be used to solve division calculations:  *I know 3 groups of 8 is 24, so 24 divided into groups of 8 is 3.* *I know 3 x 8 = 24, so I know 24 ÷ 8 = 3*	Then, use known times table facts to solve division calculations: *I need to work out 30 shared between 5.* *I know that 6 × 5 = 30* *so I know that 30 ÷ 5 = 6.*
Children will learn about divisibility with remainders through the use of mixed operations.	First, use practical equipment and arrays to understand that a remainder occurs when a set of objects cannot be divided equally any further:  *There are 13 sticks in total.* *There are 3 groups of 4, with 1 remainder.*	Then, use times table facts to understand that the remainder is what cannot be shared equally from a set: *22 ÷ 5 = ?* *4 × 5 = 20* *5 × 5 = 25 … this is larger than 22* *22 = 4 x 5 + 2 so, 22 ÷ 5 = 4 remainder 2*

Children will learn divisibility rules for dividing by 2 and 4.

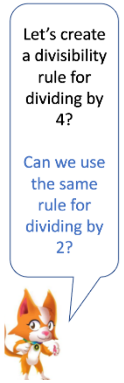
First, pupils will use times table knowledge to explore divisibility rules for dividing by 2 and 4:

<u>Dividing by 2:</u>

Even numbers are always divisible by 2



<u>Dividing by 4:</u>



Even numbers	Halve
2	1
4	2
6	3
8	4
10	5
12	6
14	7
16	8
18	9
20	10

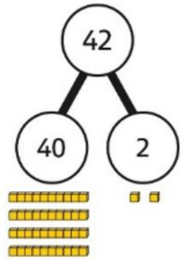
Not a divisibility rule for 4.

If a number is divisible by 4, halving it gives an even number.

Then, pupils will use knowledge of partitioning and halving to explore divisibility rules for dividing 3-digit numbers by 2 and 4:

<u>Dividing by 2:</u>

Even numbers are always divisible by 2

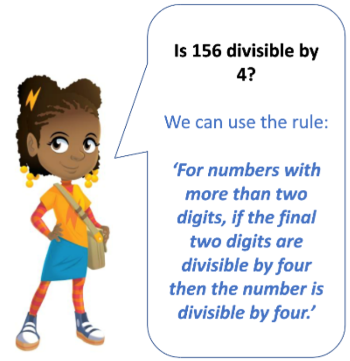


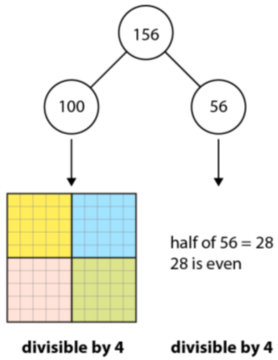
40 ÷ 2 = 20

2 ÷ 2 = 1

42 ÷ 2 = 21

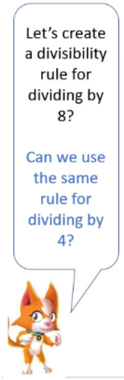
<u>Dividing by 4:</u>





Children will learn divisibility rules for dividing by 8.

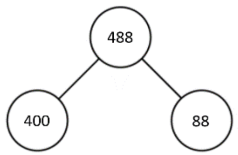
First, use times table knowledge to explore divisibility rules for dividing by 8:

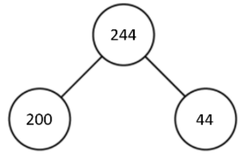


	Multiple of 4?	Multiple of 8?	Halve	Halve again
4	✓		2	
8	✓	✓	4	2
12	✓		6	
16	✓	✓	8	4
20	✓		10	
24	✓	✓	12	6
28	✓		14	
32	✓	✓	16	8
			If a number is divisible by 4, halving it gives an even number.	If a number is divisible by 8, halving it twice gives an even number.

Then, use knowledge of partitioning and halving to explore divisibility rules for dividing 3-digit numbers by 8:

If a number is divisible by 8, halving it twice gives an even number.





400 ÷ 2 = 200 88 ÷ 2 = 44

200 + 44 = 244

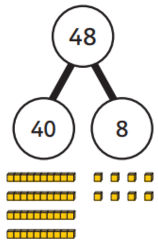
200 ÷ 2 = 100 44 ÷ 2 = 22

100 + 22 = 122

So, 488 is divisible by 8

Children will use their understanding of place value, standard partitioning and division to a divide a 2-digit number by a 1-digit number.

First, use place value equipment to support understanding of using standard partitioning to divide:



First divide the 10s.

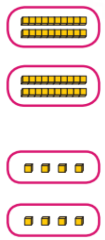
4 tens ÷ 2 = 2 tens

40 ÷ 2 = 20

Now divide the 1s.

8 ones ÷ 2 = 4 ones

8 ÷ 2 = 4

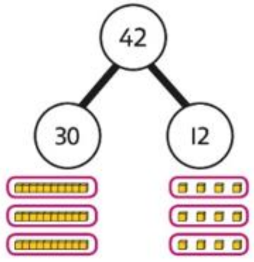
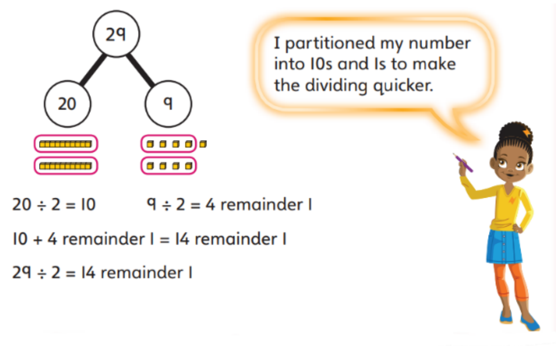


So, 48 ÷ 2 = 24

Then, move to solving mentally using standard partitioning:

60 ÷ 2 = 30
8 ÷ 2 = 4

68 ÷ 2 = 34

Children will use their understanding of place value, flexible partitioning and division to a divide a 2-digit number by a 1-digit number.	First, use place value equipment to support understanding of using flexible partitioning to divide: *I need to partition 42 differently to divide by 3.*  *42 = 30 + 12* *42 ÷ 3 = 14*	Then, move to solving mentally using flexible partitioning: *42 ÷ 3 = ?* *42 = 40 + 2 (standard partitioning does not help)* *I need to partition 42 differently to divide by 3.* *42 = 30 + 12* *30 ÷ 3 = 10* *12 ÷ 3 = 4* *10 + 4 = 14* *42 ÷ 3 = 14*
Children will continue to use their understanding of division to divide 2-digit numbers by 1-digit numbers using partitioning. They will use known multiplication facts to predict remainders when dividing.	First, use place value equipment to support understanding: *29 ÷ 2 = ?* 	Then, partition to divide, understanding the remainder in context: *67 children try to make 5 equal lines.* *67 = 50 + 17* *50 ÷ 5 = 10* *17 ÷ 5 = 3 remainder 2* *67 ÷ 5 = 13 remainder 2* *There are 13 children in each line and 2 children left out.*

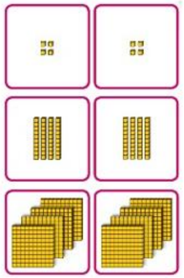
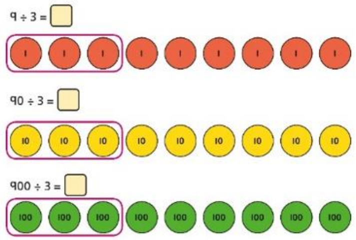
Mental Strategies:	- Know the corresponding division facts from the 3, 4 and 8 times tables - Use knowledge of place value to calculate division (e.g. 14 ÷ 2 = 7, 140 ÷ 2 = 70, 1400 ÷ 2 = 700) - Use divisibility rules to check whether a number (up to 3-digits) is divisible by 2, 4 or 8.

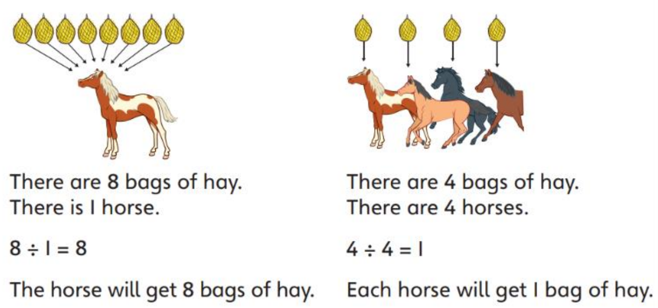
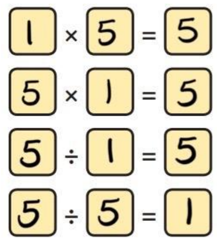
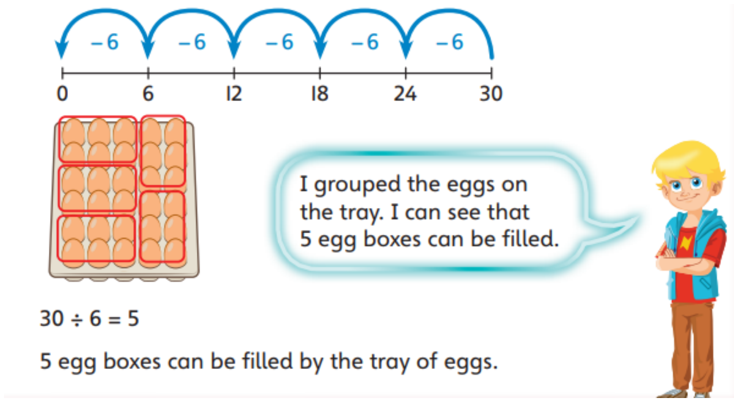
YEAR 4

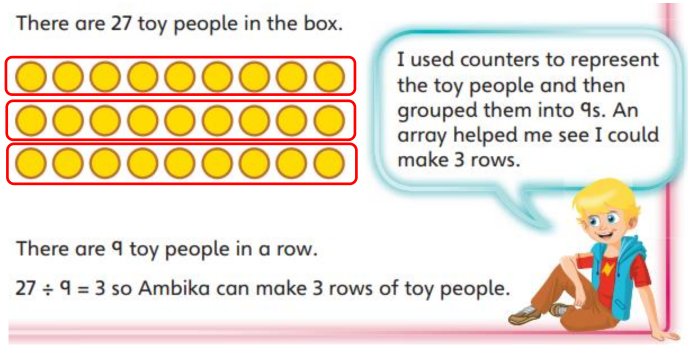
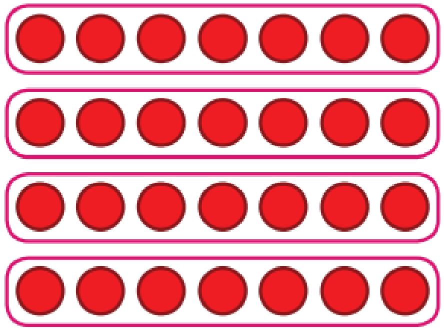
DIVISION

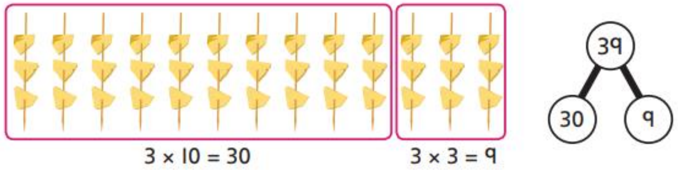
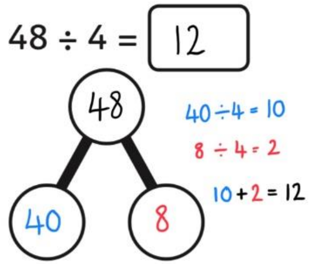
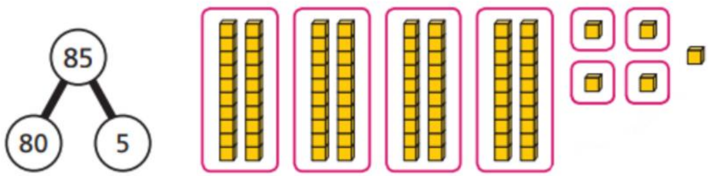
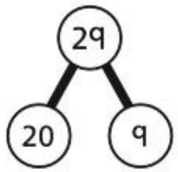
VOCABULARY: sharing, grouping, divided by, divide, divided into, divisor, short division, remainder, inverse

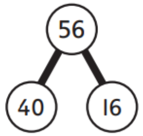
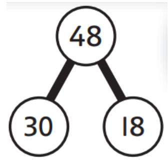
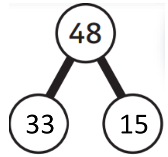
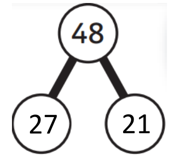
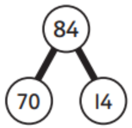
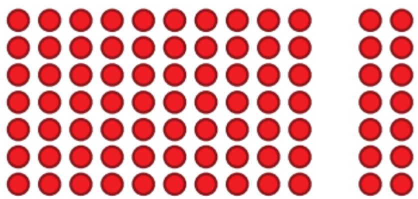
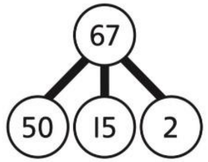
dividend ÷ divisor = quotient

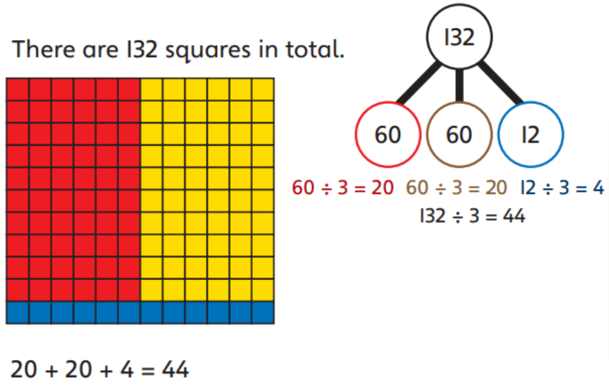
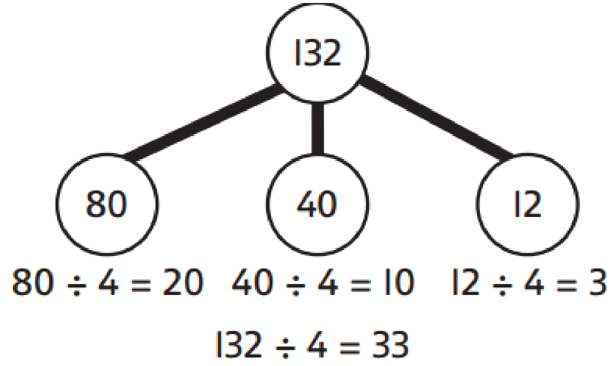
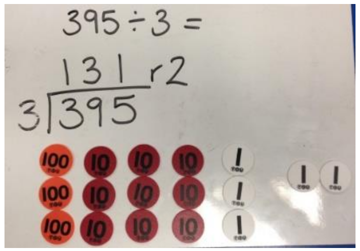
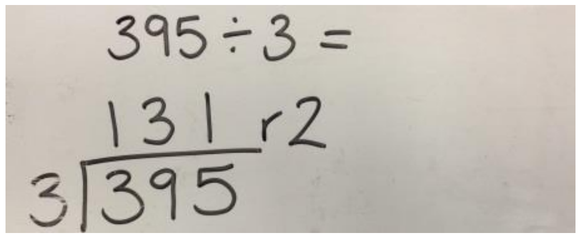
Method:	**Example/Representation:**	
Children will learn how to divide multiples of 10 and 100 using known facts and place value knowledge.	First, use place value equipment to support understanding:  *8 ones divided into 2 equal groups* *4 ones in each group* *8 tens divided into 2 equal groups* *4 tens in each group* *8 hundreds divided into 2 equal groups* *4 hundreds in each group*  *9 ÷ 3 = 3* *9 tens divided by 3 is 3 tens.* *9 hundreds divided by 3 is 3 hundreds.*	Then, use to divide 10s and 100s by a single digit: *15 ÷ 3 = 5* *150 ÷ 3 = 50* *1500 ÷ 3 = 500*

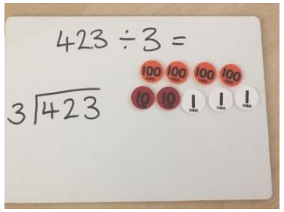
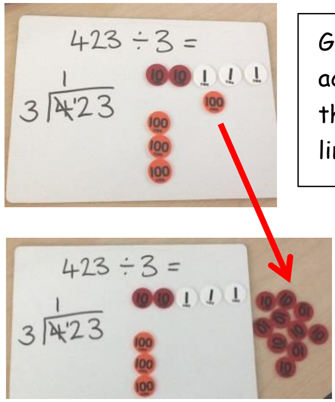
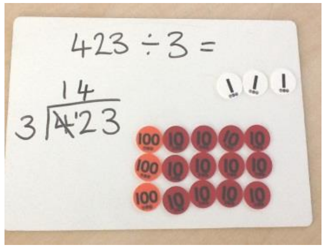
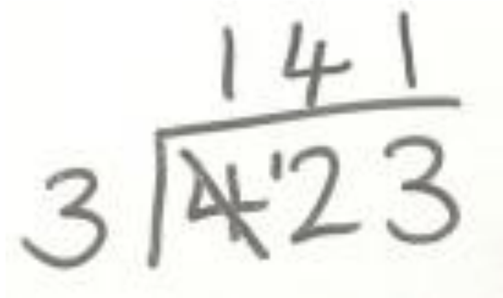
Children will learn how to divide numbers by 1. They will also relate their divisions to the inverse (multiplications).	First, use real-life examples to support understanding: 	Then, relate divisions to the inverse operation of multiplication:  
Children will understand how the 6 times table relates to dividing by 6, and explore repeated subtraction as division.	First, use real-life examples, arrays and number lines to explore connection between repeated subtraction and dividing by 6: 	Then, explore the relationship between division calculations and using known times-table facts to solve: **30 ÷ 6 = ?** **6 x 5 = 30 and 5 x 6 = 30 so 30 ÷ 6 = 5**

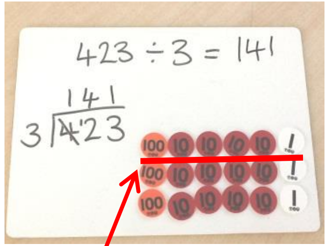
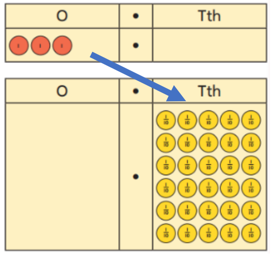
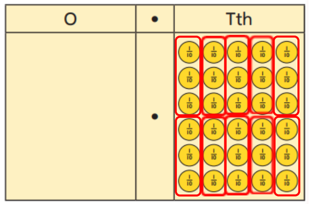
Children will understand how the 9 times table relates to dividing by 9, and explore repeated subtraction as division.	First, use real-life examples, arrays and number lines to explore the connection between repeated subtraction and dividing by 9:  	Then, explore the relationship between division calculations and using known times-table facts to solve: **27 ÷ 9 = ?** **3 x 9 = 27 and 9 x 3 = 27 so 27 ÷ 9 = 3**
Children will understand how the 7 times table relates to dividing by 7, and explore repeated subtraction as division.	First, use real-life examples, arrays and number lines to explore the connection between repeated subtraction and dividing by 7:  28 ÷ 7 = 4 There are 4 groups of 7 circles.	Then, explore the relationship between division calculations and using known times-table facts to solve: **28 ÷ 7 = ?** **4 x 7 = 28 and 7 x 4 = 28 so 28 ÷ 7 = 4**

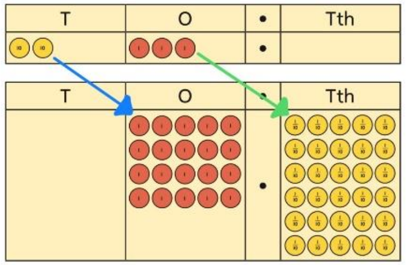
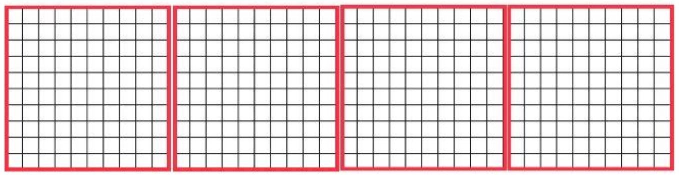
Children will learn how to divide 2-digit numbers by 1-digit numbers. They will focus on learning how to divide a 2-digit number where the tens digit and the ones are divisible by the divisor.	First, use real-life examples to support understanding:  30 pieces of pineapple ÷ 3 = 10 sticks 9 pieces of pineapple ÷ 3 = 3 sticks 39 pieces of pineapple ÷ 3 = 13 sticks 13 full sticks can be made.	Then, use standard partitioning to divide 2-digit numbers by 1-digit numbers: 
Children will recap the concept of remainders in division and be able to use standard partitioning to solve division problems that leave a remainder.	First, use place value equipment to support understanding of remainder: 85 ÷ 4 has a remainder.  8 tens ÷ 4 = 2 tens 5 ones ÷ 4 = 1 one, remainder 1 85 ÷ 4 = 21 r 1 80 ÷ 4 = 20 5 ÷ 4 = 1 r 1	Then, solve mentally using standard partitioning:  $\boxed{20} \div 2 = \boxed{10}$ $\boxed{9} \div 2 = \boxed{4}$ remainder $\boxed{1}$ $29 \div 2 = \boxed{14}$ remainder $\boxed{1}$

Children will divide a 2-digit number by a 1-digit number using flexible partitioning and by focusing on mental methods.	First, use real-life examples and equipment to support understanding of flexible partitioning: There are 56 bean bags altogether. There are 4 running lanes. 56 ÷ 4 = ?  40 ÷ 4 = 10 16 ÷ 4 = 4 So, 56 ÷ 4 = 14 There are 14 bean bags in each lane.	Then, explore efficient ways to flexibly partition: *48 ÷ 3 = 16*  30 ÷ 3 = *10* 18 ÷ 3 = *6*  *33 ÷ 3 = 11* *15 ÷ 3 = 5*  *27 ÷ 3 = 9* *21 ÷ 3 = 7*
Children will divide a 2-digit number by a 1-digit number using flexible partitioning to solve division problems that may or may not leave a remainder.	First, use visual representations and part whole models to support understanding of flexible partitioning:  70 ÷ 7 = 10 14 ÷ 7 = 2  84 ÷ 7 = 12 Lee has divided 84 by 7.	Then, use flexible partitioning to support solving division problems with jottings or mentally: 67 ÷ 5  50 ÷ 5 = $\boxed{10}$ 15 ÷ 5 = $\boxed{3}$ So, 67 ÷ 5 = $\boxed{13}$ r $\boxed{2}$

Children will divide a 3-digit number by a 1-digit number using flexible partitioning to solve division problems with no remainder.	First, use visual representations and part whole models to support understanding of flexible partitioning:  	Then, use flexible partitioning to support solving division problems with jottings or mentally: 
Children will use practical resources to support using the standard written method to solve division number sentences with remainders (HTO ÷ O)	First, use place value counters to support understanding of the formal written method of short division:  	Then, use known times table facts to support use of the formal written method of short division: 

Children will use practical resources to support the short division method where exchange across place value columns occurs. (HTO ÷ O)	First, use place value counters to support understanding of exchange across place value columns when using the formal written method of short division:  Create the dividend using place value counters.  Group the hundreds counters according to the divisor. Write the number of groups above the line in the hundreds column.  Next, group the 10s counters according to the divisor and write the number of groups above the line in the tens column.	Then, use known times table facts to support use of the formal written method of short division, including exchange across the place value columns: *423 ÷ 3 = 141* 

	 Group the ones counters according to the divisor and write the number of groups above the line in the ones column. The quotient can be seen across each group.	
Children will understand what happens when you divide a 1-digit number by 10, making connections with tenths during this process.	First, use place value counters to support understanding of exchange when dividing a 1-digit number by 10: *3 ÷ 10 = 0.3*  *We cannot divide the 3 ones counters into 10, so we need to exchange each one for 10 tenths.*  *Now divide 30 tenths into 10 groups.* *Each group has a value of 3 tenths so 3 ÷ 10 = 0.3*	Then, be able to solve efficiently using mental strategies and recognising the pattern when dividing a single-digit number by 10: *1 ÷ 10 = 0.1* *1 = 10 tenths* *10 tenths divided by 10 = 1 tenth* *2 ÷ 10 = 0.2* *2 = 20 tenths* *20 tenths divided by 10 = 2 tenths* *9 ÷ 10 = 0.9* *9 = 90 tenths* *90 tenths divided by 10 = 9 tenths*

Children will understand what happens when you divide a 2-digit number by 10.	First, use place value counters to support understanding of exchange when dividing a 1-digit number by 10: A box of 10 identical toy cars has a mass of 23 kg. What is the mass of each car?  23 = 2 tens and 3 ones = 20 ones and 30 tenths. 20 ones ÷ 10 = $\boxed{2}$ ones. 30 tenths ÷ 10 = $\boxed{3}$ tenths. 23 ÷ 10 = $\boxed{2}$ ones and $\boxed{3}$ tenths. The mass of each toy car is $\boxed{2}.\boxed{3}$ kg.	Then, be able to solve efficiently using mental strategies and recognising the pattern when dividing a 2-digit number by 100: *23 ÷ 10 = 2.3* *23 = 2 tens and 3 ones = 20 ones and 30 tenths* *20 ones divided by 10 = 2 ones* *30 tenths divided by 10 = 3 tenths* *2 ones + 3 tenths = 2.3*
Children will divide 1- and 2-digit numbers by 100, building on their understanding of dividing by 10.	First, use place value equipment to support understanding of exchange across place value columns when dividing by 100: 100 plates have a mass of 4 kg. What is the mass of each plate?  4 ones = $\boxed{400}$ hundredths $\boxed{400}$ hundredths ÷ 100 = $\boxed{4}$ hundredths 4 ÷ 100 = $\boxed{0}.\boxed{0}\boxed{4}$ The mass of each plate is $\boxed{0}.\boxed{0}\boxed{4}$ kg	Then, be able to solve efficiently using mental strategies and recognising the pattern when dividing 1 and 2-digit numbers by 10: *4 ÷ 100 = ?* *4 ones = 400 hundredths* *400 hundredths ÷ 100 = 4 hundredths* *So 4 ÷ 100 = 0.04*

Mental Strategies:	- Know all related division facts for all times tables up to 12 times table (by the end of Year 4) - Divide a 1-digit number by 10 - Divide a 2-digit number by 100

YEAR 5

DIVISION

VOCABULARY: sharing, grouping, divided by, divide, divided into, divisor, short division, remainder, inverse

dividend ÷ divisor = quotient

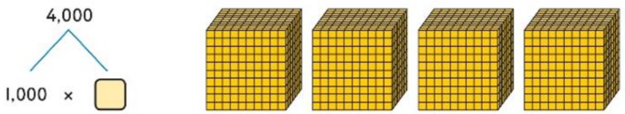
Method:

Children will use their understanding of place value to develop their ability to fluently divide whole numbers by 10, 100 and 1,000.

Example/Representation:

First, use place value equipment and bar models to support understanding of using unitising to divide by 10, 100 and 1,000:

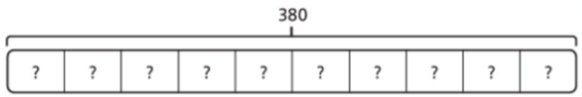
4000 ÷ 1000 = ?

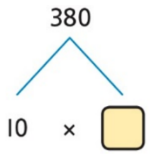


4,000 = 4 thousands.

4 × 1,000 = 4,000
So, 4,000 ÷ 1,000 = 4

380 ÷ 10 = ?





Then, understand how and why the digits change on a place value grid when dividing by 10, 100 or 1,000.

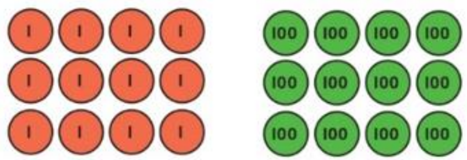
3,200 ÷ 100 = ?
3,200 is 3 thousands and 2 hundreds.

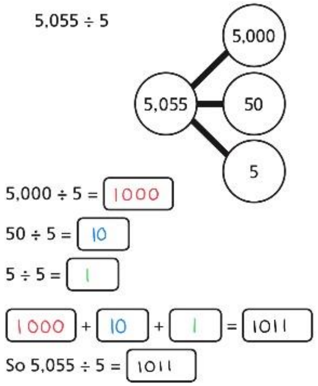
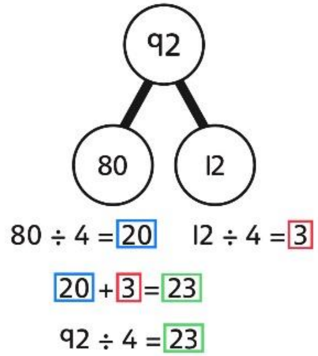
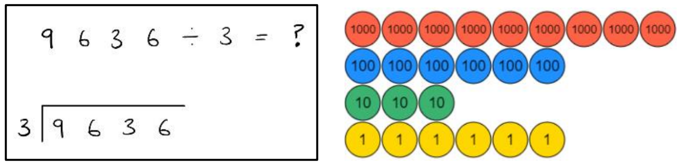
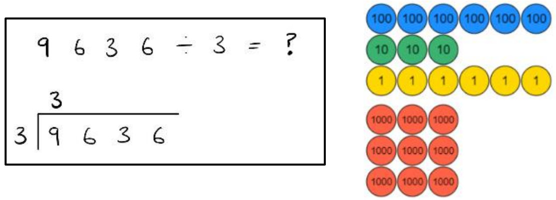
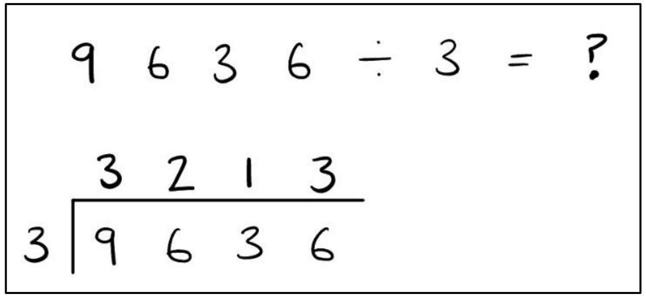
200 ÷ 100 = 2
3,000 ÷ 100 = 30
3,200 ÷ 100 = 32

So, the digits will move two places to the right.

Th	H	T	O
3	2	0	0

Th	H	T	O
		3	2

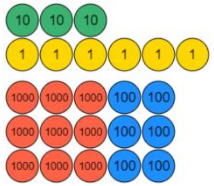
Children will use their knowledge and understanding of dividing by 10, 100 and 1,000 to reliably divide numbers by multiples of 10, 100 and 1,000 using known division facts.	First, use place value equipment to support understanding:  *180 is 18 tens.* *18 tens divided into groups of 3 tens. There are 6 groups.* *180 ÷ 30 = 6*  *12 ones divided into groups of 4. There are 3 groups.* *12 hundreds divided into groups of 4 hundreds. There are 3 groups.* *1200 ÷ 400 = 3*	Then, reason from known facts, based on understanding of unitising. Use knowledge of the inverse relationship to check. *3,000 ÷ 5 = 600* *3,000 ÷ 50 = 60* *3,000 ÷ 500 = 6* *5 × 600 = 3,000* *50 × 60 = 3,000* *500 × 6 = 3,000*

Children learn to divide numbers with up to 4 digits by a 1-digit number using partitioning. All dividends have digits that are multiples of the divisor, so no remainders occur.	First, use standard partitioning to divide 4-digit numbers by a 1-digit number:  	Then, use flexible partitioning to divide a 4-digit number by a 1-digit number: 
Children learn to divide numbers with up to 4 digits by a 1-digit number using short division. All dividends have digits that are multiples of the divisor, so no remainders occur.	First, use place value counters to support understanding of the formal written method of short division: Create the dividend using place value counters:  Group the 1000s counters according to the divisor and write the number of groups above the line in the thousands column:  	Then, use known times table facts to support use of the formal written method of short division: 

Group the 100s counters according to the divisor and write the number of groups above the line in the hundreds column.

$9636 \div 3 = ?$

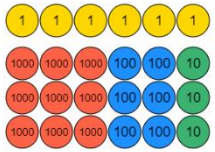
$$\begin{array}{r|l} & 3\;2 \\ \hline 3 & 9\;6\;3\;6 \end{array}$$



Group the 10s counters according to the divisor and write the number of groups above the line in the tens column.

$9636 \div 3 = ?$

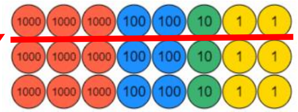
$$\begin{array}{r|l} & 3\;2\;1 \\ \hline 3 & 9\;6\;3\;6 \end{array}$$



Group the 1s counters according to the divisor and write the number of groups above the line in the ones column.

$9636 \div 3 = ?$

$$\begin{array}{r|l} & 3\;2\;1\;2 \\ \hline 3 & 9\;6\;3\;6 \end{array}$$

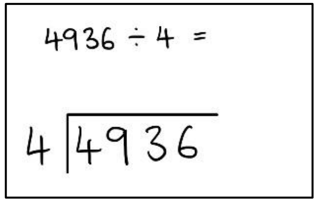


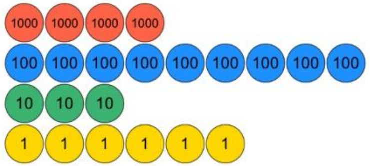
The quotient can be seen across each group.

Children learn to divide numbers with up to 4 digits by a 1-digit number using short division. The dividends may not have digits that are multiples of the divisor so some exchanges occur but all answers are whole numbers.

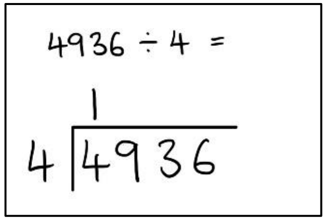
First, use place value counters to support understanding of the exchange:

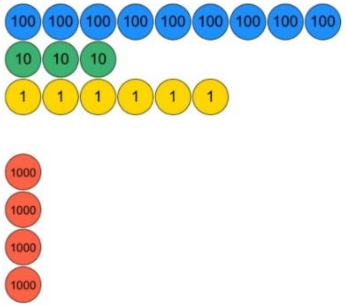
Create the dividend using place value counters:



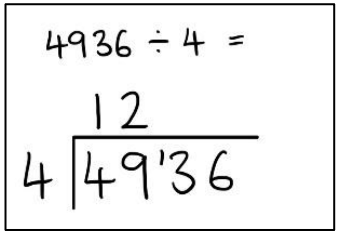


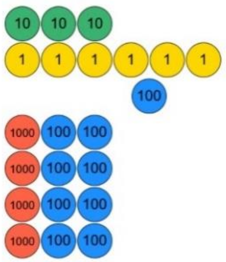
Group the 1000s counters according to the divisor and write the number of groups above the line in the thousands column:



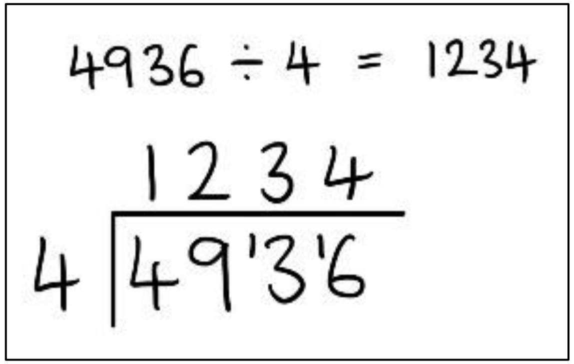


Group the 100s counters according to the divisor and write the number of groups above the line in the hundreds column.

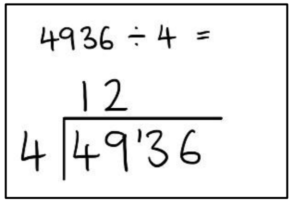


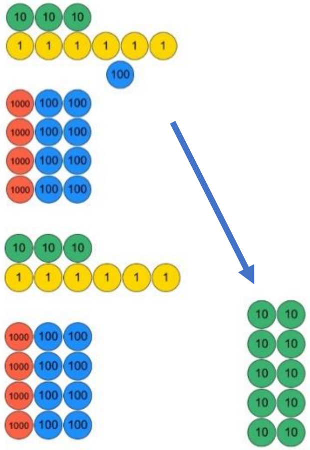


Then, use known times table facts to support use of the formal written method of short division, including exchange across the place value columns:

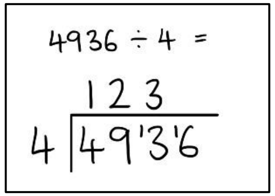


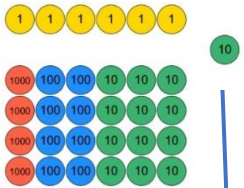
Exchange the left over 100s counter for ten 10s counters and represent this beneath the line in the tens column:



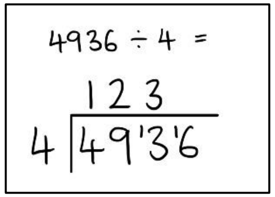


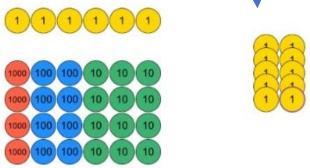
Group the 10s counters according to the divisor and write the number of groups above the line in the tens column.

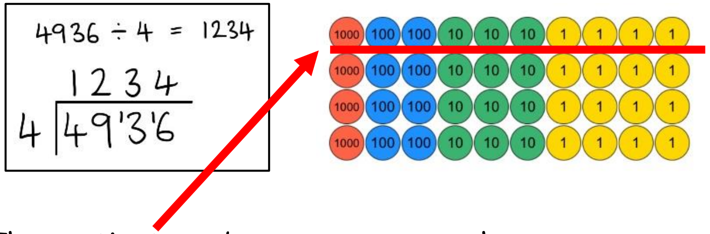
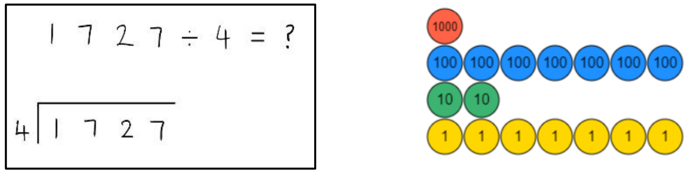
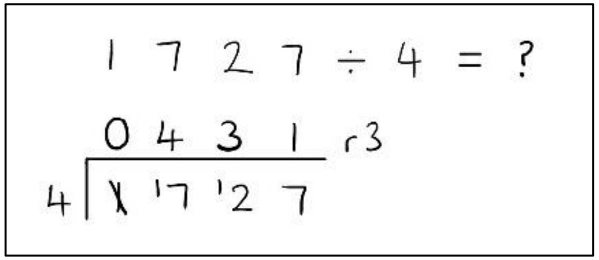




Exchange the left over 10s counter for ten 1s counters and represent this beneath the line in the ones column:

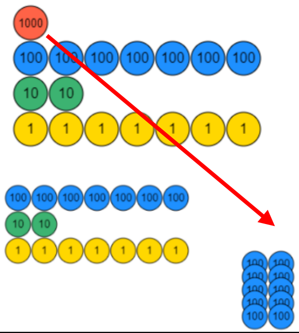




	Group the ones counters according to the divisor and write the number of groups above the line in the ones column.  The quotient can be seen across each group.	
Children learn to divide numbers with up to 4 digits by a 1-digit number using short division. Exchanges occur throughout the calculation and remainders occur in the answers.	First, use place value counters to support understanding of exchange and remainder: Create the dividend using place value counters:  Group the 1000s counters according to the divisor and write the number of groups above the line in the thousands column. There are not enough thousands counters to make a group of 4, so exchange the 1000 counter for 10 hundreds and represent this beneath the line in the hundreds column:	Then, use known times table facts to support use of the formal written method of short division, including exchange across the place value columns and remainders: 

1 7 2 7 ÷ 4 = ?

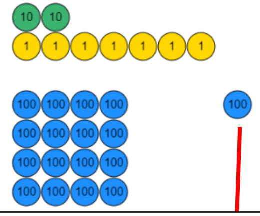
0
4 | ~~1~~ ¹7 2 7



Group the 100s counters according to the divisor and write the number of groups above the line in the hundreds column.

1 7 2 7 ÷ 4 = ?

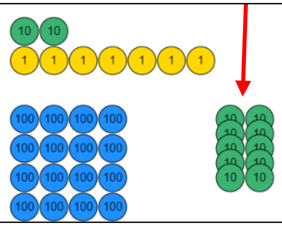
0 4
4 | ~~1~~ ¹7 ¹2 7



Exchange the left over hundreds counter for 10 tens and represent this beneath the line in the tens column:

1 7 2 7 ÷ 4 = ?

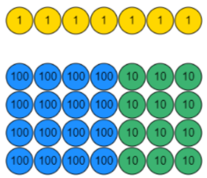
0 4
4 | ~~1~~ ¹7 ¹2 7

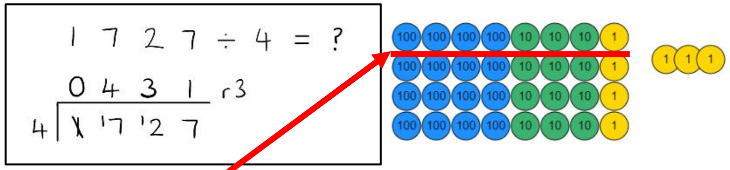


Group the 10s counters according to the divisor and write the number of groups above the line in the tens column:

1 7 2 7 ÷ 4 = ?

0 4 3
4 | ~~1~~ ¹7 ¹2 7



	Group the 1s counters according to the divisor and write the number of groups above the line in the ones column. Express the remainder as 'r' in the quotient:  The quotient can be seen across each group.	
Mental Strategies:	- Multiply and divide numbers mentally drawing upon known facts - Divide numbers by multiples of 10, 100 and 1,000 using known division facts - Associate fractions with division	

YEAR 6

DIVISION

VOCABULARY: sharing, grouping, divided by, divide, divided into, divisor, short division, remainder, inverse

dividend ÷ divisor = quotient

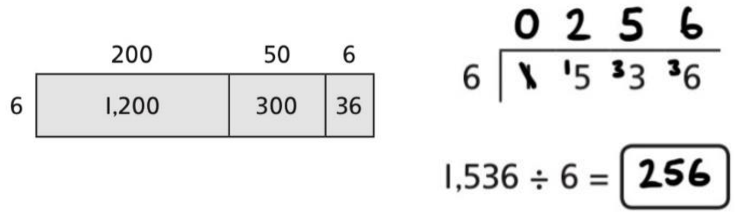
Method:

Children will develop their understanding of dividing numbers up to 4 digits by 2-digit numbers using short division and the inverse grid method.

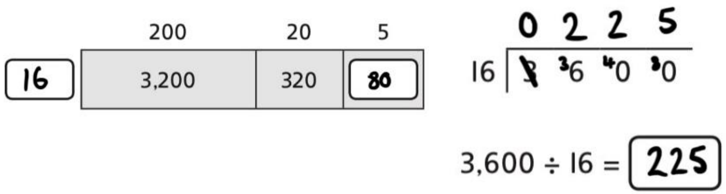
Example/Representation:

First, use the inverse grid method alongside the formal written method of short division to support and deepen understanding of the written method:

Dividing by a 1-digit divisor:

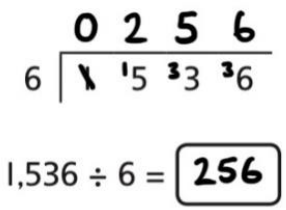


Dividing by a 2-digit divisor:

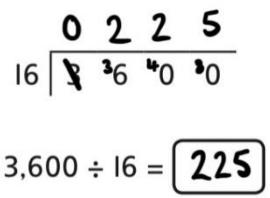


Then, use the written method of short division (using known facts) to solve efficiently:

Dividing by a 1-digit divisor:



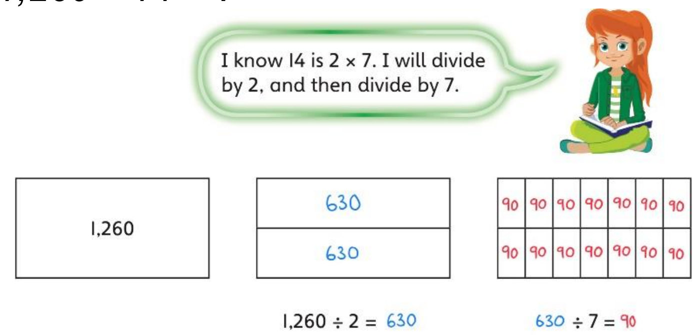
Dividing by a 2-digit divisor:



Children will develop their understanding of how 1-digit factors of 2-digit numbers can be used to make the division of numbers with up to 4-digits by 2-digit numbers easier to solve.

First, use the grid representation to support understanding of using factors to divide:

1,260 ÷ 14 = ?



Then, decide which factors are appropriate to use to solve a division efficiently:

2,100 → ÷ 2 → ÷ 6 →

2,100 → ÷ 6 → ÷ 2 →

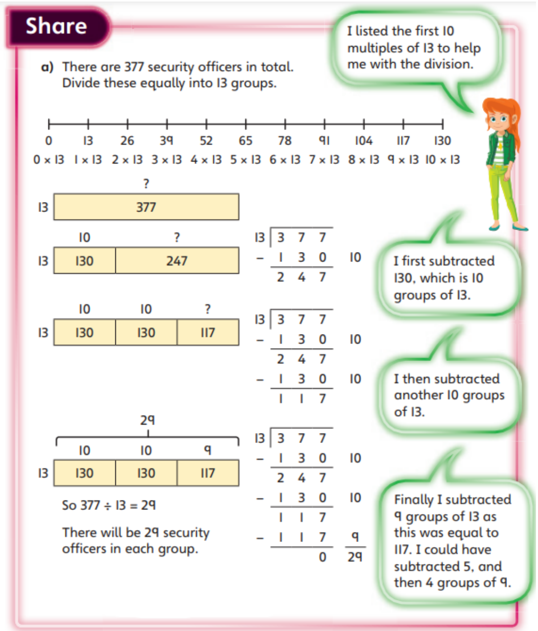
2,100 → ÷ 3 → ÷ 4 →

2,100 → ÷ 4 → ÷ 3 →

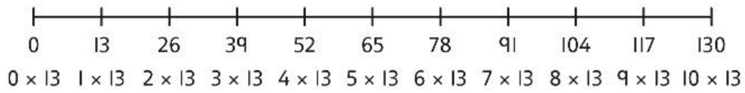
2,100 → ÷ 3 → ÷ 2 → ÷ 2 →

Children will learn long division as a method for solving division calculations where short division is less efficient. They will learn how this method links with those they have already learnt, and how to record it accurately.

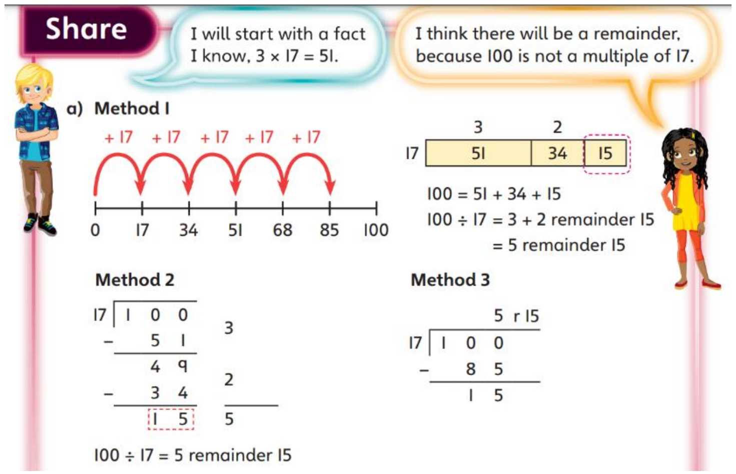
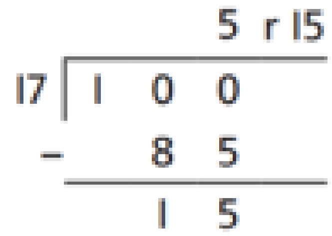
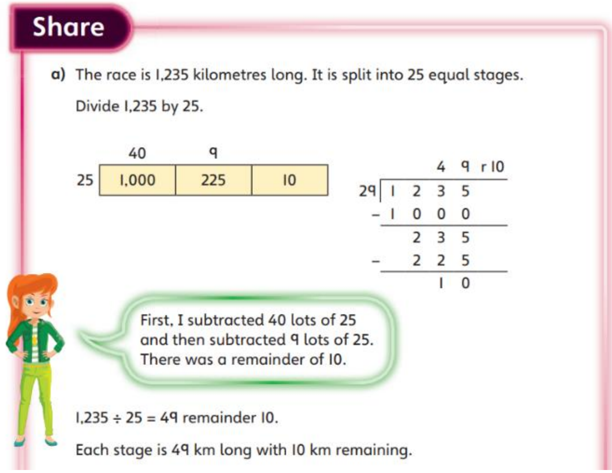
First, use an area model to support understanding of the written method of long division:

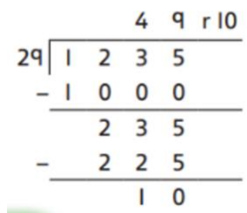


Then, use long division where factors are not useful (for example, when dividing by a 2-digit prime number). Write the required multiples to support the division process.



		2	9	
13	3	7	7	
−	1	3	0	10
	2	4	7	
−	1	3	0	10
	1	1	7	
−	1	1	7	9
			0	

<table>
<tr>
<td>Children will develop their understanding of division with remainders. They will learn how the written methods for division they have learnt can represent and solve a division calculation that has a remainder.</td>
<td>First, explore different methods and compare efficiency:
</td>
<td>Then, compare and select appropriate methods for specific divisions:
</td>
</tr>
<tr>
<td>Children will deepen their understanding of remainders and how to represent them. They will learn that representing a remainder as a fraction gives a more accurate answer.</td>
<td>First, use area model alongside written method for long division to support understanding:
</td>
<td>Then, use the written method of long division and express remainders as a fraction, understanding this within the context of the problem:

The race is 1235km long and it is split into 25 equal stages:

Each stage of the race is $49\frac{2}{5}$ km long.</td>
</tr>
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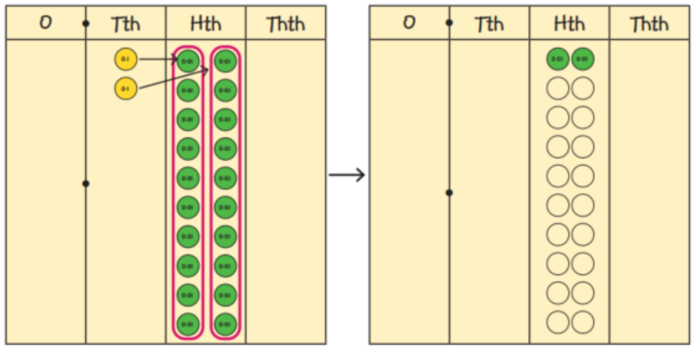
<td></td>
<td>To get a more accurate answer, divide the remainder between all 25 stages, so that it is also divided by 25.

This can then be written as a fraction $\frac{10}{25}$

$\frac{10}{25}$ simplifies to $\frac{2}{5}$

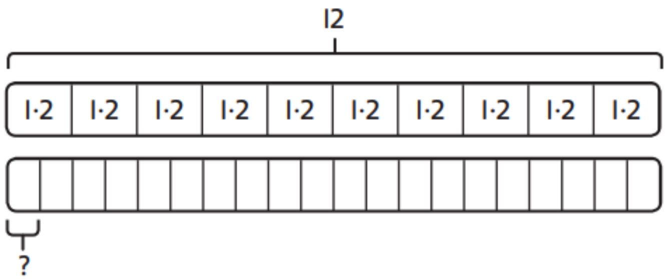
Each stage is 49 km plus $\frac{2}{5}$ of a km.</td>
<td></td>
</tr>
<tr>
<td>Children will divide by powers of 10. They will develop understanding of digits moving to the right when dividing by 10, 100 and 1,000.</td>
<td>First, use place value equipment to support understanding of how the exchange affects decimal numbers on the place value grid:



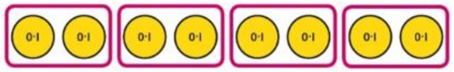
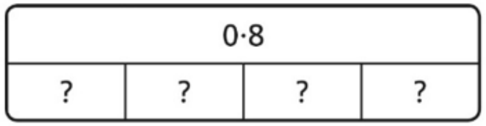
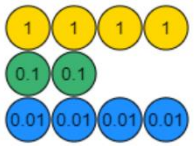
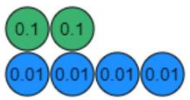
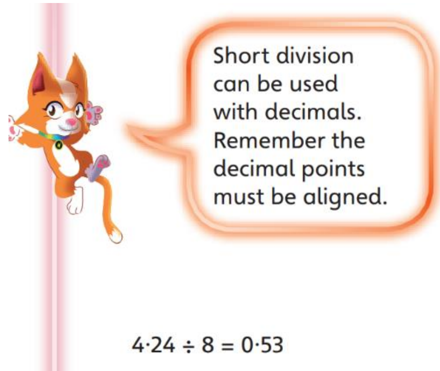
Exchange each 0·1 for ten 0·01s. Divide 20 counters by 10.

0·2 = 2 tenths
2 tenths = 20 hundredths.
20 hundredths ÷10 is 2 hundredths, so 0.2 ÷ 10 = 0.02</td>
<td>Then, use knowledge of dividing by 10, 100 and 1,000 and dividing by factors to divide by multiples of 10, 100 and 1,000:

12 ÷ 20 = 0.6

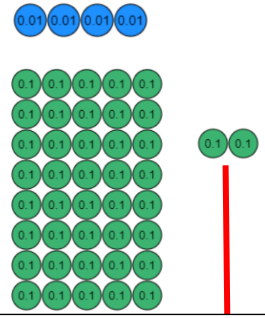


12 ÷ 10 = 1·2 1·2 ÷ 2 = 0·6</td>
</tr>
</table>

Children will divide decimals by using known multiplication facts and adjusting by powers of 10.	First, use place value equipment to support understanding of division by sharing: *0.8 ÷ 4 = 0.2*  *8 tenths divided into 4 groups. 2 tenths in each group.*	Then, move to using known multiplication facts and adjusting by powers of 10 to solve efficiently:  4 × 2 = 8 8 ÷ 4 = 2 So, 4 × 0·2 = 0·8 0·8 ÷ 4 = 0·2
Children will learn to use short division and exchange to divide decimals when they are faced with divisions where they cannot immediately recognise multiplication facts.	First, use place value equipment to deepen understanding of the written method of short division: Create the dividend using place value counters: 8 ⟌ 4 · 2 4  Group the 1s counters according to the divisor and write the number of groups above the line in the ones column. There are not enough 1s counters to make a group of 8, so exchange the 1s counters for 40 tenths and represent this beneath the line in the tenths column: 0 · 8 ⟌ 4 · ^{4}2 4  	Then, use known multiplication facts to support efficient use of written method:  8 ⟌ 4 · 2 4 0 · 8 ⟌ 4 · ^{4}2 4 0 · 5 8 ⟌ 4 · ^{4}2 ^{2}4 0 · 5 3 8 ⟌ 4 · ^{4}2 ^{2}4 4·24 ÷ 8 = 0·53

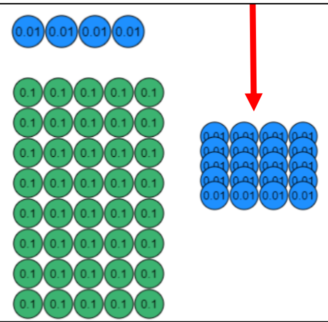
Group the tenths counters according to the divisor and write the number of groups above the line in the tenths column.

$$\begin{array}{r|l} & 0\cdot5 \\ \hline 8 & 4\cdot{}^{4}2\,{}^{2}4 \end{array}$$



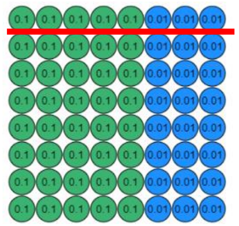
Exchange the remaining tenths counters for 20 hundredths (because 1 tenth = 10 hundredths) and represent beneath the line in the hundredths column:

$$\begin{array}{r|l} & 0\cdot5 \\ \hline 8 & 4\cdot{}^{4}2\,{}^{2}4 \end{array}$$



Group the hundredths counters according to the divisor and write the number of groups above the line in the hundredths column:

$$\begin{array}{r|l} & 0\cdot5\;3 \\ \hline 8 & 4\cdot{}^{4}2\,{}^{2}4 \end{array}$$



The quotient can be seen across each group.

Mental Strategies:	- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy - Use known division facts to calculate simple fractions of an amount - Use factors to divide mentally - Use factors to divide by multiples of 10, 100 and 1000